NASA SP-7011 (121)

AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY

WITH INDEXES

(Supplement 121)

NOVEMBER 1973

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AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES

(Supplement 121)

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 October 1973 in

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

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NOVEMBER 1973
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INTRODUCTION

This Supplement to *Aerospace Medicine and Biology* (NASA SP-7011) lists 298 reports, articles and other documents announced during October 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.

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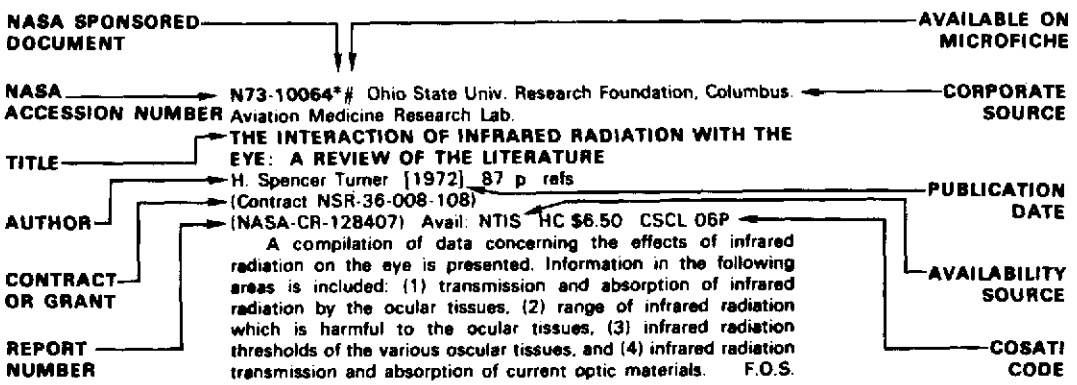

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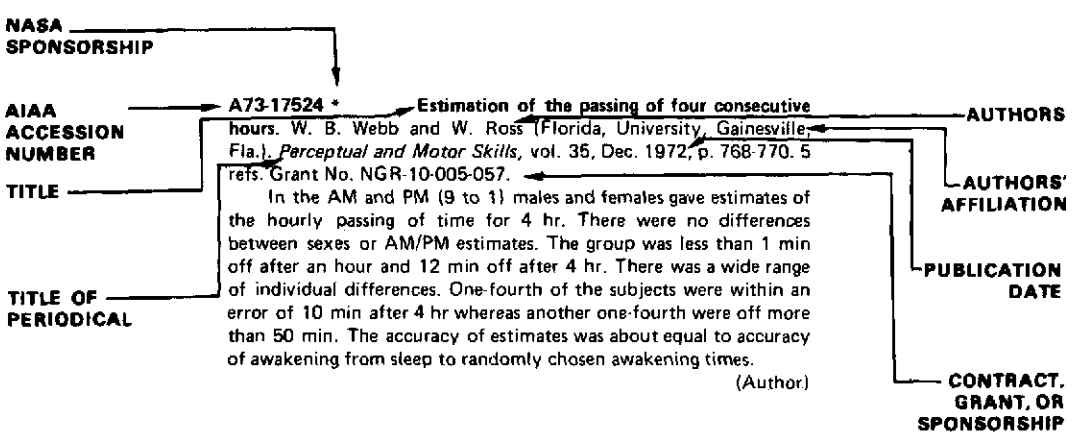

AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 121) NOVEMBER 1973

IAA ENTRIES

A73-37150 * **Apollo 14 and Apollo 16 heavy-particle dosimetry experiments.** R. L. Fleischer, H. R. Hart, Jr., G. M. Comstock, M. Carter, A. Renshaw (GE Research and Development Center, Schenectady, N.Y.), and A. Hardy (NASA, Johnson Space Center, Houston, Tex.). *Science*, vol. 181, Aug. 3, 1973, p. 436-438. 21 refs. Contract No. NAS9-11486.

Doses of heavy particles at positions inside the command modules of Apollo missions 8, 12, 14, and 16 correlate well with the calculated effects of solar modulation of the primary cosmic radiation. Differences in doses at different stowage positions indicate that the redistribution of mass within the spacecraft could enhance safety from the biological damage that would otherwise be expected on manned, deep-space missions. (Author)

A73-37196 # **Psychophysiological characteristic of the activity of military-transport-aviation flight crews during low-altitude flights (Psikhofiziologicheskaia kharakteristika deiatel'nosti letnogo sostava voenno-transportnoi aviatsii pri poletakh na malykh vysotakh).** K. V. Kurdiaev, P. G. Kozacha, V. V. Pekshev, and V. M. Gnitsevich. *Voenno-Meditsinskii Zhurnal*, May 1973, p. 62, 63. In Russian.

A73-37197 # **Hyperventilation in pilots during flight (O giperventiliatsii u letchikov v polete).** G. I. Gurvich and V. K. Martens. *Voenno-Meditsinskii Zhurnal*, May 1973, p. 64-66. 10 refs. In Russian.

Pulmonary ventilation volume, respiration rates, and carbon dioxide contents in alveolar air were recorded in aircraft crew members in a study of the external respiration function and gas metabolism during flight in the absence of hypoxic hypoxia. Occurrence of hyperventilation with hypocapnia was observed in the subjects during some phases of flight. V.Z.

A73-37251 # **Reinforcement of unconscious traces of stimuli in the human being during ontogenesis (O konsolidatsii neosoznavaemykh sledov razdrazhenii u cheloveka v ontogeneze).** L. G. Voronin, V. F. Konovalov, A. T. Bondar', N. M. Gromyko, and A. I. Fedotchev (Akademiia Nauk SSSR, Institut Biologicheskoi Fiziki, Pushchino-on-Oka, USSR). *Akademiia Nauk SSSR, Doklady*, vol. 210, May 11, 1973, p. 489-492. 14 refs. In Russian.

Study of the process of reinforcement of traces of stimuli in human subjects ranging from 4 to 18 years of age. The bioelectric correlates of formation and reproduction of stimuli traces were determined from the skin-galvanic reaction in a two-part experiment in which a trace was generated from a light stimulus and was later reactivated. It is found that the most stable presence and trace electrographic reactions are recorded in children. It is concluded that the process of reinforcement of unconscious traces of stimuli in the long-term memory of four- to seven-year olds is achieved in 24 hours, while reinforcement of similar traces in adults is completed within an hour. It is thus confirmed that the process of reinforcement of stimuli traces is caused by a transition of the short-term memory from the neurodynamic level to the molecular level, which is the basic long-term memory. A.B.K.

A73-37252 # **The inhibiting action of 5-oxytryptophan on thermal regulation during the awakening from hibernation (Ugnetaiushchee deistvie 5-oksitriptofana na teploreguliatsiiu pri probuzhdenii ot zimnei spiachki).** N. K. Popova (Akademiia Nauk SSSR, Institut Tsitologii i Genetiki, Novosibirsk, USSR). *Akademiia Nauk SSSR, Doklady*, vol. 210, May 11, 1973, p. 496-498. 10 refs. In Russian.

Study of the possible role of serotonin in thermal regulation in a model of the emergence of gophers from hibernation. The serotonin content in various parts of the brains of gophers during hibernation and after awakening was determined, and the effect of an experimentally enhanced serotonin level on thermal regulation during the awakening of the animals was ascertained. It is shown that during awakening from hibernation a reduction of the serotonin content occurs in a number of parts of the brain. It is found that the introduction of 5-oxytryptophan, a precursor of serotonin in its biological synthesis, sharply inhibits the warming of the animals and slows down the awakening of the gophers from hibernation. A.B.K.

A73-37274 * **Microwave radiation hazards around large microwave antenna.** A. Klascius (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, Calif.). *American Industrial Hygiene Association Journal*, vol. 34, Mar. 1973, p. 97-101.

The microwave radiation hazards associated with the use of large antennas become increasingly more dangerous to personnel as the transmitters go to ever higher powers. The near-field area is of the greatest concern. It has spill over from subreflector and reflections from nearby objects. Centimeter waves meeting in phase will reinforce each other and create hot spots of microwave energy. This has been measured in front of and around several 26-meter antennas. Hot spots have been found and are going to be the determining factor in delineating safe areas for personnel to work. Better techniques and instruments to measure these fields are needed for the evaluation of hazard areas. (Author)

A73-37300 * # **Control of pineal indole biosynthesis by changes in sympathetic tone caused by factors other than environmental lighting.** H. J. Lynch, J. P. Eng, and R. J. Wurtman (MIT, Cambridge, Mass.). *National Academy of Sciences, Proceedings*, vol. 70, June 1973, p. 1704-1707. 23 refs. Grants No. PHS-AM-11709; No. NGR-22-009-627.

Description of experimental investigations showing that, in addition to environmental lighting, other manipulations known to modify sympathetic tone can also modify pineal indole biosynthesis. Comparable alterations in sympathetic tone that occur in response to activity or feeding cycles may be instrumental in generating the pineal rhythms that persist in the absence of light-dark cycle. M.V.E.

A73-37316 * An anthropomorphic master-slave manipulator system. H. C. Vykukal, R. F. King, and W. C. Vallotton (NASA, Ames Research Center, Moffett Field, Calif.). In: Remotely manned systems: Exploration and operation in space; Proceedings of the First National Conference, Pasadena, Calif., September 13-15, 1972. Pasadena, Calif., California Institute of Technology, 1973, p. 199-205.

Review of some of the results of a teleoperator systems technology program devoted to the development of an anthropomorphic unilateral master-slave manipulator system. Following a discussion of the mechanical design details and servo design considerations, the developed system's test results are presented. M.V.E.

A73-37320 The oculometer in remote viewing systems. J. Merchant (Honeywell Radiation Center, Lexington, Mass.). In: Remotely manned systems: Exploration and operation in space; Proceedings of the First National Conference, Pasadena, Calif., September 13-15, 1972. Pasadena, Calif., California Institute of Technology, 1973, p. 239-250. USAF-sponsored research.

Consideration of the use of an oculometer in an eye-controlled variable-resolution television system for teleoperator remote vision. An oculometer is described which can perform a continuous measurement of the viewer's eye direction in almost any viewing arrangement without interfering with the viewer. The oculometer operates by tracking two elements of eye detail, the pupil-iris boundary and the corneal reflection. The bright-pupil technique is employed to overcome the problem of pupil-iris discrimination. The angular range of the oculometer is the range of eye directions, relative to the line joining the eye to the oculometer, that can be measured. The image sensor employed is a 1-in. silicon vidicon operating in both track and search modes with a standard 525-in. TV raster scan. The processing of the signal produced by the silicon vidicon is discussed, as well as an extension of the current cubic-inch configuration to a cubic-foot configuration of the remote oculometer. A.B.K.

A73-37323 Sorcerer's Apprentice - Head-mounted display and wand. D. L. Vickers (Utah, University, Salt Lake City, Utah). In: Remotely manned systems: Exploration and operation in space; Proceedings of the First National Conference, Pasadena, Calif., September 13-15, 1972. Pasadena, Calif., California Institute of Technology, 1973, p. 293-304. 9 refs. Contract No. F30602-70-C-0300.

A head-mounted display system is described which creates an illusory three-dimensional (3-D) environment. It is composed of the head mounted display and its supporting software. This system produces a cyclic flow of information from observer to computer and back to the observer. Real time flow of this information allows flicker-free viewing and is made possible by special purpose hardware and by hand-optimized software. An observer within the 3-D environment has at his disposal a wand system by which he can reach out and 'touch' the synthetic objects he sees. A wand for creating and interacting with synthetic objects visible only to one wearing the head set is the basis for the name: Sorcerer's Apprentice. The wand system contains a hand-held wand, an interpretive language for using the wand, and a unique data structure attached to the display file. Four major developmental problems and their solutions are discussed. F.R.L.

A73-37325 Man-machine interface for controllers and end effectors. T. B. Malone (Essex Corp., Alexandria, Va.). In: Remotely manned systems: Exploration and operation in space; Proceedings of the First National Conference, Pasadena, Calif., September 13-15, 1972. Pasadena, Calif., California Institute of Technology, 1973, p. 319-326.

Review of current technology and evaluation criteria of controller man-machine and end effector man-machine interfaces in teleoperator systems based on various design concepts. The advantages and disadvantages of each of these concepts are discussed, and further development requirements are pointed out for the evaluation criteria and man-machine interfaces. M.V.E.

A73-37326 Terminal pointer hand controller and other recent teleoperator controller concepts - Technology summary and application to earth orbital missions. E. L. Saenger and C. D. Pegden (URS/Matrix Co., Huntsville, Ala.). In: Remotely manned systems: Exploration and operation in space; Proceedings of the First National Conference, Pasadena, Calif., September 13-15, 1972. Pasadena, Calif., California Institute of Technology, 1973, p. 327-336. 6 refs.

A73-37327 * Evaluation of human operator visual performance capability for teleoperator missions. C. T. Huggins (NASA, Marshall Space Flight Center, Huntsville, Ala.), T. B. Malone, and N. L. Shields, Jr. (Essex Corp., Alexandria, Va.). In: Remotely manned systems: Exploration and operation in space; Proceedings of the First National Conference, Pasadena, Calif., September 13-15, 1972. Pasadena, Calif., California Institute of Technology, 1973, p. 337-350.

Investigation of the human operator visual performance demands of teleoperator system applications to earth-orbital missions involving visual system requirements for satellite retrieval and satellite servicing functions. The first phase of an experimental program implementing this investigation is described in terms of the overall test apparatus and procedures used, the specific tests performed, and the test results obtained. M.V.E.

A73-37328 * Touch sensors and control. J. W. Hill and A. J. Sword (Stanford Research Institute, Menlo Park, Calif.). In: Remotely manned systems: Exploration and operation in space; Proceedings of the First National Conference, Pasadena, Calif., September 13-15, 1972. Pasadena, Calif., California Institute of Technology, 1973, p. 351-368. 12 refs. Contracts No. NAS2-5409; No. NAS2-6880.

Description of the equipment employed and results obtained in experiments with tactile feedback and different levels of automatic control. In the experiments described tactile feedback was investigated by incorporating a touch sensing and touch display system into a teleoperator, while the levels of automatic control were investigated by incorporating supervisory control features in the teleoperator control system. In particular, a hand contact system which senses and reproduces to the operator the contact between the end-effector and the object being touched or manipulated is described, as well as a jaw contact system which senses and reproduces to the operator the shape and location of the object held in the remote jaws, and an arm control system consisting of a control station where the operator controls the motion of the arm by transmitting commands, a remote station that accepts the commands and uses them, and a communications link that limits information flow. In addition, an algorithmic language for remote manipulation is described, and the desired features that an automatic arm controller should possess are reviewed. A.B.K.

A73-37333 * The control of a manipulator by a computer model of the cerebellum. J. S. Albus (NASA, Goddard Space Flight Center, Greenbelt, Md.). In: Remotely manned systems: Exploration and operation in space; Proceedings of the First National Conference, Pasadena, Calif., September 13-15, 1972.

Pasadena, Calif., California Institute of Technology, 1973, p. 423-430. 11 refs.

Extension of previous work by Albus (1971, 1972) on the theory of cerebellar function to an application of a computer model of the cerebellum to manipulator control. Following a discussion of the cerebellar function and of a perceptron analogy of the cerebellum, particularly in regard to learning, an electromechanical model of the cerebellum is considered in the form of an IBM 1800 computer connected to a Rancho Los Amigos arm with seven degrees of freedom. It is shown that the computer memory makes it possible to train the arm on some representative sample of the universe of possible states and to achieve satisfactory performance. M.V.E.

A73-37392 # **Physiological shifts in the human organism under increased neuropsychic stresses (Fiziologicheskie sdvigi v organizme cheloveka vo vremia povyshennogo nervno-psikhicheskogo napriazheniia).** Kh. S. Khamitov and E. V. Kotliarevskii (Gosudarstvennyi Meditsinskii Institut, Kazan, USSR). *Fiziologicheskii Zhurnal SSSR,* vol. 59, Mar. 1973, p. 361-366. 19 refs. In Russian.

A73-37393 # **Changes in some behavioral reactions and in the bioelectric activity of the brain in cats during the development of sleep under polarization of individual brain structures (Izmeneniia nekotorykh povedencheskikh reaktsii i kharaktera bioelektricheskoi aktivnosti mozga koshki pri razvitii sna v usloviiakh poliarizatsii otdel'nykh struktur mozga).** I. V. Danilov, L. A. Popova, and V. A. Katinas (Akademiia Meditsinskikh Nauk SSSR, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR,* vol. 59, Mar. 1973, p. 367-372. In Russian.

A73-37394 # **Regional serotonin content variations in the brain of cats during a prolonged absence of sleep (Regional'nye izmeneniia soderzhaniia serotonina v golovnom mozge koshek pri dlitel'nom lishenii sna).** E. A. Gromova (Akademiia Nauk SSSR, Institut Biofiziki, Pushchino-on-Oka, USSR) and N. L. Vekshina (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Fiziologicheskii Zhurnal SSSR,* vol. 59, Mar. 1973, p. 373-377. 15 refs. In Russian.

A73-37395 # **Interaction between contours in visual masking (Vzaimodeistvie mezhdu konturami pri zritel'noi maskirovke).** A. A. Nevskaia (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR,* vol. 59, Mar. 1973, p. 401-406. 32 refs. In Russian.

Study of pattern recognition in humans under conditions of direct and reverse visual masking by various masking stimuli. It is shown that masking by an image the contours of which coincide with the contour of the test figure is the most effective, but if other contours are present in the visual field the masking effect of the coinciding contour is attenuated. The results contradict a theory which attributes visual masking to integration of the test and masking stimuli. The data are considered from the standpoint of inhibitory interactions in regions corresponding to shifts in illumination (image contours) and of the occurrence of disinhibition when additional contours appear in the visual field. A.B.K.

A73-37396 # **Protein synthesis in the neurons and glial cells of the stellate ganglia of rats during the adaptation to the effects of high altitude hypoxia (Sintez belka v neironakh i kletkakh glii zvezdchatykh uzlov krys pri adaptatsii k deistviiu vysotnoi gipoksii).** M. G. Pshennikova (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Fiziologicheskii Zhurnal SSSR,* vol. 59, Mar. 1973, p. 421-427. 33 refs. In Russian.

A73-37397 # **Respiratory changes in the stroke volume of the left ventricle in healthy humans (Dykhatel'nye izmeneniia udarnogo ob'ema levogo zheludochka zdorovogo cheloveka).** M. I. Tishchenko, M. A. Seppen, and V. V. Sudakova (Vsesoiuznyi Nauchno-Issledovatel'skii Institut Pul'monologii, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR,* vol. 59, Mar. 1973, p. 459-464. 13 refs. In Russian.

Study of the respiratory fluctuations in the stroke volume of the left ventricle during quiet natural breathing of healthy humans. Using the method of integral rheography, which makes it possible to determine the stroke volume during each heart contraction, quantitative indices of these respiratory variations are established. The patterns of the variations in stroke volume during inspiration and expiration breath holding are investigated. Equations are derived which describe these variations and make it possible to calculate the proper variations in stroke volume, pulse frequency, and volume rate of blood flow as a function of the breath holding time. A.B.K.

A73-37398 **The populated cosmos (Naselennyi kosmos).** Edited by B. P. Konstantinov. Moscow, Izdatel'stvo Nauka, 1972. 372 p. In Russian.

This book attempts to document the initial achievements of space exploration and the expectations and aspirations of mankind relative to future benefits of this exploration in articles dealing with the possibility of extraterrestrial life, problems of space medicine and biology, the impact of space activity on human society, and the new discipline of space law. Due to the speculative nature of many topics considered, articles advancing a particular point of view are often accompanied by articles which provide contradictory arguments. The prevalent theme of the book concerns the possibility of extending human civilization beyond the present earth-bound conditions. Major topics include the nature of life, space factors affecting life in the solar system, possible exploration beyond the solar system, extraterrestrial intelligence, and the role of the human civilization. T.M.

A73-37404 * # **Comparative study of patches for liquid cooled garments.** A. Shitzer (Technion - Israel Institute of Technology, Haifa, Israel) and A. B. Chambers (NASA, Ames Research Center, Div. of Biotechnology, Moffett Field, Calif.). *Journal of Spacecraft and Rockets,* vol. 10, Aug. 1973, p. 541-544. 12 refs.

Tests were performed on 12 cooling patches of various designs to establish criteria for the evaluation of their performance in liquid-cooled suits in industrial, military and aerospace applications. The thermal effectiveness value was 0.088 for patch designs with a double spiral flow pattern, and 0.075 for patch designs with a parallel flow pattern. The ratio of thermal energy transfer rate to cooling-medium pumping power requirement is indicated as the prime performance characteristic to be considered in the selection and rating of cooling patches. V.Z.

A73-37411 **Linear summation of spatial harmonics in human vision.** R. V. Abadi and J. J. Kulikowski (University of Manchester Institute of Science and Technology, Manchester, England). *Vision Research,* vol. 13, Sept. 1973, p. 1625-1628. 13 refs.

It is shown that the subthreshold summation method eliminates linearity distorting effects in the analysis of spatial harmonics in human vision when the adaptation technique is applied. The results obtained confirm the applicability of the Fourier theory to the detection of gratings. M.V.E.

A73-37412 **Photopic suppression of monkey's rod receptor potential, apparently by a cone-initiated lateral inhibition.** D. N. Whitten and K. T. Brown (California, University, San Francisco, Calif.). *(Association for Research in Vision and Ophthalmology, Annual Spring Meeting, Symposium on Recent Advances in Retinal Physiology, Sarasota, Fla., Apr. 24-28, 1972.) Vision Research,* vol. 13, Sept. 1973, p. 1629-1658. 55 refs. Grant No. NIH-EY-00468.

The late receptor potential (RP) was isolated in Macaca monkeys by clamping the retinal circulation at the optic disk and maintaining the animals in light halothane anesthesia under well

controlled arterial oxygenation. The results obtained indicate that, under normal physiological conditions, stimuli well above cone threshold do not elicit a rod response of saturated amplitude; instead, the rod late RP is completely suppressed. At photopic intensities where visual functions are mediated only by cones, the entire post-receptor pathway is cleared for carrying pure cone signals. This mechanism has significant advantages for many aspects of photopic visual functions. M.V.E.

A73-37413 Slowed decay of the monkey's cone receptor potential by intense stimuli, and protection from this effect by light adaptation. D. N. Whitten and K. T. Brown (California, University, San Francisco, Calif.). *Vision Research*, vol. 13, Sept. 1973, p. 1659-1667. 23 refs. Grant No. NIH-EY-00468.

A73-37414 Contrast sensitivity, Westheimer function and Stiles-Crawford effect in a blue cone monochromat. N. W. Daw and J. M. Enoch (Washington University, St. Louis, Mo.). *Vision Research*, vol. 13, Sept. 1973, p. 1669-1680. 25 refs. Grants No. NIH-EY-00204; No. NIH-EY-00053.

A73-37415 Spatial determinants of the aftereffect of seen motion. R. Over, J. Broerse, B. Crassini, and W. Lovegrove (Queensland, University, Brisbane, Australia). *Vision Research*, vol. 13, Sept. 1973, p. 1681-1690. 18 refs.

Investigation of the spatial determinants of the aftereffect of linear motion, often called the waterfall illusion, by means of three described experiments. In each one observers were required to track the apparent motion of a stationary grating of vertical lines following prolonged exposure to a moving grating. The magnitude of the aftereffect was studied as a function of the velocity and direction of motion of the adaptation gratings, as well as in terms of the spatial periodicity of the adaptation and test gratings. M.V.E.

A73-37416 Spatial frequency channels in human vision and the threshold for adaptation. S. Stecher (Lehigh University, Bethlehem, Pa.), C. Sigel (Lehigh University, Bethlehem; Pennsylvania, University, Philadelphia, Pa.), and R. V. Lange (Lehigh University, Bethlehem, Pa.; Brandeis University, Waltham, Mass.). *Vision Research*, vol. 13, Sept. 1973, p. 1691-1700. 15 refs. Grant No. NIH-RO1-EY-00023.

Threshold measurements of a spatial sinusoid were made before and after adaptation to different adapting frequencies both higher and lower than the test frequency. The test threshold was found to increase with adaptation contrast, the rate of change being greater the closer the adaptation and test frequencies approached each other. M.V.E.

A73-37417 The interaction between horizontal and vertical eye-rotations in tracking tasks. A. W. Goodwin and D. H. Fender (California Institute of Technology, Pasadena, Calif.). *Vision Research*, vol. 13, Sept. 1973, p. 1701-1712. 12 refs. Grants No. NIH-NB-03627; No. NIH-GM-01335.

Investigation of the information processing capabilities of the human oculomotor system when it is presented with a two-dimensional tracking task consisting of different classes of stimuli along the horizontal and vertical directions. The target motion followed a sinusoid in one of the directions, vertical or horizontal, and low-pass filtered Gaussian random sequences of variable bandwidth in the orthogonal direction. The results obtained include the finding that the presence of random sequences reduces the efficiency of sinusoidal tracking, the latter being little affected by variations in bandwidth. Hence, the system appears to consist of two independent channels with little crosstalk. M.V.E.

A73-37418 Non-linearity of visual signals in relation to shape-sensitive adaptation responses. A. Y. Maudarbocus and K. H. Ruddock (Imperial College of Science and Technology, London, England). *Vision Research*, vol. 13, Sept. 1973, p. 1713-1737. 28 refs.

Investigation of the binocularly transferred effects arising from visual adaptation to sinusoidal grating stimuli, using laser interference methods for producing both test and adaptation gratings. It is shown that, if a uniform background field is superimposed on a given adaptation grating, the binocularly transferred effect is reduced. Numerical data relating the level of the uniform background field to the change in contrast threshold illumination level of the test grating are shown to be consistent with known nonlinear visual responses. The distortion of a sinusoidal grating input stimulus resulting from the action of the nonlinearity is examined, and the associated spatial frequency spectrum is computed by numerical methods. M.V.E.

A73-37419 Spatial characteristics of chromatic induction - The segregation of lateral effects from straylight artefacts. J. Walraven (Instituut voor Zintuigfysiologie RVO-TNO, Soesterberg, Netherlands). *Vision Research*, vol. 13, Sept. 1973, p. 1739-1753. 35 refs.

Investigation of the spatial properties of chromatic induction and of the distribution of stray light over the retinal image in lateral and pseudolateral effects. Chromatic induction was measured as a function of spatial relationship between test and contrast-inducing fields, using a monocular compensation method. Red annular surroundings were used that were either flashed simultaneously with the test field or presented as steady backgrounds. Under both conditions, lateral effects were observed that clearly demonstrated the importance of spatial parameters of the contrast-inducing field. On the basis of available stray light data and other experimental evidence, it is shown that in the case of stationary surroundings these lateral effects can be completely attributed to entoptic light scatter. M.V.E.

A73-37420 Dichromatic convergence points obtained by subtractive colour matching. J. Birch (City University, London, England). *Vision Research*, vol. 13, Sept. 1973, p. 1755-1765. 10 refs. Research supported by the Worshipful Company of Spectacle Makers.

Isochromatic lines were obtained for both dichromats and anomalous trichromats by means of the Lovibond tintometer. The isochromatic lines for protanopic and deuteranopic observers were used to calculate the respective convergence points. The values obtained for the protanopic convergence point agree well with those found by Pitt (1935) and others, but the deuteranopic data show considerable variability. M.V.E.

A73-37421 Orientation specificity and response variability of cells in the striate cortex. G. H. Henry, P. O. Bishop, R. M. Tupper, and B. Dreher (Australian National University, Canberra, Australia). *Vision Research*, vol. 13, Sept. 1973, p. 1771-1779. 10 refs.

Application of the multiple histogram method to the determination of the optimal stimulus orientation of nine cells in the striate cortex. The reported results are believed to be typical of those cells in the striate cortex which display orientation specificity. M.V.E.

A73-37524 Analysis of pressure waves as a mean of diagnosing vascular obstructions. B. M. Kim and W. H. Corcoran (California Institute of Technology, Pasadena, Calif.). *Medical and Biological Engineering*, vol. 11, July 1973, p. 422-430. 11 refs. Research supported by the Donald E. Baxter Foundation.

A feasibility study was made to examine whether pressure measurements can be used to diagnose vascular obstructions in blood vessels. Distortion of a pressure wave due to an obstruction in an elastic tube was investigated theoretically and experimentally. Linear theory and the method of characteristics were employed in developing mathematical expressions for the distortion of the pressure wave. The quality of the models developed was examined by performing

experiments on a latex tube with rigid obstructions. A nonlinear model using the method of characteristics was in good agreement with the experimented data for obstructions with any severity, while a linear model was applicable to small obstructions. The nonlinear model is proposed as a mathematical model for the detection of vascular obstructions by analyzing pressure waves. (Author)

A73-37543 * **Three models of the vibrating ulna.** J. M. Jurist and K. Kianian (Wisconsin, University, Madison, Wis.). *Journal of Biomechanics*, vol. 6, July 1973, p. 331-342. 11 refs. Research supported by the Wisconsin Alumni Research Foundation, University of Wisconsin, and NIH; Grant No. NGR-50-002-051; Contract No. AT(11-1)-1422.

Evaluation of the ability of three models of the ulna to predict ulnar resonant frequency. The ulna is considered to be a uniform cylindrical tube made of homogeneous isotropic material. In model I the tube is attached at each end to rigid supports by hinges, in model II the tube is attached to rigid supports by springs rather than hinges, while model III is the same as model II except for the addition of a spring-mass system simulating an accelerometer strapped to the wrist. It is found that all three models exhibit comparable effectiveness in predicting the allowed cyclic vibration frequency, although model I is marginally better than models II or III in predicting this parameter. All three models also yield relatively realistic values for Young's modulus. In terms of results, therefore, there is no clear choice between the models. However, owing to greater costs incurred with models II and III, it is concluded that model I is the most useful, even though it is the least 'realistic' of the three models evaluated. A.B.K.

A73-37582 **Mechanisms of cardiac arrhythmias - From hypothesis to physiologic fact.** A. Pick (Michael Reese Hospital and Medical Center, Chicago, Ill.). *(University of Amsterdam, International Symposium on Recent Advances in Cardiac Arrhythmias, Amsterdam, Netherlands, Mar. 23, 24, 1972.) American Heart Journal*, vol. 86, Aug. 1973, p. 249-269. 90 refs.

The hypothetical mechanisms considered are related to manifestations of concealed conduction, reentry pathways in the atria and/or the A-V junction, concealed reentry in the A-V junction (atypical Wenckebach periods), and the question of supernormal conduction. Other mechanisms discussed involve the pathways for ventricular preexcitation, the dependence of aberrant conduction on cycle length, and impulse formation and Mobitz Type I block in the ventricular conduction system. Aspects of potential mechanisms of aberration of escape beats are presented in a table. G.R.

A73-37711 **Advanced methods of recovery for space life support systems.** S. V. Chizhov, B. A. Adamovich, Iu. E. Siniak, V. B. Gaidadymov, Z. P. Pak, M. I. Shikina, I. N. Fetin, and V. V. Krasnoshchekov (Akademiia Nauk SSSR, Moscow, USSR). In: Astronautical research 1971; Proceedings of the Twenty-second Congress, Brussels, Belgium, September 20-25, 1971. Dordrecht, D. Reidel Publishing Co., 1973, p. 163-169.

Evaluation of a number of methods of reclaiming water from water-containing wastes in the life-support systems of spacecraft and space stations. It is concluded that the requirements specific to regenerative life-support systems in space are best met by a system based on sorption processes. However, since the sorbent bed capacity is limited, this method of water regeneration could be successfully applied to slightly contaminated wastes only. Nevertheless, it is the main technique for the final purification of water produced by any other regeneration method. The most advanced concept of water recovery from water-containing wastes of high and moderate degree of contamination is the concept of air evaporation with catalytic oxidation. For water recovery from wash and personal hygiene water, apart from the sorption method, the methods of coagulation and reverse osmosis could be used. The problem of artificial mineralization of recovered water to obtain better palatability and physiological integrity is also discussed. A.B.K.

A73-37732 # **Flight deck environment and pilot workload - Biological measures of workload.** J. M. Rolfe and S. J. E. Lindsay (RAF, Institute of Aviation Medicine, Farnborough, Hants., England). In: Symposium on Flight Deck Environment and Pilot Workload, London, England, March 15, 1973, Proceedings. London, Royal Aeronautical Society, 1973. 16 p. 35 refs.

Discussion of methods used to measure the workload of pilots for the purpose of reducing aircraft accidents related to human error. Observational analysis of the subject's performance by a trained observer, subjective assessments obtained from the crew themselves, additional performance measures obtained by using loading tasks, and physiological measures are examined in terms of underlying assumptions, applications of the resulting information, interpretation of the results, and the reliability of the latter. T.M.

A73-37734 # **The assessment of pilot workload.** J. S. Howitt (Civil Aviation Authority, England). In: Symposium on Flight Deck Environment and Pilot Workload, London, England, March 15, 1973, Proceedings. London, Royal Aeronautical Society, 1973. 9 p.

Techniques currently used to measure pilot workload are evaluated in terms of the manner of their application in the field and the usefulness of the information provided. The techniques are divided into categories pertaining to measurement of immediate workload, the duty-day workload, and the long-term workload covering a defined period of work days. Attention is given to heart rate measurements, subjective opinions of crewmembers, post-flight psychological tests, biochemical indices of stress, and analysis of sleep patterns. T.M.

A73-37739 # **Annex 13 and the work of the aviation pathologist - Practical problems.** J. K. Mason (RAF, Institute of Pathology and Tropical Medicine, Halton, Bucks., England). In: Symposium on International Aircraft Accidents Investigation, London, England, January 15, 1973, Proceedings. London, Royal Aeronautical Society, 1973, 10 p.

The objectives of the work of the aviation pathologist include the prevention of accidents. The demonstration of the cause of an accident is to provide the basis for eliminating that cause. A correlation of the injuries sustained with the relevant safety and environmental factors will aid in the development of improvements designed to reduce the number of fatal accidents. Efforts on the part of the pathological team to implement Annex 13 are considered. G.R.

A73-37755 # **The effect of social-emotional environmental stress on the functional state of the neocortical structures of rhesus monkeys (Der Einfluss eines sozial-emotionalen Umweltstress auf den funktionellen Zustand neokortikaler Strukturen von Rhesusaffen).** G. Martin, H. Baumann, T. G. Urmancheeva, C. Gurk, and F. Wolter (Deutsche Akademie der Wissenschaften, Zentralinstitut für Herz- und Kreislauf-Regulationsforschung, Berlin, East Germany; Akademiia Meditsinskikh Nauk SSSR, Sukhumi, Georgian SSR). *Acta Biologica et Medica Germanica*, vol. 30, no. 5, 1973, p. 665-673. 19 refs. In German.

In the investigation neuronal responsiveness was monitored with the aid of the average evoked potentials (AEP) from the visual and sensomotoric cortex. The stress-induced impairment of neuronal excitation propagation is characterized by a depression in the primary and the secondary amplitude of the AEP. It is found that after a time of application of only 14 days negative psychoemotional stress situations which significantly determine the social environment and the day-night rhythm cause fundamental changes in the functional structure of parts of the central nervous system. G.R.

A73-37756 # Quantitative evoked-potential analyses for the neurophysiological characterization of faulty learning processes in the experimental arterial hypertonia-pathogenesis (Quantitative evoked-potential-Analysen zur neurophysiologischen Charakterisierung von Fehllernprozessen in der experimentellen arteriellen Hypertonie-Pathogenese). H. Baumann and K. Hecht (Deutsche Akademie der Wissenschaften, Zentralinstitut für Herz- und Kreislauf-Regulationsforschung, Berlin, East Germany). *Acta Biologica et Medica Germanica*, vol. 30, no. 5, 1973, p. 675-696. 40 refs. In German.

The investigation discussed is a continuation of an analysis conducted by Baumann et al. (1971) about bioelectric information-processing activities. Early stages of arterial hypertension were produced in albino rats by the application of a psychonervous stress (conditional-reflectory learning exercise) with the aid of electrodes which had been implanted in the brain. A stress exposure of two months duration was found to produce a regular change in the bioelectric functional state of vasomotory and emotionally relevant reticular, hypothalamic, and limbic brain structures. Data regarding optically and acoustically evoked potentials were evaluated by a computer program on the basis of a variance-discriminant analysis.

G.R.

A73-37757 # Sodium Na-24 and potassium K-42 availability for sweat production after intravenous injection and their handling by sweat glands. K. Gibinski, F. Kumaszka, J. Zmudzinski, L. Giec, J. Waclawczyk, and J. Dosiak (Slaska Akademia Medyczna, Katowice, Poland). *Acta Biologica et Medica Germanica*, vol. 30, no. 5, 1973, p. 697-708. 15 refs. Research supported by the National Institute Occupational Health. ESSA Project PL-480.

The time of appearance and the further course of excretion of both Na-24 and K-42 in thermal sweat were studied in healthy young men. The radioactive material was injected intravenously to the volunteers either already sweating or 4 to 5 hours before exposure to heat. Both sodium and potassium from the extravascular space reach the skin surface usually in less than 1 min. The reduction of the sodium concentration from extravascular fluid (the direct substrate) to sweat varies largely in the adult population. A possibility of two different energetic mechanisms responsible for the elaboration of different osmotic gradients resulting in different production of hypoosmotic sweat from the extracellular fluid in various subjects is discussed. The different sodium and potassium patterns of excretion in sweat are discussed. (Author)

A73-37774 Pathological effects of radio waves. M. S. Tolgskaia and Z. V. Gordon (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). (Translation of Morfofiziologicheskie izmeneniia pri deistvii elektromagnitnykh voln radiochastot, Moscow, Izdatel'stvo Meditsina, 1971.) New York, Consultants Bureau, 1973. 143 p. 134 refs. $20.

The monograph summarizes the results of morphological and physiological studies of the reversible and irreversible effects of radio waves on a total of 646 rabbits, rats and mice, covering chronic and acute exposures at 500 kHz to 1.5 MHz, 14.88, 69.7, 155 and 191 MHz, lasting from several minutes to 15 months. The functional and morphological changes produced by exposures of various lengths and intensities in the cardiovascular and nervous systems, myocardium, reproductive organs, biochemistry, blood, eye, weight, cerebrum, cortex, spinal cord, skin and neurons are discussed. Exposures in the centimeter wavelength range tended to affect the nervous fibers of the skin, internal organs and cortical neurons while exposures in the decimeter range showed no effect on the nervous activity of the skin. The monograph is intended for scientists interested in the subject.

V.Z.

A73-37795 Experimental studies on the mechanisms of closure of cardiac valves with use of roentgen videodensitometry. A. G. Tsakiris (Sherbrooke, Université, Quebec, Canada), R. E. Sturm, and E. H. Wood (Mayo Clinic and Mayo Foundation, Rochester, Minn.). *American Journal of Cardiology*, vol. 32, Aug. 1973, p. 136-143. 28 refs. Research supported by the American Heart Association; Grants No. NIH-HE-3532; No. NIH-HE-FR7; No. NIH-HE-4664.

A73-37796 * Video instrumentation for radionuclide angiocardiography. J. P. Kriss (Stanford University, Stanford, Calif.). *American Journal of Cardiology*, vol. 32, Aug. 1973, p. 167-174. 12 refs. Research supported by the Charles Deere Wyman Fund, McCarthy Foundation, and National Easter Seal Society for Crippled Children and Adults; Grant No. NsG-81.

Two types of videoscintiscopes for performing radioisotopic angiocardiography with a scintillation camera are described, and use of these instruments in performing clinical studies is illustrated. Radionuclide angiocardiography is a simple, quick and accurate procedure recommended as a screening test for patients with a variety of congenital and acquired cardiovascular lesions. When performed in conjunction with coronary arterial catheterization, dynamic radionuclide angiography may provide useful information about regional myocardial perfusion. Quantitative capabilities greatly enhance the potential of this diagnostic tool. (Author)

A73-37797 Use of a video system in the study of ventricular function in man. M. L. Marcus (Iowa, University, Hospitals, Iowa City, Iowa), W. H. Schuette, W. C. Whitehouse, J. J. Bailey, M. A. Douglas, and D. L. Glancy (National Institutes of Health, National Heart and Lung Institute, Bethesda, Md.). *American Journal of Cardiology*, vol. 32, Aug. 1973, p. 175-179. 12 refs.

A video-based system is described that determines ventricular volume from cineangiograms by automated border recognition or by manually assisted video planimetry. Analog circuits are utilized to provide on-line volume calculations. A computer system is used to calculate complex indexes of ventricular function from simultaneously obtained pressure and volume data. Although the system requires considerable effort to establish, it has many potential applications. (Author)

A73-37798 * Biplane roentgen videometric system for dynamic, 60/sec, studies of the shape and size of circulatory structures, particularly the left ventricle. E. L. Ritman, R. E. Sturm, and E. H. Wood (Mayo Clinic and Mayo Foundation, Rochester, Minn.). *American Journal of Cardiology*, vol. 32, Aug. 1973, p. 180-187. 12 refs. Research supported by the American Heart Association; Grants No. NIH-HE-4664; No. NIH-FR-7; No. NIH-HE-3532; No. NGR-24-003-001.

An operator interactive video system for the measurement of roentgen angiographically outlined structures is described. Left ventricular volume and three-dimensional shapes are calculated from up to 200 pairs of diameters measured from ventriculograms at the rate of 60 pairs of biplane images per second. The accuracy and reproducibility of volumes calculated by the system were established by analysis of roentgenograms of inanimate objects of known volume and by comparison of left ventricular stroke volumes calculated by the system with the stroke volumes calculated by an indicator-dilution technique and an aortic root electromagnetic flowmeter. Computer-generated display of the large amounts of data obtained by the videometry system is described. (Author)

A73-37939 # Role of specific and nonspecific thalamic nuclei in the genesis of certain slow rhythms on the human electrocorticogram (O roli spetsificheskikh i nespetsificheskikh iader talamusa v geneze nekotorykh medlennykh ritmov elektrokortikogrammy cheloveka). V. E. Maiorchik, N. Ia. Vasin, and I. A. Il'inskii (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Neirofiziologiia*, vol. 5, May-June 1973, p. 227-235. 22 refs. In Russian.

A73-37940 # **Functional characteristics of different neurons in the auditory cortex (S funktsional'nykh osobennostiakh raznykh neironov slukhovoi kory).** F. N. Serkov, E. Sh. Ianovskii, and A. N. Tal'nov (Akademiia Nauk Ukrainskoi SSR, Institut Fiziologii, Kiev, Ukrainian SSR). *Neirofiziologiia*, vol. 5, May-June 1973, p. 236-245. 9 refs. In Russian.

Reactions to paired and rhythmic stimulation of geniculocortical fibers were studied in cortical neurons of 246 cats immobilized with d-turbocurarine. The refractivity period varied from 1 to 200 msecond in different individual neurons. These results are linked to the functional inhomogeneity of auditory neurons responding to sequences of efferent impulses received in the auditory cortex. V.Z.

A73-37941 # **Evoked potentials in the hypothalamus in response to stimulation of the vagus and sciatic nerves (Vyzvannye potentsialy gipotalamusa pri razdrazhenii bluzhdaiushchego i sedalishchnogo nervov).** O. G. Baklavadhzian, F. A. Adamian, and E. A. Avetisian (Akademiia Nauk Armianskoi SSR, Institut Fiziologii, Yerevan, Armenian SSR). *Neirofiziologiia*, vol. 5, May-June 1973, p. 253-260. 41 refs. In Russian.

A73-37942 # **Investigation of the distribution of synaptic inputs on an analog model of the motoneurons (Issledovanie raspredeleniia sinapticheskikh vkhodov na analogovoi modeli motoneironov).** G. G. Kurchavyi, M. V. Motorina, and A. I. Shapovalov (Akademiia Nauk SSSR, Institut Evoliutsionnoi Fiziologii i Biokhimii, Leningrad, USSR). *Neirofiziologiia*, vol. 5, May-June 1973, p. 289-297. 16 refs. In Russian.

A73-37943 # **Motor unit reactions of man to spinal and supraspinal inhibitory stimuli (Reaktsiia dvigatel'nykh edinits cheloveka na spinal'noe i supraspinal'noe tormoznye vozdeistviia).** M. S. Zalkind and V. Iu. Shlykov (Akademiia Nauk SSSR, Institut Problem Peredachi Informatsii, Moscow, USSR). *Neirofiziologiia*, vol. 5, May-June 1973, p. 298-306. 23 refs. In Russian.

The electrical activity of individual motor units of Musculus flexor pollucis brevis was measured during responses to spinal and supraspinal inhibitory stimulation. The inhibitory action was more pronounced in motor units with higher amplitudes of the potential than in motor units with lower amplitudes of the potential. A dependence of the inhibitory reaction on the average interstimulus interval was established under spinal stimulation while no such dependence could be detected under supraspinal stimulation. It is theorized that the involvement of spinal motor neurons in an inhibitory reaction is due to the interaction of a number of independent factors. V.Z.

A73-37944 # **Investigation of the geometry of the dendritic tree of retinal ganglion cells (Issledovanie geometrii dendritnogo dereva ganglioznykh kletok setchatki).** M. I. Venslauskas and A. I. Gutauskas (Kaunasskii Gosudarstvennyi Meditsinskii Institut, Kaunas, Lithuanian SSR). *Neirofiziologiia*, vol. 5, May-June 1973, p. 307-314. 21 refs. In Russian.

A73-37964 * # **Evaluation of 165 deg F reverse osmosis modules for washwater purification.** S. Hossain, R. L. Goldsmith, M. Tan (Abcor, Inc., Cambridge, Mass.), T. Wydeven, and M. I. Leban (NASA, Ames Research Center, Moffett Field, Calif.). *SAE, ASME, AIAA, ASMA, and AIChE, Intersociety Conference on Environmental Systems, San Diego, Calif., July 16-19, 1973, ASME Paper 73-ENAs-2.* 7 p. Members, $1.00; nonmembers, $3.00. NASA-supported research; U.S. Office of Saline Water Contract No. 14-30-3158.

Three membrane systems have been evaluated for concentration at 165 F of wash-water contaminants. Membranes tested are polybenzimidazole (hollow fibers), cellulose acetate blend (spiral wound), and sulfonated polyphenylene oxide (plate-and-frame). Detailed membrane flux and rejection data are presented for 200-hr life tests with synthetic wash water, at two concentrations, and real wash water, at one concentration. Advantages and limitations of the membrane configurations are discussed. (Author)

A73-37970 * # **A contaminant monitor for submarine atmospheres.** M. R. Ruecker (Perkin-Elmer Corp., Pomona, Calif.). *SAE, ASME, AIAA, ASMA, and AIChE, Intersociety Conference on Environmental Systems, San Diego, Calif., July 16-19, 1973, ASME Paper 73-ENAs-9.* 14 p. 13 refs. Members, $1.00; nonmembers, $3.00. Contract No. NAS9-12066.

A requirement for monitoring selected atmospheric constituents on board nuclear powered submarines has been met by the development of the Central Atmosphere Monitoring System, Mark I. This system employs a mass spectrometer to monitor H2, H2O, N2, O2, CO2, Freon 11, Freon 12, and Freon 114, in addition to an infrared sensor for CO. The CAMS MKI development is discussed, including background, operating fundamentals, principal requirements, functional and physical descriptions, and summarized test results. Each of two prototype units has successfully completed over 9000 hr of operational sea trails, providing the necessary ground work for the manufacture of production units. At the same time, these units, which have benefited extensively from NASA hardware experience, may in turn provide useful data for the development of a new class of maintainable atmospheric monitoring instrumentation for manned spacecraft. (Author)

A73-37971 * # **Reverse osmosis for wash water recovery in space vehicles.** R. W. Lawrence and C. W. Saltonstall, Jr. (Envirogenics Systems Co., El Monte, Calif.). *SAE, ASME, AIAA, ASMA, and AIChE, Intersociety Conference on Environmental Systems, San Diego, Calif., July 16-19, 1973, ASME Paper 73-ENAs-12.* 9 p. 9 refs. Members, $1.00; nonmembers, $3.00. NASA-supported research; U.S. Office of Saline Water Contract No. 14-30-2815.

Tests were carried out on both synthetic and real wash water derived from clothes laundry to determine the utility of reverse osmosis in recovering the water for recycle use. A blend membrane made from cellulose di- and triacetates, and a cross-linked cellulose acetate/methacrylate were evaluated. Both were found acceptable. A number of detergents were evaluated, including a cationic detergent, sodium dodecyl sulfate, potassium palmitate, and sodium dodecylbenzenesulfonate. The tests were all made at a temperature of 165 F to minimize microbial growth. Long-term (15 to 30 day) runs were made at 600 and 400 psi on laundry water which was pretreated either by alum addition and sand filtration or by filtration only through 0.5 micron filters. A 30-day run was made using a 2-in. diameter by 22-in. long spiral module at 400 psig with filtering as the pretreatment. The membrane fouling by colloidal matter was found to be controllable. The unit produced initially 55 gal/day and 27 gal/day after 30 days. (Author)

A73-37972 # **Adsorption of spacecraft contaminants on Bosch carbon.** M. P. Manning and R. C. Reid (MIT, Cambridge, Mass.). *SAE, ASME, AIAA, ASMA, and AIChE, Intersociety Conference on Environmental Systems, San Diego, Calif., July 16-19, 1973, ASME Paper 73-ENAs-15.* 8 p. 6 refs. Members, $1.00; nonmembers, $3.00.

The reduction of CO2 by H2 over iron catalysts in a Bosch recycle reactor has been shown to yield a ribbon-like, filamentary carbon. Under the electron microscope, the carbon appears as ribbons some 500 A wide, 50 A thick, and with lengths as long as 15 microns. BET areas of these carbons range from 100 to 170 sq m/g without pretreatment. The use of this carbon as an adsorbent for both trace gas phase contaminants and for several organic water phase contaminants has been investigated. Based on the use of the Polanyi potential theory, the Bosch carbon was shown to have adsorption capacities of about a factor of 50 less than commercial

gas phase activated carbon adsorbents. Based on volumetric adsorption studies of several organic dyes, the Bosch carbon was shown to have adsorptive capacities of about a factor of 8 less than carbons employed for commercial water treatment. (Author)

A73-37973 * # Development of sulfonated polyphenylene oxide membranes for the reverse osmosis purification of wash water at sterilization temperatures /165 F/. A. B. LaConti, J. M. Amore, and J. F. Enos (General Electric Co., Lynn, Mass.). *SAE, ASME, AIAA, ASMA, and AIChE, Intersociety Conference on Environmental Systems, San Diego, Calif., July 16-19, 1973, ASME Paper 73-ENAs-16.* 16 p. 8 refs. Members, $1.00; nonmembers, $3.00. NASA-supported research; U.S. Office of Saline Water Contract No. 14-30-2752.

A73-37974 * # Waste Management System overview for future spacecraft. A. L. Ingelfinger (NASA, Washington, D.C.) and R. W. Murray (General Electric Co., Philadelphia, Pa.). *SAE, ASME, AIAA, ASMA, and AIChE, Intersociety Conference on Environmental Systems, San Diego, Calif., July 16-19, 1973, ASME Paper 73-ENAs-18.* 7 p. Members, $1.00; nonmembers, $3.00.

Waste Management Systems (WMS) for post Apollo spacecraft will be significantly more sophisticated and earthlike in user procedures. Some of the features of the advanced WMS will be accommodation of both males and females, automatic operation, either tissue wipe or anal wash, measurement and sampling of urine, feces and vomitus for medical analysis, water recovery, and solids disposal. This paper presents an overview of the major problems of and approaches to waste management for future spacecraft. Some of the processes discussed are liquid/gas separation, the Dry-John, the Hydro-John, automated sampling, vapor compression distillation, vacuum distillation-catalytic oxidation, incineration, and the integration of the above into complete systems. (Author)

A73-37975 # NS-1 membranes - Potentially effective new membranes for treatment of washwater in space cabins. L. T. Rozelle, J. E. Cadotte, C. V. Kopp, and K. E. Cobian (North Star Research and Development Institute, Minneapolis, Minn.). *SAE, ASME, AIAA, ASMA, and AIChE, Intersociety Conference on Environmental Systems, San Diego, Calif., July 16-19, 1973, ASME Paper 73-ENAs-19.* 6 p. 9 refs. Members, $1.00; nonmembers, $3.00. Research supported by the Environmental Protection Agency; U.S. Office of Saline Water Contract No. 14-30-2883.

A73-37976 * # Compact carbon monoxide sensor utilizing a confocal optical cavity. B. Scott, J. Magyar, R. Weyant (Perkin-Elmer Corp., Pomona, Calif.), and J. Hall (Perkin-Elmer Corp., Costa Mesa, Calif.). *SAE, ASME, AIAA, ASMA, and AIChE, Intersociety Conference on Environmental Systems, San Diego, Calif., July 16-19, 1973, ASME Paper 73-ENAs-20.* 5 p. Members, $1.00; nonmembers, $3.00. Research supported by the U.S. Bureau of Mines and NASA; Contract No. HO-122074.

The carbon monoxide sensor discussed in this paper utilizes a unique confocal cavity which allows the complete system to be packaged in a small volume suitable for hand-held use. The optical system is the heart of the instrument with equal emphasis placed on the electronics support circuitry, consisting essentially of a thermal infrared pyroelectric detector and lock-in amplifier. The pyroelectric detector offers a major advantage over other thermal detectors, providing a signal-to-noise ratio and detectivity that remain nearly constant over the frequency range from dc to 2000 Hz. Since bias voltage is not required, low frequency noise is not generated in the detector. (Author)

A73-37978 * # Evaluation of RO modules for the SSP ETC/LSS. W. J. Jasionowski and R. A. Bambenek (CHEMTRIC, Inc., Rosemont, Ill.). *SAE, ASME, AIAA, ASMA, and AIChE, Intersociety Conference on Environmental Systems, San Diego, Calif., July 16-19, 1973, ASME Paper 73-ENAs-22.* 8 p. Members, $1.00; nonmembers, $3.00. Contracts No. NAS9-9191; No. NAS9-10273.

During the past eight years the NASA Manned Spacecraft Center has supported the development of an Integrated Water and Waste Management System for use in the Space Station Prototype (SSP) Environmental Thermal Control/Life-Support System (ETC/LSS). This system includes the reverse osmosis (RO) process for recycling wash water and the compression distillation process for recovering useable water from urine, urinal flush water, humidity condensate, commode flush water and the wash water concentrated by RO. This paper summarizes the experimental work performed during the past four years to select the best commercially available RO module for this system and to also define which surfactants and germicides are most compatible with the selected module. (Author)

A73-37979 * # Space Shuttle Orbiter ECLSS. O. T. Stoll, G. E. Laubach, and J. W. Gibb (Rockwell International Corp., Space Div., Downey, Calif.). *SAE, ASME, AIAA, ASMA, and AIChE, Intersociety Conference on Environmental Systems, San Diego, Calif., July 16-19, 1973, ASME Paper 73-ENAs-23.* 10 p. Members, $1.00; nonmembers, $3.00. Contract No. NAS9-14000.

The Orbiter Environmental Control and Life Support System (ECLSS) provides the functions of atmosphere revitalization, crew life support, active thermal conditioning, and airlock support for EVA and docking activities. The ECLSS must satisfy the requirements of orbital missions with four to ten crewmembers and mission duration of a few hours to 30 days and the requirements associated with an atmospheric horizontal flight test program and ferry flight missions. The ECLSS development plan utilizes an ECLSS ground test article and thermal/vacuum testing to support the first horizontal flight test at the end of 1976. The ground testing and horizontal flight test program certify the Orbiter ECLSS for the first orbital flight in early 1978. (Author)

A73-37980 * # Crew equipment applications - Firefighter's Breathing System. W. L. Smith (NASA, Office of Manned Space Flight, Bioenvironmental Systems Div., Washington, D.C.). *SAE, ASME, AIAA, ASMA, and AIChE, Intersociety Conference on Environmental Systems, San Diego, Calif., July 16-19, 1973, ASME Paper 73-ENAs-24.* 6 p. 5 refs. Members, $1.00; nonmembers, $3.00.

The Firefighter's Breathing System (FBS) represents a significant step in applying NASA's crew equipment technologists and technologies to civilian sector problems. This paper describes the problem, the utilization of user-design committees as a forum for development of design goals, the design of the FBS, and the field test program to be conducted. (Author)

A73-37981 * # Evaluation of proposed Skylab and SSP soap products. R. L. Durfee, J. M. Spurlock, and F. C. Whitmore (Versar, Inc., Springfield, Va.). *SAE, ASME, AIAA, ASMA, and AIChE, Intersociety Conference on Environmental Systems, San Diego, Calif., July 16-19, 1973, ASME Paper 73-ENAs-26.* 8 p. Members, $1.00; nonmembers, $3.00. Contract No. NAS9-12672.

Four candidate cleansing agents evaluated in terms of potential hazards to crew members included two soaps (Neutrogena bar soap and Olive Leaf Liquid), one nonfoaming surfactant (Miranol JEM), and one laundry detergent (sodium dodecylbenzene sulfonate). None of the four exhibited adverse dermatological effects from skin patch tests or supported growth of potentially pathogenic microorganisms. Aqueous solutions of Neutrogena did support a mold species. Neutrogena and Miranol JEM were used in a simulated Skylab personal hygiene regimen with no adverse effects on skin or skin microflora. Based on our results, each of these agents appear to be a promising candidate material for the use intended. (Author)

A73-37982 * # Hyperfiltration technique applied to wash water reclamation at elevated temperatures. J. C. Hester and C. A. Brandon (Clemson University, Clemson, S.C.). *SAE, ASME, AIAA, ASMA, and AIChE, Intersociety Conference on Environmental*

Systems, San Diego, Calif., July 16-19, 1973, ASME Paper 73-ENAs-27. 8 p. 8 refs. Members, $1.00; nonmembers, $3.00. NASA-sponsored research.

A73-37983 * # **Apollo Lunar Module environmental control system - Mission performance and experience.** J. C. Brady (NASA, Johnson Space Center, Houston, Tex.), D. M. Browne (Boeing Aerospace Co., Houston, Tex.), H. J. Schneider, and J. F. Sheehan (Grumman Aerospace Corp., Bethpage, N.Y.). *SAE, ASME, AIAA, ASMA, and AIChE, Intersociety Conference on Environmental Systems, San Diego, Calif., July 16-19, 1973, ASME Paper 73-ENAs-28.* 12 p. Members, $1.00; nonmembers, $3.00.

A73-37985 * # **Skylab medical experiments altitude test crew observations.** K. J. Bobko (USAF, Washington, D.C.; NASA, Johnson Space Center, Houston, Tex.). *SAE, ASME, AIAA, ASMA, and AIChE, Intersociety Conference on Environmental Systems, San Diego, Calif., July 16-19, 1973, ASME Paper 73-ENAs-30.* 10 p. Members, $1.00; nonmembers, $3.00.

The paper deals with the crew's observations during training and the SMEAT 56-day test. Topics covered include the crew's adaptation to the SMEAT environment and medical experiments protocol. Personal observations are made of daily activities surrounding the medical experiments hardware, Skylab clothing, supplementary activities, recreational equipment, food, and waste management. An assessment of these items and their contributions to the Skylab flight program is made. (Author)

A73-37986 # **Advanced trash management system.** G. A. Singer, W. H. Hanlon, and F. E. Senator (McDonnell Douglas Astronautics Co., Huntington Beach, Calif.). *SAE, ASME, AIAA, ASMA, and AIChE, Intersociety Conference on Environmental Systems, San Diego, Calif., July 16-19, 1973, ASME Paper 73-ENAs-31.* 12 p. Members, $1.00; nonmembers, $3.00.

In order to establish an optimum approach to the trash management requirements of a second Skylab and/or for application to other future long term missions, it is necessary to develop new techniques and equipment for the purpose of minimizing the volume of trash generated. This paper identifies the problems encountered with the accumulation of a large volume of trash during the Skylab-A mission and shows how these problems were minimized using the present trash management techniques. In future long term space missions, more equipment, clothing, food, and restraints are necessary and therefore more trash will be generated than on Skylab-A. This paper identifies and discusses trash management techniques and equipment requirements for these longer duration missions. (Author)

A73-37987 * # **Spacecraft environmental optical contamination problems associated with thermal control surface outgassing.** J. J. Trenkle and D. R. Wilkes (NASA, Marshall Space Flight Center, Huntsville, Ala.). *SAE, ASME, AIAA, ASMA, and AIChE, Intersociety Conference on Environmental Systems, San Diego, Calif., July 16-19, 1973, ASME Paper 73-ENAs-32.* 4 p. Members, $1.00; nonmembers, $3.00.

A73-37988 # **Microbial contamination of water - Traditional and space-age problems and approaches.** M. Sofios (McDonnell Douglas Astronautics Co., Huntington Beach, Calif.). *SAE, ASME, AIAA, ASMA, and AIChE, Intersociety Conference on Environmental Systems, San Diego, Calif., July 16-19, 1973, ASME Paper 73-ENAs-33.* 14 p. 19 refs. Members, $1.00; nonmembers, $3.00.

A73-37989 * # **Zero-gravity and ground testing of a waste collection subsystem for the Space Shuttle.** A. F. Behrend, Jr. (NASA, Johnson Space Center, Houston, Tex.) and J. E. Swider, Jr. (United Aircraft Corp., Hamilton Standard Div., Windsor Locks, Conn.). *SAE, ASME, AIAA, ASMA, and AIChE, Intersociety Conference on Environmental Systems, San Diego, Calif., July 16-19, 1973, ASME Paper 73-ENAs-42.* 11 p. Members, $1.00; nonmembers, $3.00.

A73-37990 * # **Laundering in space - A summary of recent developments.** O. K. Houck (NASA, Johnson Space Center, Houston, Tex.) and J. J. Symons (Whirlpool Corp., St. Joseph, Mich.). *SAE, ASME, AIAA, ASMA, and AIChE, Intersociety Conference on Environmental Systems, San Diego, Calif., July 16-19, 1973, ASME Paper 73-ENAs-43.* 20 p. 9 refs. Members, $1.00; nonmembers, $3.00.

Clothing must be washed and reused on future long duration space missions to maintain personal hygiene without severe weight penalties of stored clothing. Laundering equipment that may operate in the absence of gravity is being developed. Weight savings expected from this equipment are illustrated in this paper that describes a six-man combined clothes washer/dryer engineering prototype. Also included in the paper is the rationale used in selecting the final prototype design as well as a discussion of major factors affecting design and performance. (Author)

A73-37991 * # **Skylab Medical Experiments Altitude Test /SMEAT/ facility design and operation.** A. H. Hinners, Jr. and J. V. Correale (NASA, Johnson Space Center, Houston, Tex.). *SAE, ASME, AIAA, ASMA, and AIChE, Intersociety Conference on Environmental Systems, San Diego, Calif., July 16-19, 1973, ASME Paper 73-ENAs-44.* 17 p. Members, $1.00; nonmembers, $3.00.

This paper presents the design approaches and test facility operation methods used to successfully accomplish a 56-day test for Skylab to permit evaluation of selected Skylab medical experiments in a ground test simulation of the Skylab environment with an astronaut crew. The systems designed for this test include the two-gas environmental control system, the fire suppression and detection system, equipment transfer lock, ground support equipment, safety systems, potable water system, waste management system, lighting and power system, television monitoring, communications and recreation systems, and food freezer. (Author)

A73-37992 * # **SMEAT atmosphere trace contaminants.** J. L. Schornick, C. T. Heinrich, G. S. Garcia, Jr. (Northrop Services, Inc., Houston, Tex.), and C. E. Verostko (NASA, Johnson Space Center, Houston, Tex.). *SAE, ASME, AIAA, ASMA, and AIChE, Intersociety Conference on Environmental Systems, San Diego, Calif., July 16-19, 1973, ASME Paper 73-ENAs-45.* 12 p. Members, $1.00; nonmembers, $3.00.

The atmosphere trace contaminant analysis support provided for the Skylab Medical Experiments Altitude Test (SMEAT) which was conducted from July 26 through September 20, 1972, at the JSC Crew Systems Division facility is discussed. Sample acquisition techniques and analytical instrumentation methodology utilized for identification and quantification of the trace contaminants are described. Emphasis is placed on the contaminants found, their occurrence patterns, and possible sources. (Author)

A73-38005 **Aircrew workload during the approach and landing.** A. N. Nicholson (RAF, Institute of Aviation Medicine, Farnborough, Hants., England). *Aeronautical Journal*, vol. 77, June 1973, p. 286-289. 5 refs.

The workload during the approach and landing which is likely to be experienced by any airline pilot operating worldwide routes is analyzed. The operational procedures of the flight deck involved in the study conformed to those used by the majority of international carriers. The workload during each letdown was assessed by the pilot. The individual factors which influenced the workload assessment were the technical serviceability of the aircraft and efficiency of the crew, the availability of navigational aids, the meteorological

conditions, the physical features of the airport, and the efficiency of the control procedures. It appears that factors amenable to correction are likely to be responsible for much of the high workload situations in civil transport operations. F.R.L.

A73-38071 Modeling the human in a time-varying anti-aircraft tracking loop. D. L. Kleinman (Systems Control, Inc., Cambridge, Mass.) and T. Perkins (U.S. Army, Material Systems Analysis Agency, Aberdeen, Md.). In: Joint Automatic Control Conference, 14th, Columbus, Ohio, June 20-22, 1973, Preprints of Technical Papers. New York, Institute of Electrical and Electronics Engineers, Inc., 1973, p. 798, 799. 5 refs. Grant No. DAAF03-72-R-0153. Project GADES.

Optimal control and human response theory are combined to develop a computerized, predictive model of the input-output tracking response of the human gunner in an anti-aircraft artillery (AAA) loop. The model includes representations for the various human limitations (e.g., time-delay, randomness) that act to degrade system performance. The model extends earlier work in manual control by considering rapidly varying system dynamics, arbitrary nonstochastic inputs, and dynamic attentional allocation between two tracking axes. Model predictions of tracking error covariance are compared with data obtained from trained gunners in independent experiments that simulated the Vulcan Air Defense System (VADS). The agreements are excellent for both elevation and azimuth axis tracking, over a range of target passes from easy to difficult. The predictions are obtained using a single set of man-model input parameters that are typical of human response limitations. It is concluded that the modeling approach can be used with confidence in a systems analysis study of weapons effectiveness. (Author)

A73-38085 Design and evaluation of a backhoe model with a master slave control. B. B. Ibrahim and C. H. Sprague (Kansas State University of Agriculture and Applied Science, Manhattan, Kan.). In: Joint Automatic Control Conference, 14th, Columbus, Ohio, June 20-22, 1973, Preprints of Technical Papers. New York, Institute of Electrical and Electronics Engineers, Inc., 1973, p. 939-944. 6 refs. Research supported by the Kansas State University of Agriculture and Applied Science.

This paper documents the results from a project to design, build and evaluate a model of a backhoe based on a master-slave control concept. A control of this type allows the operator to simultaneously actuate the four degrees of freedom of the backhoe to move the bucket along a smooth path to achieve the desired motion. Experiments conducted with the model show that inexperienced operators rapidly develop speed and precision in controlling the backhoe. Full sized backhoes with this type of control should lead to faster operator learning, greater operator skill and productivity and less stress on the backhoe systems. The question of whether these advantages would offset increased cost and complexity remains to be answered. (Author)

A73-38150 Model of evaporation responses to heat load increases (Modèle de la réponse évaporatoire à l'augmentation de la charge thermique). Y. Houdas, A. Sauvage, M. Bonaventure, and J.-D. Guieu (Lille, Université, Lille, France). *Journal de Physiologie*, vol. 66, July 1973, p. 137-161. 47 refs. In French. Direction des Recherches et Moyens d'Essais Contract No. 70-387.

The thermoregulatory control system of the organism is believed to act more as a servomechanism of thermal exchanges than as a regulator of internal temperature. The underlying hypothesis is that the variable controlled by the thermoregulatory system is the level of body heat stored rather than the deep body temperature. M.V.E.

A73-38159 Serial correlation of physiological time series and its significance for a stress analysis (Serienkorrelation physiologischer Zeitreihen und deren Bedeutung für die Beanspruchungsanalyse). W. Laurig (Darmstadt, Technische Hochschule, Darmstadt, West Germany). *Internationale Zeitschrift für angewandte Physiologie einschliesslich Arbeitsphysiologie*, vol. 31, no. 4, 1973, p. 237-247. 13 refs. In German. Research supported by the Stiftung Volkswagenwerk.

In connection with the development of an approach for conducting stress analyses in the case of radar controllers, an investigation was conducted concerning the relation between heart rate and the parameters work difficulty and work length. The concept of series correlation is discussed together with aspects of the quantification of the series correlation, the detection of a correlation between time series, and the reduction of the degrees of freedom. G.R.

A73-38160 Exercise during hyperoxia and hyperbaric oxygenation. F. Pirnay, R. Marechal, R. Dujardin, M. Lamy, R. Deroanne, and J. M. Petit (Institut Ernest Malvoz; Liège, Université, Liège, Belgium). *Internationale Zeitschrift für angewandte Physiologie einschliesslich Arbeitsphysiologie*, vol. 31, no. 4, 1973, p. 259-268. 38 refs.

Physiological reactions during exercise were tested under hyperoxic and hyperbaric conditions. In six subjects walking and running at increasing speeds on a treadmill, maximum performance showed little change when the respired air was enriched with O2-Maximum metabolism, measured by CO2 production, increased by 3.2 per cent. During exercise on a bicycle ergometer, maximum O2 uptake increased by 3 per cent in five subjects breathing pure O2 at 1 ata. During hyperoxia the maximum O2 consumption measured at 2 and 3 ata did not differ significantly from that measured at 1 ata. Heart rate showed highly comparable maximum values under the various experimental conditions. During submaximal exercise, heart rate was consistently lower when the subjects breathed O2. The O2 linked difference became slighter with every increase in work load. Under hyperbaric and hyperoxic conditions, ventilation was invariably reduced during exercise. (Author)

A73-38161 Amplitude variations of acoustically evoked potentials as a function of signal information and fatigue due to stress (Amplitudenvariationen akustisch evozierter Potentiale in Abhängigkeit von der Signalinformation und belastungsbedingter Ermüdung). K.-P. Klinger (München, Technische Universität, Munich, West Germany). *Internationale Zeitschrift für angewandte Physiologie einschliesslich Arbeitsphysiologie*, vol. 31, no. 4, 1973, p. 269-278. 17 refs. In German.

A73-38182 Signal perception in noise induced hearing loss. P. Plath (Rheinisch-Westfälische Technische Hochschule, Aachen, West Germany). *(Polish Society of Acoustics, International Symposium on Problems of Auditive Perception, Poznan, Poland, May 29-June 1, 1972.) Acustica*, vol. 29, July 1973, p. 47-52. 8 refs.

Circumscribed lesion of Corti's organ, as in cases of noise induced permanent threshold shift (NIPTS), influences speech discrimination only inasmuch as the sound level for optimal speech discrimination must be increased, while a discrimination loss not compensable by speech level increment is only correlated to the age of the patients. In cases of NIPTS, the difference limen for intensity is lowered within the region of 4 kHz in comparison to normal hearing ears, especially near hearing threshold, and this lowering is not correlated to age. Through these findings, the well-known difficulties which arise in the use of hearing aids by patients with NIPTS are explained. There are not only different hearing losses within several frequency regions, but there is also different sensitivity for sound intensity and for intensity differences. These differences can be compensated centrally by young patients; the older patients are not able to compensate for the changes in the dynamics of the hearing organ. (Author)

A73-38258 The effect of exercise on intrinsic myocardial performance. W. G. Winters, R. A. Anderson (Vermont, University, Burlington, Vt.), and D. M. Leaman (Milton S. Hershey Medical Center, Hershey, Pa.). *Circulation*, vol. 48, July 1973, p. 50-55. 10 refs. Grant No. PHS-HE-12205.

Systolic time intervals were performed on 49 male subjects. Twenty-eight subjects were inactive with respect to a continuing exercise program and were classified as a sedentary group. The active group was composed of 12 members who were moderately active and nine members of a college track team. Using analysis of covariance no significant difference was found in the total duration of electromechanical systole (QS2), left ventricular ejection time (LVET), or the pre-ejection period (PEP) between the moderately active subgroup and the members of the track team. However, a highly significant difference was found between the sedentary and the active group in the QS2 and PEP. The LVET was not significantly different. (Author)

A73-38259 **A new technique for the study of left ventricular pressure-volume relations in man.** L. P. McLaurin (North Carolina Memorial Hospital, Chapel Hill, N.C.), W. Grossman, M. A. Stefadouros, E. L. Rolett, and D. T. Young (North Carolina, University; North Carolina Memorial Hospital, Chapel Hill, N.C.). *Circulation*, vol. 48, July 1973, p. 56-64. 20 refs. Research supported by the North Carolina Heart Association; Grant No. NIH-HL-14883-01.

A73-38260 * **Effects of posture on exercise performance - Measurement by systolic time intervals.** D. H. Spodick (Lemuel Shattuck Hospital, Boston, Mass.) and V. M. Quarry-Pigott (Lemuel Shattuck Hospital; Tufts University, Boston, Mass.). *Circulation*, vol. 48, July 1973, p. 74-78. 24 refs. Grant No. NGR-22-012-006.

Because posture significantly influences cardiac performance, the effects of moderate supine and upright ergometer exercise were compared on the basis of proportional (+37%) rate increments over resting control. Supine exercise produced significant decreases in left ventricular ejection time (LVET), pre-ejection period (PEP), and isovolumic contraction time (IVCT). Ejection time index (ETI) and corrected ejection time (LVETc) did not change significantly. Upright exercise produced greater decreases in PEP and LVET, but despite the rate increase there was no change in LVET, which resulted in sharp increases in ETI and LVETc. The discordant directional effects on LVET and its rate-correcting indices between the two postures were consistent with hemodynamic studies demonstrating lack of stroke volume change during supine exercise and increased stroke volume over control during light to moderate upright exercise. (Author)

A73-38294 * **Brain calcium - Role in temperature regulation.** J. L. Hanegan and B. A. Williams (NASA, Ames Research Center, Moffett Field, Calif.). *Science*, vol. 181, Aug. 17, 1973, p. 663, 664. 11 refs.

Perfusion of the preoptic-anterior hypothalamus with excess calcium ion in ground squirrels produces a drop in core temperature. The magnitude of the drop is directly dependent on ambient temperature. Respiration, heart rate, and oxygen consumption are also reduced during perfusion of calcium ion. It is concluded that the depression of body temperature during calcium ion perfusion is due to generalized depression of the neurons of the preoptic-anterior hypothalamus. (Author)

A73-38360 **Aerobic capacity of relatively sedentary males.** A. E. Coleman, P. Kreuzer (Texas, University, Austin, Tex.), and C. L. Burford (Texas Tech University, Lubbock, Tex.). *Journal of Occupational Medicine*, vol. 15, Aug. 1973, p. 628-632. 25 refs. Research supported by the Texas Tech University.

Physical work capacity (PWC), sometimes called aerobic capacity, is defined as the maximum level of metabolism or work that an individual is capable of attaining, and is determined by measuring maximal oxygen consumption (VO2max). A program is described the objectives of which were to identify problem areas (low VO2 maximum values) and prescribe physical exercise designed to delay the aging processes and hopefully reduce the risk of cardiovascular disorders, decrease obesity, enhance energy output, and increase the chances for enjoying a more productive life. The findings suggest that the effects of sedentary living and age can be balanced or delayed with regular physical activity. F.R.L.

A73-38377 **Interference of 'attend to and learn' tasks with tracking.** P. D. McLeod (Medical Research Council, Applied Psychology Unit, Cambridge, England). *Journal of Experimental Psychology*, vol. 99, Aug. 1973, p. 330-333. 5 refs.

Examination of the data of Noble et al. (1967) underlying their finding that a secondary task requiring attention but no overt responses does not interfere with concurrent tracking. A weakness in their measure of secondary task performance is discussed. An experiment is described in which 11 naval enlisted men track and simultaneously perform an additional task with or without overt responses. It is found that both overt and covert response conditions interfere equally with tracking. M.V.E.

A73-38378 **Effects of prestimulus cuing and target load variability on maintenance of response strategies in a visual search task.** J. F. Hearns (Massachusetts, University, Amherst, Mass.). *Journal of Experimental Psychology*, vol. 99, Aug. 1973, p. 375-380. 11 refs.

A73-38472 # **Today's challenge - Optimizing the air traffic controller's role.** L. B. Barnes and D. L. Dickson (System Development Corp., Santa Monica, Calif.). In: Air Traffic Control Association, Annual Meeting and Technical Program, 17th, Chicago, Ill., October 9-11, 1972, Proceedings. Washington, D.C., Air Traffic Control Association, 1973, p. 60-62.

Development of an evaluation system for assessing air traffic controller performance. After determining if available FAA data were usable for determining controller tasks and their measures and performing a complete and detailed analysis of air traffic functions, a test performance evaluation package was designed and was tested in the field. The problem of optimizing the increasingly important manager/monitor function of the air traffic controller is considered from the selection and training standpoints. A.B.K.

A73-38484 **Invariance of visual receptive-field size and visual acuity with viewing distance.** C. R. Cavonius and R. Hilz (München, Universität, Munich, West Germany). *Optical Society of America, Journal*, vol. 63, Aug. 1973, p. 929-933. 20 refs.

The size of human visual receptive fields was measured by two methods while the observer accommodated on near and distant targets. In one method, interference patterns that were not affected by the state of accommodation of the eye were formed on the retina and used to measure the modulation-sensitivity function of the visual system without the influence of its optics. The spatial frequency to which the observer was most sensitive, which is related to receptive-field size, was not affected by changes of accommodation or convergence. Visual acuity also remained constant when accommodation was changed. In the second experiment, receptive-field size was estimated by determining the size of a superimposed background that most effectively masked a small test flash. As in the first experiment, viewing distance did not appear to influence receptive-field size. It is concluded that size constancy is not a result of changes in receptive-field dimensions. (Author)

A73-38866 * **Ejection time by ear densitogram and its derivative - Clinical and physiologic applications.** V. Quarry-Pigott, R. Chirife, and D. H. Spodick (Lemuel Shattuck Hospital; Tufts University, Boston, Mass.). *Circulation*, vol. 48, Aug. 1973, p. 239-246. 5 refs. Grant No. NGR-22-012-006.

Ear densitographic ejection times (EDET) and first derivative ear densitogram ejection times (dEDET) were studied to determine whether their reliability and validity justify their substitution for ejection times derived from the far less stable carotid pulse tracing.

Inter- and intra-subject comparisons were made on thirty individuals under a wide variety of disease and challenge states. Statistical analysis of the data - which had been obtained through a blinded procedure - showed an overall correlation (r) of .98 for carotid vs EDET and .99 for carotid vs dEDET. The t-test demonstrated no significant differences among ejection times derived from the three methods. Moreover, the close tracking at rest and during challenges of ejection times derived from these curves with those from the carotid indicate that either method may be substituted for standard carotid curves without sacrificing reliability or validity of the measure. (Author)

A73-38867 **Assessing the severity of aortic stenosis by phonocardiography and external carotid pulse recordings.** A. J. Bonner, Jr., H. N. Sacks, and M. E. Tavel (Indiana University; Marion County General Hospital, Indianapolis, Ind.). *Circulation*, vol. 48, Aug. 1973, p. 247-252. 24 refs. Research supported by the Herman C. Krannert Fund, Eli Lilly and Co., and the Indiana Heart Association; Grants No. PHS-HE-09815-08; No. PHS-HE-6308; No. PHS-HTS-5363; No. PHS-HE-5749.

Phonocardiograms and carotid pulse tracings were done on a group of 47 patients with all degrees of aortic stenosis and were compared with two groups of normals. Indices evaluated were pre-ejection period, left ventricular ejection time, maximum rate of arterial pulse rise, arterial half rise time (T time) and upstroke time, and timing of the peak intensity of the systolic murmur in relation to the electrocardiographic QRS and first heart sound. The indices most indicative of the presence of aortic stenosis and best correlated with its severity were the ejection time index, the maximal rate of rise of the carotid pulse and the timing of the peak of the systolic murmur. If, in a given case, all three of these indices fall outside of certain limits (ejection time index above 0.42 sec, maximum rate of arterial pulse rise below 500 mm Hg/sec, and Q wave to peak of murmur above 0.19 sec), then severe aortic stenosis is almost invariably present. (Author)

A73-38868 **Echocardiographic evaluation of the hemodynamic effects of chronic aortic insufficiency with observations on left ventricular performance.** H. G. Danford, D. A. Danford, J. E. Mielke, and L. F. Peterson (St. Elizabeth Hospital; Appleton Memorial Hospital, Appleton, Wis.). *Circulation*, vol. 48, Aug. 1973, p. 253-262. 45 refs.

A73-38869 **Detection of left ventricular asynergy by echocardiography.** J. J. Jacobs, H. Feigenbaum, B. C. Corya, and J. F. Phillips (Indiana University; Marion County General Hospital, Indianapolis, Ind.). *Circulation*, vol. 48, Aug. 1973, p. 263-271. 25 refs. Research supported by the Herman C. Krannert Fund and Indiana Heart Association; Grants No. PHS-HE-09815-08; No. PHS-HE-6308; No. PHS-HTS-5363; No. PHS-HE-5749.

Ten of the 48 patients in the study conducted had normal selective coronary arteriograms and normal left ventricular cineangiocardiograms in right anterior oblique projection. A somewhat surprising observation was that the incidence of abnormalities in the echocardiograms was higher than in the ventriculograms among the patients with angiographically proven coronary artery disease. The good correlation between the electrocardiogram and the echocardiogram in the localization of the area of ischemic damage supports the claim that echocardiography can detect localized areas of asynergy. G.R.

A73-38998 # **A diagnostic program - Problems of predicting myocardial infarction on a digital computer (Diagnosticheskaia programma - Voprosy prognozirovaniia infarkta miokarda s pomoshch'iu tsifrovykh vychislitel'nykh mashin).** I. I. Dzegelenok, A. N. Doroshenko, and A. G. Shigin (Moskovskii Energeticheskii Institut, Moscow, USSR). In: Applied mathematics and cybernetics. Moscow, Izdatel'stvo Nauka, 1973, p. 254-258. In Russian.

A mathematical basis is discussed for constructing computer programs to predict the outcome of disease in patients with a secondary infarction condition. A mathematical model of prognosis is built on a large volume of clinical data. Two types of algorithms are developed which cover a range of symptoms and their combinations. A chart is included for classification of cases with satisfactory and lethal outcomes by using optimistic and pessimistic computer programmed algorithms. Clinical data demonstrate the efficiency of the algorithms in practical applications. V.Z.

A73-39000 # **Prediction of the outcomes of myocardial infarction from formulas derived by the dynamic programming method (Prognozirovanie iskhodov infarkta miokarda po formulam, vyvedennym metodom dinamicheskogo programmirovaniia).** E. Sh. Khalfen, K. S. Iatsenko, and D. M. Zaferman (Nauchno-Issledovatel'skii Proektnyi Institut Neftekhimavtomat, USSR). In: Applied mathematics and cybernetics. Moscow, Izdatel'stvo Nauka, 1973, p. 279-282. 5 refs. In Russian.

A73-39002 # **Probabilistic statistical methods for analysis of impulse flows in nerves (Veroiatnostno-statisticheskie metody analiza impul'snykh potokov v nervakh).** B. I. Balanter (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) and L. I. Tatarinov (Gor'kovskii Gosudarstvennyi Universitet, Gorki, USSR). In: Applied mathematics and cybernetics. Moscow, Izdatel'stvo Nauka, 1973, p. 333-344. 10 refs. In Russian.

Probabilistic models are constructed for describing the stimulation of impulse flows in receptor fields and for transmission of such flows by nerve fibers. Statistical methods are applied to determine the laws of distribution of nerve fibers according to impulse repetition frequencies and impulse transmission rates. The results are applicable to the stimulation of a nerve by single pulses, by a sequence of impulses with different repetition frequencies, by two impulses which follow at variable time intervals, and by a sequence of impulses which follow each other at time intervals subject to a certain specific law. V.Z.

A73-39003 # **A mathematical model of the peripheral pain signalization mechanism (Matematicheskaia model' perifericheskogo mekhanizma bolevoi signalizatsii).** B. I. Balanter and V. M. Khaiutin (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). In: Applied mathematics and cybernetics. Moscow, Izdatel'stvo Nauka, 1973, p. 345-348. 6 refs. In Russian.

It is demonstrated by experiments that the reaction to pain under the action of chemical agents on a tissue is a result of synchronous stimulation of microbundles of thin afferent nerve fibers. Concepts of evoked and probabilistic synchronization of impulse flows are applied to construct a mathematical model of the transmission of bioelectrical signals by nerve fibers. The model is used to determine some characteristics of electric neurons which are essential for the identification of the synchronization of signals caused by pain as distinct from that of signals produced by other stimuli. V.Z.

A73-39004 # **An electrical model of the inertial and adaptive properties of vision as a self-regulating system with delayed feedback (Elektricheskaia model' inertsionnykh i adaptatsionnykh svoistv zreniia kak avtoreguliruiushchaiasia sistema s zapazdyvaiushchei obratnoi sviaz'iu).** V. N. Budko (Voronezhskii Gosudarstvennyi Universitet, Voronezh, USSR). In: Applied mathematics and cybernetics. Moscow, Izdatel'stvo Nauka, 1973, p. 349-352. In Russian.

A73-39005 # **Mathematical analysis of the operation of regulatory mechanisms of the spinal cord (Matematicheskii analiz raboty mekhanizmov upravleniia spinnogo mozga).** L. A. Maksimenko (Dnepropetrovskii Gosudarstvennyi Universitet, Dne-

propetrovsk, Ukrainian SSR). In: Applied mathematics and cybernetics. Moscow, Izdatel'stvo Nauka, 1973, p. 355-358. 7 refs. In Russian.

Derived differential equations describe the dynamics of transient processes in the regulatory mechanisms which function at the entrance of the multineuron reflex arch of the spinal cord. Attention is given to the action of primary afferent depolarization, the homosynaptic depression, and trace depolarization. The influence of inhibition parameters is investigated, and a graphical representation is provided of the transient processes in the multiloop regulatory system. G.R.

A73-39101 # Physiological cost in 36- and 48-hour simulated flights. H. B. Hale, W. F. Storm, J. W. Goldzieher, B. O. Hartman, R. E. Miranda, and J. M. Hosenfeld (USAF, School of Aerospace Medicine, Brooks AFB, Tex.; Southwest Foundation for Research and Education, San Antonio, Tex.). *Aerospace Medicine*, vol. 44, Aug. 1973, p. 871-881. 17 refs.

Groups of young healthy men were studied during 36- and 48-hr simulated flights in which they performed on psychomotor measuring devices, using a 2-hour work/rest schedule. Physiologic cost was assessed by use of a battery of urinary techniques, including potassium, sodium, urea, 17-OHCS, and, in some cases, individual 17-ketosteroids. Comparison was made of responses to (1) uncomplicated flight, (2) flight complicated by environmental dryness, (3) flight complicated by 8000-ft pressure altitude, and (4) flight complicated by dryness and altitude. The prolonged psychomotor effort (and attendant sleep deprivation) acted as a nonspecific stressor. Altitude had intensifying influence, but dryness tended to counteract some phases of the stress response. In combination, altitude and dryness in certain physiologic respects acted in a depressant manner. (Author)

A73-39102 Ultradian rhythms in human telemetered gross motor activity. G. G. Globus, E. C. Phoebus, J. Humphries, R. Boyd, and R. Sharp (California, University, Irvine, Calif.). *Aerospace Medicine*, vol. 44, Aug. 1973, p. 882-887. 15 refs. Grant No. DADA17-69-C-9009.

The temporal organization of sleep shows an ultradian (72-144 min) rhythm comprising the alteration between REM and NREM sleep. The present study monitored waking gross body movement via telemetry under conditions of individual isolation or small group isolation. For the small group condition, the most prominent rhythm in gross body movement was at 113.3 min. For the individual condition, the most prominent rhythm (independent of phase across subjects) was the range 142.6 to 148.4 min. This provides some further support for the hypothesis that ultradian rhythms occur during waking, although they account for little of the total variance in gross motor activity in the present experiment. (Author)

A73-39103 * Apollo diet evaluation - A comparison of biological and analytical methods including bioisolation of mice and gamma radiation of diet. T. D. Luckey (Missouri, University, Columbia, Mo.), M. H. Bengson (GE Space Technology Center, Valley Forge, Pa.), and M. C. Smith (NASA, Johnson Space Center, Houston, Tex.). *Aerospace Medicine*, vol. 44, Aug. 1973, p. 888-901. 21 refs. Contract No. NAS9-9000.

A73-39104 Circadian rhythms of free radical state concentrations in the organs of mice. L. A. Piruzian, O. A. Kovalenko, and V. M. Chibrikin (Akademiia Nauk SSSR, Institut Khimicheskoi Fiziki, Moscow, USSR). *(Aerospace Medical Association, Annual Scientific Meeting, 43rd, Bal Harbour, Fla., May 8-11, 1972.) Aerospace Medicine*, vol. 44, Aug. 1973, p. 902-904. 8 refs.

In recent years there has been considerable interest in the role played by free radical states in the genesis of various pathological processes and during stress conditions. The free radical state concentration in animal tissue has been found to change during tumor growth and radiation damage to the organism. These changes in free radical state concentration were determined with respect to controls. It was of interest to examine the effects of various physical factors on daily free radical fluctuations. Starvation for seventy-two hours was found not to noticeably affect the phase, period, or amplitude of the fluctuations. Although X-ray radiation disrupted redox reactions, free radical fluctuations were not noted thirty days after mice were irradiated. (Author)

A73-39105 * Nutrition systems for pressure suits. C. S. Huber (Technology, Inc., Life Sciences Div., Houston, Tex.), N. D. Heidelbaugh, R. M. Rapp, and M. C. Smith, Jr. (NASA, Johnson Space Center, Biomedical Research Div., Houston, Tex.). *Aerospace Medicine*, vol. 44, Aug. 1973, p. 905-909. 5 refs.

Nutrition systems were successfully developed in the Apollo Program for astronauts wearing pressure suits during emergency decompression situations and during lunar surface explorations. These nutrition systems consisted of unique dispensers, water, flavored beverages, nutrient-fortified beverages, and intermediate moisture food bars. The emergency decompression system dispensed the nutrition from outside the pressure suit by interfacing with a suit helmet penetration port. The lunar exploration system utilized dispensers stowed within the interior layers of the pressure suit. These systems could be adapted for provision of nutrients in other situations requiring the use of pressure suits. (Author)

A73-39106 Changes in whole body force transmission of dogs exposed repeatedly to vibration. R. G. Edwards and C. F. Knapp (Kentucky, University, Lexington, Ky.). *Aerospace Medicine*, vol. 44, Aug. 1973, p. 910-913. 12 refs. Contract No. F44620-69-C-0127.

Whole body force transmission was recorded from sitting dogs during 30-sec exposures to vertical, sinusoidal vibration. A vibration test consisted of sequentially exposing each animal to frequencies of 2, 3, 4, 5, 6, 7, and 12 Hz at constant acceleration amplitudes from 0.3 to 1.0 g. Each test was repeated approximately every two days. Whole body force transmission was plotted as a function of (1) vibration frequency and (2) repeated exposure to the same vibration. Analysis of the data indicated appreciable changes in the amplitude of whole body force transmission from repeated exposures near the resonant frequency. For this case, the largest value of force transmission occurred during the first test and decreased to lower values with repeated exposure. (Author)

A73-39107 Patterns of diurnal variation in the intraocular pressure of airline pilots. J. G. Daubs (Yale University, New Haven, Conn.). *Aerospace Medicine*, vol. 44, Aug. 1973, p. 914-917. 27 refs.

A73-39108 Comparison of the job attitudes of personnel in three air traffic control specialties. R. C. Smith (FAA, Civil Aeromedical Institute, Oklahoma City, Okla.). *Aerospace Medicine*, vol. 44, Aug. 1973, p. 918-927. 15 refs.

A73-39109 Sleep loss in air cabin crew. F. S. Preston, H. P. R. Smith, and V. M. Sutton-Mattocks (British European Airways Corp. and British Overseas Airways Corp., Medical Service, London Airport, Heathrow, Middx., England). *Aerospace Medicine*, vol. 44, Aug. 1973, p. 931-935. 9 refs.

In recent years, there have been a number of studies of the changes in circadian rhythms and their effect on the sleep of pilots. Little definitive work has been carried out on this aspect as it affects air cabin crews. As part of a cabin crew workload study in BOAC, the sleep patterns of 12 stewards and 12 stewardesses were studied for periods of about 14 weeks. Attempts were made to correlate

sleep loss with variables such as time zone change, days away on tour, and rest days during any given integration. In this particular group, sleep loss seemed to be related to the number of night flights, at local time, per tour and not to time zone changes. (Author)

A73-39110 # Information yield of the Annual Medical Examination for Flying. R. G. Rossing (U.S. Veterans Administration Center, Temple, Tex.) and M. F. Allen (USAF, School of Aerospace Medicine, Brooks AFB, Tex.). *Aerospace Medicine*, vol. 44, Aug. 1973, p. 936-943. 9 refs.

A recent two-year study attempted to evaluate the present frequency and content of the USAF Medical Examination for Flying. Records of officers on flying status who either died, were retired for permanent disability, or were temporarily disabled for 30 days or more, were reviewed. A search was made for conditions which were causing a significant number of losses and for which more vigorous investigation might be made during the annual examination, and only two such were recognized: arteriosclerotic heart disease and psychiatric illnesses. Paired medical examinations done on the same individual a year apart were compared, item by item, to evaluate the information yield of the second examination. It is concluded that the information yield of the annual examinations as presently performed is low, especially in the younger age groups. (Author)

A73-39111 Spatial disorientation and the 'break-off' phenomenon. A. J. Benson (RAF, Institute of Aviation Medicine, Farnborough, Hants., England). *Aerospace Medicine*, vol. 44, Aug. 1973, p. 944-952. 20 refs.

Out of 78 air crewmembers referred for clinical assessment because of 'disorientation in flight,' 29 pilots described incidents in which they experienced feelings of unreality and detachment. These commonly occurred during monotonous phases of flight in conditions where external visual orientation cues were restricted. In 22 pilots of fixed-wing aircraft, the perceptual disturbances characteristic of the 'break-off' phenomenon occurred when flying at altitudes in excess of 30,000 ft, but seven helicopter pilots had comparable sensory disturbances at 500-10,000 ft. In all but three pilots, the dissociative sensations were coupled with illusory perceptions of aircraft attitude and motion, though only in eight pilots was there a qualitatively false perception of aircraft orientation. Evidence is presented which suggests the 'spatial disorientation' occurring as a concomitant of 'break-off' was caused by minor degrees of vestibular asymmetry. (Author)

A73-39112 Sudden incapacitation in flight - 1 Jan. 1966-30 Nov. 1971. R. B. Rayman (USAF, Inspection and Safety Center, Norton AFB, Calif.). *Aerospace Medicine*, vol. 44, Aug. 1973, p. 953-955.

United States Air Force (USAF) experience of sudden incapacitation in flight during the period from Jan. 1, 1966 through Nov. 30, 1971 has been reviewed for the purpose of tabulating causes of incapacitation as well as discerning trends which might bear upon flying safety. Eighty-nine such cases have been identified during the time frame of this study and include: loss of consciousness of various etiologies, spatial disorientation, hypoxia, fumes in the cockpit, airsickness, hyperventilation, coronary disease, and otitis media. The causes of in-flight sudden incapacitation are discussed with particular reference to its predictability before the event. (Author)

A73-39113 Respiratory nitrogen elimination - A potential source of error in closed-circuit spirometry. G. A. Wood and B. Ricci (Massachusetts, University, Amherst, Mass.). *Aerospace Medicine*, vol. 44, Aug. 1973, p. 961, 962. 8 refs.

A73-39145 A new method for determining the degree of oxygenation of hemoglobin spectra in the case of inhomogeneous light paths, explained in an analysis of spectra of the human skin (Ein neues Verfahren zur Bestimmung des Oxygenierungsgrades von Hämoglobinspektren bei inhomogenen Lichtwegen, erläutert an der Analyse von Spektren der menschlichen Haut). R. Wodick and D. W. Lübbers (Max-Planck-Institut für Arbeitsphysiologie, Dortmund, West Germany). *Pflügers Archiv*, vol. 342, no. 1, 1973, p. 41-60. 32 refs. In German.

A73-39146 * Effects of round window stimulation on unit discharges in the visual cortex and superior colliculus. P. A. Schwartzkroin (Stanford University, Stanford, Calif.). *Experimental Brain Research*, vol. 17, July 30, 1973, p. 527-538. 38 refs. Grants No. PHS-EY-00691; No. NGR-05-020-435.

A73-39149 An interesting phenomenon in the case of weightlessness (Über ein interessantes Phänomen bei Schwerelosigkeit). H. J. Pichler. *(Deutsche Gesellschaft für Hals-Nasen-Ohren-Heilkunde, Kopf- und Hals-Chirurgie, Jahresversammlung, 43rd, Wiesbaden, West Germany, May 17, 1972.) Astronautik*, vol. 10, no. 2, 1973, p. 162-164. 17 refs. In German.

Astronauts when entering conditions of weightlessness have the sensation to rotate into an upside-down position. The physiological reasons for this phenomenon, called the inversion illusion, are examined, giving attention to a central inversion effect. Additional vestibular symptoms involving nausea and dizziness are observed in the case of the astronaut Irwin during the Apollo 15 mission. G.R.

A73-39205 Laser hazards. M. Eleccion. *IEEE Spectrum*, vol. 10, Aug. 1973, p. 32-38. 5 refs.

The evaluation of laser hazards to human health is discussed from the viewpoint of problems that arise during definition of compulsory safety standards for commercial laser products. Ocular and skin damage inflicted by laser radiation at various spectral ranges is briefly characterized to demonstrate typical limits of safe exposure. The compulsory laser safety standard currently proposed by the government is deemed controversial since it attempts to regulate the capabilities, applications, and operational features of lasers from the viewpoint of potential safety hazard. T.M.

A73-39208 Continuous radio telemetric recording of pulse rate in radar controllers while on duty (Kontinuierliche radiotelemetrische Registrierung der Pulsfrequenz bei Radarlotsen am Arbeitsplatz). H. Frost and H. Malinowsky (Giessen, Universität, Giessen, West Germany). *Wehrmedizinische Monatsschrift*, vol. 17, Aug. 1973, p. 231-239. 45 refs. In German.

During a study of the occupational (mainly mental) strain on pilots, prolonged pulse rate measurements were made in order to investigate the question as to how far parameters of pulse rate could provide possible information for an appraisal of the demands of this type of activity. The initial materials for the analysis of pulse rate were recordings from a radiotelemetric ECG magnetic tape. Their evaluation was carried out by means of a specially developed program system with a process calculator; the subsequent digital pulse data were graphically represented with a plotter. The use of continuous processing of pulse rate by the incorporation of a computer enables the simultaneous recognition to a certain extent of ECG changes. (Author)

A73-39209 Severe intraabdominal injuries without abdominal protective rigidity after an air crash - Seat belt injury (Schwere intraabdominale Verletzungen ohne Bauchdeckenabwehrspannung nach Flugzeugabsturz - Sitzgurtverletzung). H.-H. Briese (Landeskrankenhaus, Sanderbusch, West Germany). *Wehrmedizinische Monatsschrift*, vol. 17, Aug. 1973, p. 244-246. In German.

Comparison of two cases shows that severe intraabdominal injuries may be present, although muscular tension in the abdominal wall may be completely absent. By the application of great force, in the present case through the fastened seat belt in an air crash, the peritoneum and the musculature may be so severely torn at the same time that 'receptor' and 'reacting organ' for pain reception and transference fail. This can result in overlooking serious internal

abdominal injuries. Although adequate literature references are lacking, the injuries described can be considered typical trauma from aircraft seat belts. (Author)

A73-39212 # **Ground safety panel presentation.** J. M. Rives. In: Annual Corporate Aircraft Safety Seminar, 18th, Arlington, Va., April 1-3, 1973, Proceedings. Arlington, Va., Flight Safety Foundation, Inc., 1973, p. 18-21.

The areas considered necessary to assure safe flying, highly skilled personnel, and good maintenance are discussed. These areas are safety equipment, initial training, recurrent training, protective clothing and shelter from inclement weather, proper maintenance scheduling and long extended work periods, discrepancy reporting and communication between flight personnel and maintenance personnel, and test and servicing equipment. F.R.L.

A73-39215 # **Oxygen safety in corporate aircraft.** J. Meyer (Scott Paper Co., Philadelphia, Pa.). In: Annual Corporate Aircraft Safety Seminar, 18th, Arlington, Va., April 1-3, 1973, Proceedings. Arlington, Va., Flight Safety Foundation, Inc., 1973, p. 28-32.

Some practices and procedures which, when adhered to, should prevent aircraft from being exposed to the possibility of oxygen fires are outlined. In discussing the hazards of oxygen systems, the aircraft oxygen system itself, oxygen support and servicing equipment, and the actual servicing of oxygen are examined. These items are interrelated and all three have one common requirement, that of cleanliness. When testing the aircraft system, it is important that the minimum amount of oxygen be used. Most oxygen fires have occurred during servicing, when transferring high-pressure oxygen from one cylinder to another. F.R.L.

A73-39348 # **Management of the treatment of illnesses as a problem of modern control theory (Upravlenie lecheniem zabolevanii kak problema sovremennoi teorii upravleniia).** A. M. Petrovskii, V. V. Suchkov, and I. K. Shkhvatsabaia. *Avtomatika i Telemekhanika,* May 1973, p. 99-105. In Russian.

Medical treatment of chronic illnesses is analyzed as a problem of controlling a multivariable stochastic plant in the absence of complete relevant information. The problems of state correction and stabilization are formulated as two typical tasks involved, and methods of solving these two problems are examined with reference to institutional and out-patient treatment of chronic hypertension. T.M.

A73-39400 # **Structural changes in the adrenal nerve apparatus during experimental subtotal pancreatectonia (K strukturnym izmeneniiam nervnogo apparata nadpochechnikov pri subtotal'noi pankreatektomii v eksperimente).** R. A. Guseinova, L. G. Mamedbekova, D. D. Zakirdzhaev, and B. D. Seidov (Ministerstvo Zdravookhraneniia Azerbaidzhanskoi SSR, Nauchno-Issledovatel'skii Institut Klinicheskoi i Eksperimental'noi Meditsiny, Baku, Azerbaidzhan SSR). *Akademiia Nauk Azerbaidzhanskoi SSR, Doklady,* vol. 29, no. 2, 1973, p. 60-65. 9 refs. In Russian.

A73-39478 **Space-related research in mycology concurrent with the first decade of manned space exploration.** M. Dublin and P. A. Volz (Eastern Michigan University, Ypsilanti, Mich.). *Space Life Sciences,* vol. 4, Apr. 1973, p. 223-230. 74 refs.

A73-39479 **Intra-day variations in visual responsiveness.** L. Ronchi (Istituto Nazionale di Ottica, Arcetri, Italy). *Space Life Sciences,* vol. 4, Apr. 1973, p. 231-239. 25 refs.

In this research we raise two questions: (1) which is the order of magnitude of repeat variability of visual responsiveness during prolonged sessions, and (2) does visual responsiveness depend on the time of the day. Because of the complexity of the visual process, the reference to biological rhythm is rather vague. To answer the above questions we reviewed the available literature and we produce some findings recorded by us. By assuming as an index of variability the ratio of SD/Mean, the following conclusions may be drawn: speed of reading suprathreshold material - 5 to 26%, absolute threshold luminance - 25 to 50%, amplitude of the electroretinographic response - 7 to 14%, and cortical potential evoked by sinusoidally modulated light - 12 to 29%. (Author)

A73-39480 * **Inversion of lighting regimen alters acrophase relations of circadian rhythms in body temperature, heart rate and movement of pocket mice.** R. G. Lindberg (Northrop Corporate Laboratories, Hawthorne, Calif.), E. Halberg, F. Halberg, and P. Hayden (Minnesota, University, Minneapolis, Minn.). *Space Life Sciences,* vol. 4, Apr. 1973, p. 240-248. 9 refs. USAF-supported research; Grant No. PHS-5-K6-GM-13981; Contracts No. NAS2-5037; No. NAS9-12338.

A73-39481 * **Effects of a synchronizer phase-shift on circadian rhythms in response of mice to ethanol or ouabain.** W. Nelson and F. Halberg (Minnesota, University, Minneapolis, Minn.). *Space Life Sciences,* vol. 4, Apr. 1973, p. 249-257. 12 refs. Grants No. PHS-5-K6-GM-13981; No. NGR-24-005-006; Contract No. F29600-69-C-0011.

A73-39482 * **Circadian variations in presumably healthy men under conditions of peace-time army reserve unit training.** E. L. Kanabrocki (U.S. Veterans Administration Hospital, Hines, Ill.), L. E. Scheving (Arkansas, University, Little Rock, Ark.), F. Halberg (Minnesota, University, Minneapolis, Minn.), R. L. Brewer, and T. J. Bird. *Space Life Sciences,* vol. 4, Apr. 1973, p. 258-270. 21 refs. Grants No. PHS-5-K6-GM-13981; No. NGR-24-005-006.

A73-39483 **Method allowing biological and biochemical studies of vacuum-exposed bacteria.** M. Schwager (Frankfurt, Universität, Frankfurt am Main, West Germany). *Space Life Sciences,* vol. 4, Apr. 1973, p. 271-277.

A method is described which allows quantitative biological and biochemical studies of the vacuum effect on bacteria. Quantitative studies can only be performed if vacuum-exposed bacteria can be removed completely from their support. This is achieved by exposing bacteria to vacuum on a polyvinylalcohol film. After vacuum exposure this film is dissolved in buffer, leading to a quantitative release of bacteria into the buffer. This suspension of vacuum-exposed bacteria can then be used for quantitative biological and biochemical studies of the vacuum effect on bacteria. (Author)

A73-39484 **Origin of terrestrial polypeptides - A theory based on data from discharge-tube experiments.** P. R. Griffiths, P. J. Schuhmann, and E. R. Lippincott (Maryland, University, College Park, Md.). *Space Life Sciences,* vol. 4, Apr. 1973, p. 278-290. 50 refs.

Polymeric materials derived from HCN have been synthesized from reactants containing only carbon, hydrogen and nitrogen, as the solid product formed at high temperature on the walls of a discharge tube, and at room temperature from the gaseous products of that discharge condensed in a cold trap and allowed to warm up in the dark. These compounds were hydrolyzed with acid, and when possible with alkali. Amphoteric molecules were separated from the hydrolysate and examined for amino acids by GLC, after preparation of the TAB derivative. In all cases where nitrogenous solids were hydrolyzed, many natural and a few synthetic amino acids were formed, while blank runs indicated no trace of amino acids under the same treatment. A new theory for the origin of proteins on the primitive earth has been described in the light of these experimental results. (Author)

A73-39485 * **Effect of simulated lunar impact on the survival of bacterial spores.** O. Whitfield, E. L. Merek, and V. I. Oyama (NASA, Ames Research Center, Moffett Field, Calif.). *Space Life Sciences,* vol. 4, Apr. 1973, p. 291-294. 10 refs.

In order to test the effect of impact on organisms, the survival of bacterial spores after being propelled at high velocity in Pyrex and plastic beads into crushed basalt was measured. The beads were fired into sterilized canisters by both a conventional powder and a light gas gun. Results indicate that at the minimum (2.4 km/sec) lunar capture velocity, the number of colony forming units (CFUs) decreased by five orders of magnitude, and at 5.5 km/sec, statistically a more probable capture velocity, no CFUs were found. The decrease in CFUs observed with increasing velocity indicates that the spores were most probably killed by the impact. F.R.L.

A73-39486 * Altered susceptibility to motion sickness as a function of subgravity level. E. F. Miller, II and A. Graybiel (U.S. Navy, Naval Aerospace Medical Research Laboratory, Pensacola, Fla.). *Space Life Sciences*, vol. 4, Apr. 1973, p. 295-306. 21 refs. NASA-sponsored research. NASA Order T-81633; NASA Order L-43518.

Large interindividual differences among 74 normal subjects in the change in susceptibility to motion sickness with effective lifting of the normal g-load by parabolic flight maneuvers were recorded with high test-retest reliability. Most subjects, who were required to make standardized head movements while seated in a chair rotating at a constant speed, demonstrated either a substantial increase or a decrease in susceptibility, in confirmation of a previous study, while a few appeared to be more or less unaffected by the 1 g to 0 g gravitational change. A similar test procedure conducted with eighteen of the subjects at lunar- and Martian-gravity levels revealed further interindividual differences in susceptibility as a function of g-level. (Author)

A73-39487 The effect of immobilization on body fluid volume in the rat. J. Sobocinska (Akademia Medyczna, Warsaw, Poland). *Space Life Sciences*, vol. 4, Apr. 1973, p. 307, 308.

Total body water and extracellular volume were measured simultaneously with H-3 and Br-82 in male albino rats after two, four and eight weeks of immobilization. On the basis of these measurements the intracellular fluid volume was calculated. It was found that immobilization caused no changes in the volume and distribution of body fluids. (Author)

A73-39599 Erythropoietin production in dogs exposed to high altitude and carbon monoxide. G. R. Syvertsen and J. A. Harris (Illinois, University, Urbana, Ill.). *American Journal of Physiology*, vol. 225, Aug. 1973, p. 293-299. 39 refs.

A time course of erythropoietic responses was examined in dogs exposed to either high altitude (5500 m) or to carbon monoxide (195 ppm) for 72 hr. The hematocrit and hemoglobin levels attained by 72 hr were not significantly different between dogs exposed to altitude and those exposed to CO. The increases in hematocrits and hemoglobin concentrations in response to altitude were attributed to a decrease in plasma volume and to increased erythropoietin. The increases in hematocrits and hemoglobin concentrations in response to CO were attributed to increased erythropoietin production. (Author)

A73-39600 Determinants of hypothalamic neuronal thermosensitivity in ground squirrels and rats. J. A. Boulant and K. E. Bignall (Rochester, University, Rochester, N.Y.). *American Journal of Physiology*, vol. 225, Aug. 1973, p. 306-310. 25 refs. Grant No. NIH-NB-05713.

Single-unit activity was recorded from either anesthetized or decerebrate ground squirrels and rats. In the anterior hypothalamic-preoptic area (AH/PO), the thermosensitivity of 113 units was determined by their change in firing rate to changes in local temperature. When the proportions of warm-sensitive, cold-sensitive, and intensitive units were statistically compared, no differences were found between the two species of animals or between anesthetized and decerebrate preparations or between different seasons in the ground squirrel. However, significant differences were demonstrated between units held for relatively short periods (15 to 75 min) and those held for long periods of time (90 to 700 min). Also, significant differences were found between units having slow spontaneous firing rates (1 to 5 impulses/sec) and units having higher firing rates (6 to 50 impulses/sec). (Author)

A73-39601 Changes in thermosensitive characteristics of hypothalamic units over time. J. A. Boulant and K. E. Bignall (Rochester, University, Rochester, N.Y.). *American Journal of Physiology*, vol. 225, Aug. 1973, p. 311-318. 18 refs. Grant No. NIH-NB-05713.

Fifty-one anterior hypothalamic-preoptic single units were observed for more than 90 min each in either anesthetized or decerebrate rats and ground squirrels. Forty-four of the units recorded showed significant changes over time in spontaneous firing rate and/or local thermosensitivity. The most prevalent type of change (23 units) was a slow, fluctuating increase and decrease in activity levels. In four units, however, this fluctuation was more rapid - i.e., occurring approximately every 10 min. These changes could not be correlated with any of the measured temperatures. Some additional units displayed unidirectional increases or decreases in firing rate and thermosensitivity over extended periods of time. These findings suggest that activity changes in individual hypothalamic neurons may occur without simultaneous changes in set point temperature regulation and that thermoregulation is controlled by a summated effect of a large pool of neurons. (Author)

A73-39602 * Glycolytic intermediates and adenosine phosphates in rat liver at high altitude /3,800 m/. L. F. Cipriano and N. Pace (California, University, Berkeley, Calif.). *American Journal of Physiology*, vol. 225, Aug. 1973, p. 393-398. 23 refs. Grant No. NGL-05-003-024.

Liver tissue obtained from adult rats exposed to 3800 m altitude for intervals ranging from 1.5 hr to 63 days was examined by enzymatic analysis. During the first 3 hr of exposure, an immediate decrease in rephosphorylation of high-energy phosphates led to reduced glycogenesis and eventual pileup of AMP, pyruvate, fructose 1,6-diphosphate, glucose 6-phosphate, and glucose. This was accompanied by a reduction of pentose phosphate pathway activity. After 3 to 6 hr, a secondary adjustment of substrate concentrations occurred along with the apparent facilitation of phosphofructokinase. This secondary adjustment appears to increase anaerobic production of ATP and represents a significant intracellular contribution to the acclimatization process at high altitude. (Author)

A73-39603 * Contraction kinetics of ventricular muscle from hibernating and nonhibernating mammals. F. E. South and H. K. Jacobs (Missouri, University, Columbia, Mo.). *American Journal of Physiology*, vol. 225, Aug. 1973, p. 444-449. 31 refs. Research supported by the University of Missouri; Grant No. NGR-26-004-025.

Temperature-dependent studies of excitability and tension-production kinetics were made on isolated trabecular strips from hibernating hamsters (HH), nonhibernating hamsters (CH), and from rats (R). The strips were electrically driven and isometric tension along with its first time derivative (dP/dt) were recorded. Excitabilities of both hamster tissues were greater than that of rat tissue from 5 to 38 C with HH greater than CH. Peak tension production followed the order of HH greater than CH greater than R at all temperatures below 24 C. Rat preparations showed an optimum peak tension production at about 31 C while HH and CH showed optima between 17 and 24 C. Times to maximal rates of tension rise showed significant variation. In this respect, the order of sensitivity to decreasing temperature was HH greater than CH greater than R. (Author)

A73-39759 **A study of evoked slow activities in man which follow a voluntary movement and articulated speech (Etude chez l'homme d'activités évoquées lentes succédant au mouvement volontaire et au langage articulé).** G. Lelord, F. Laffont, D. Sauvage, and P. Jusseaume (Hôpital Bretonneau, Tours, France). *Electroencephalography and Clinical Neurophysiology,* vol. 35, Aug. 1973, p. 113-124. 29 refs. In French. Research supported by the Institut National de la Santé et de la Recherche Médicale, Caisse Régionale de Sécurité Sociale, and Foundation de France.

In the experiments conducted, the subject had to carry out a movement after receiving a stimulus. Electrodes placed at various locations of the head of the subject were used to observe electrical activity. A slow negative wave was usually found to appear after the movement. This wave was not restricted to the contralateral motor area, but extended bilaterally with a maximum at the vertex. Clenching of the fist, movements of the bucco-lingual region, and the articulation of a word appeared to produce the same wave characteristics. The wave characteristics obtained are presented in a number of graphs. G.R.

A73-39760 **Visually evoked cortical potentials to patterned stimuli in monkey and man.** P. Padmos, J. J. Haaijman, and H. Spekreijse (Instituut voor Zintuigfysiologie RVO-TNO, Soesterberg; Laboratory for Medical Physics, Amsterdam, Netherlands). *Electroencephalography and Clinical Neurophysiology,* vol. 35, Aug. 1973, p. 153-163. 38 refs.

In the experiments reported a checkerboard pattern was alternated with a blank field whose luminance was equal to the mean luminance of the checkerboard, so that the overall luminous flux remained constant. It was found that most human subjects exhibit a response to checkerboard stimulation. Spatial frequency selectivity in the case of a center-surround antagonistic receptive field structure seems the most plausible explanation of the results obtained with monkeys. The differences between human and monkey stimulus-response relationships are tentatively explained by the differences in cortical architecture. G.R.

A73-39761 **Unusual properties of repetitive fasciculations.** F. Sindermann, B. Conrad, H. M. Jacobi, and V. J. Prochazka (Ulm, Universität, Ulm, West Germany). *Electroencephalography and Clinical Neurophysiology,* vol. 35, Aug. 1973, p. 173-179.

Two normal subjects and a patient with an old poliomyelitis and normocalcaemic tetany were used in the studies. It was found that repetitive fasciculation potentials in the triceps and the adductor pollicis respectively showed a pause after contraction of the relevant muscle. The results obtained suggest that the pause originated proximal to the motor nerve endings. Radial nerve anaesthesia abolished the fasciculation in the triceps in one of the subjects. This fasciculation was also evoked by electrical stimulation of the radial nerve. Afferent conduction of the stimulus-induced volley was involved in originating the evoked fasciculation. G.R.

A73-39762 **Variations of heart rate during sleep as a function of the sleep cycle.** J. L. Aldredge and A. J. Welch (Texas, University, Austin, Tex.). *Electroencephalography and Clinical Neurophysiology,* vol. 35, Aug. 1973, p. 193-198. 9 refs. Contracts No. F44620-71-C-0091; No. F41609-71-C-0002.

Ten subjects, selected on the basis of good physical and mental health, were used in the investigation. Eight hours of sleep EEG, EOG, and EKG were recorded on FM magnetic tape for two nights. The majority of the subjects experienced a marked decrease in heart rate over a night of sleep which is reflected in the variation of the average mean heart rate with sleep cycle. The hypothesis that the mean heart rates for each sleep cycle of a particular night and stage are equal is rejected on the basis of the obtained data. G.R.

A73-39763 **Automated three-dimensional dendrite tracking system.** C. F. Garvey, J. H. Young, Jr., P. D. Coleman, and W. Simon (Rochester, University, Rochester, N.Y.). *Electroencephalography and Clinical Neurophysiology,* vol. 35, Aug 1973, p. 199-204. 5 refs. Navy-supported research; Grant No. NIH-NS-07870.

The development of an automatic system for tracking and measuring cell processes on designated nerve cells is discussed. The tracking and focusing are done by a computer with only minimal intervention from a human observer so that statistically reliable amounts of data can be obtained in a reasonable length of time. The data source of the system is a television camera which scans an image through a Leitz Orthoplan microscope. The vertical motion of the microscope stage is controlled by a computer driven stepping motor connected to the microscope fine focus control. A set of algorithms has been developed which allows a computer to recognize a dendrite, to follow it to the edge of the field, and then move the slide in whatever direction is necessary to continue following that dendrite until it ends. G.R.

A73-39764 **Similarities and differences concerning the sleep of two baboons, Papio hamadryas and Papio papio (Similitudes et différences du sommeil chez deux babouins, Papio hamadryas et Papio papio).** J. Bert (CNRS, Institut de Neurophysiologie et de Psychophysiologie, Marseille, France). *Electroencephalography and Clinical Neurophysiology,* vol. 35, Aug. 1973, p. 209-212. 11 refs. In French.

Results obtained by Bert et al. (1972) show that sleep characteristics are not common to a whole genus but vary according to the species. Studies conducted with the baboon species Papio hamadryas confirm this fact. The two baboon species, Papio hamadryas and Papio papio, live both in the savanna. However, the regions occupied by Papio hamadryas are much more arid than the areas in which Papio papio is found. G.R.

A73-39776 **Correlation of ventilatory responses to hypoxia and hypercapnia.** A. S. Rebuck, M. Kangalee, L. D. Pengelly, and E. J. M. Campbell (McMaster University, Hamilton, Ontario, Canada). *Journal of Applied Physiology,* vol. 35, Aug. 1973, p. 173-177. 25 refs. Research supported by the Joint Coal Board of New South Wales.

Ventilatory responses to isocapnic hypoxia and to CO2 under hyperoxic conditions were measured in 11 normal subjects, using a rebreathing technique. Subjects with a higher ventilatory response to hypoxia also had more marked sensitivity to CO2. The mixed venous CO2 tension was inversely related both to CO2 and hypoxic sensitivity, suggesting that the control mechanisms have functionally related sensitivities, in turn related to mixed venous CO2 tension. (Author)

A73-39777 **Transient ventilatory response to hypoxia with and without controlled alveolar PCO2.** W. J. Reynolds and H. T. Milhorn, Jr. (Mississippi, University, Jackson, Miss.). *Journal of Applied Physiology,* vol. 35, Aug. 1973, p. 187-196. 18 refs. Grant No. NIH-HL-14278-01.

The transient ventilatory responses of a group of normal male volunteers to step inputs from room air to mixtures containing 9, 8, and 7% oxygen were determined by continuous recording of expiratory flow, oxygen tension, and CO2 tension with a FM magnetic tape system. The analog data were then digitized and calculations performed to yield breath-by-breath values for tidal volume, respiratory frequency, minute volume, and alveolar oxygen tension and CO2 tension. In one experimental series the subject's alveolar CO2 tension was allowed to fall, and in another it was held constant by a rapidly responding external control system (capnostat). (Author)

A73-39778 **Mechanical interaction between the diaphragm and rib cage.** M. D. Goldman and J. Mead (Harvard University, Boston, Mass.). *Journal of Applied Physiology,* vol. 35, Aug. 1973, p. 197-204. 16 refs.

We obtained passive volume-pressure (V-P) characteristics of the rib cage in four standing subjects during voluntary relaxation.

Estimates or changes in rib cage volume (Vrc) based on changes in its anteroposterior and transverse diameters were related to transthoracic, transdiaphragmatic, and transabdominal pressures. Passive tensing of the diaphragm was obtained by compression of the abdomen with a pneumatic cuff. We conclude that the intrinsic pressure developed by the rib cage itself, freed from the influence of diaphragmatic tension, is transabdominal pressure and that the diaphragm increases rib cage volume only to the extent that it increases transabdominal pressure. (Author)

A73-39779 Effect of skin wetting on finger cooling and freezing. G. W. Molnar, A. L. Hughes, O. Wilson, and R. F. Goldman (U.S. Veterans Administration Hospital, Little Rock, Ark.; U.S. Army, Research Institute of Environmental Medicine, Natick, Mass.; Institute of Aviation Medicine, Malslatt, Sweden). *Journal of Applied Physiology*, vol. 35, Aug. 1973, p. 205-207. 10 refs.

The middle phalanx of a finger of seven subjects was exposed in duplicate tests, once dry and once wet, to a windstream of 6.8 m/sec at -15.0 C. Both pre-Newtonian and Newtonian cooling rates were somewhat faster for the wet than for the dry skin. The difference can be ascribed to an increment of heat transfer by evaporation from the wet skin. The mean time to reach the supercool temperature at which the wet skin started to freeze, however, was only 1.0 min longer for the dry skin. Freezing occurred in six of the seven cases of wet skin (cold induced vasodilatation supervened in the seventh case), but only in three cases with dry skin. It is concluded that water in the corneum precipitates crystallization at a higher supercooled temperature than that at which crystallization will tend to occur in dry skin. (Author)

A73-39780 Force output of the diaphragm as a function of phrenic nerve firing rate and lung volume. M. J. Evanich, M. J. Franco, and R. V. Lourenco (Illinois, University, Chicago, Ill.). *Journal of Applied Physiology*, vol. 35, Aug. 1973, p. 208-212. 16 refs. Grant No. NIH-HL-14735.

Transdiaphragmatic pressure (Pdi) was measured in cats during bilateral stimulation of cervical phrenic nerves with a physiological range of stimulus pulse rates. Values of Pdi were obtained under isovolumetric conditions at functional residual capacity (FRC) and at lung volumes below and above FRC. The results indicate that: (1) range of phrenic nerve motor firing rate with the most effective transfer of neural to diaphragmatic mechanical information corresponds to that found during normal breathing; (2) diaphragm muscle gain is a function of lung volume; and (3) effective resting length of the diaphragm may lie below FRC. (Author)

A73-39781 Evaluation of positive end-expiratory pressure in hypoxemic dogs. R. L. Jones and E. G. King (Alberta, University, Edmonton, Alberta, Canada). *Journal of Applied Physiology*, vol. 35, Aug. 1973, p. 213-219. 36 refs. Medical Research Council of Canada Grant No. MA-4220.

Cardiorespiratory effects of 5, 10, 15, and 20 cm H2O positive end-expiratory pressure (PEEP) were studied in pentobarbital-anesthetized dogs with (group A) or without (group C) oleic acid-induced pulmonary edema and in alpha-chloralose-anesthetized dogs with edema (group B). This study has shown that although arterial oxygen pressure increased during PEEP in pentobarbital-anesthetized dogs with edematous lungs, cardiac output decreased sufficiently to lower O2 delivery to peripheral tissues. Alpha-chloralose anesthesia significantly altered this cardiovascular response to PEEP. (Author)

A73-39782 Ventilatory control in the Hereford calf. G. E. Bisgard, A. V. Ruiz, R. F. Grover, and J. A. Will (Wisconsin, University, Madison, Wis.; Colorado, University, Denver, Colo.). *Journal of Applied Physiology*, vol. 35, Aug. 1973, p. 220-226. 34 refs. Research supported by the University of Wisconsin; Grant No. PHS-HL-13154.

Ventilatory control was studied in eight female Hereford calves 6-8 weeks of age. Studies were carried out in Madison, Wis. (740 mm Hg). The ventilatory response to acute hypoxia was assessed by having the calves breathe a progressively more hypoxic gas mixture so that arterial oxygen pressure decreased from approximately 130 to 30 mm Hg over a 20- to 25-min period. Arterial CO2 pressure was kept near normoxic levels and arterial blood was sampled every 1-2 min. The calf was found to be less sensitive to acute hypoxia than man. There was potentiation between acute hypoxia and hypercapnia in calves, but the potentiation was quantitatively less than that reported for man. (Author)

A73-39783 Phase IV volume of the single-breath nitrogen washout curve on exposure to altitude. G. W. Gray, I. D. B. Rennie, C. S. Houston, and A. C. Bryan (Defence and Civil Institute of Environmental Medicine, Downsview, Ontario, Canada). *Journal of Applied Physiology*, vol. 35, Aug. 1973, p. 227-230. 16 refs.

Phase IV volumes of the single-breath nitrogen washout curve were measured as an index of pulmonary interstitial fluid volume at ground level and after exposure to altitude. In a 4-hr exposure to 16,000 ft in a decompression chamber, no significant change was found in the phase IV volume or the phase IV/vital capacity ratio, in five subjects. In 12 subjects exposed to 17,500 ft on Mount Logan, no significant change was seen in phase IV volumes after one week. It is concluded that no measurable increase in the pulmonary interstital fluid volume, as detected by this technique, occurred with altitude exposure at the time intervals in which it was measured. (Author)

A73-39784 Responses of men and women to two-hour walks in desert heat. D. B. Dill, M. K. Yousef, and J. D. Nelson (Desert Research Institute, Boulder City; Nevada, University, Las Vegas, Nev.). *Journal of Applied Physiology*, vol. 35, Aug. 1973, p. 231-235. 10 refs. Research supported by the Nevada Heart Association; NSF Grant No. 17126; Grant No. NIH-HD-05625.

Performances of men and women walking in desert heat at 100 m/min were compared. Seven of eight men walked for 2 hr in the afternoon with ambient temperature ranging from 37 to 47 C, while three girls generally were unable to complete a 2-hr walk in the forenoon with ambient temperatures of 31-42 C. Each subject walked twice without drinking and twice with periodic replenishment of water and salt losses in sweat. In the men, the mean change in weight with water and salt replenished was -0.12 kg; those without water to drink lost 2.03 kg. It appears that if subjects walking for 2 hr in desert heat are instructed to drink periodically an amount of salt solution that balances salt and water losses in sweat their body weight in maintained and their cardiovascular system benefited. (Author)

A73-39785 Anaerobic threshold and respiratory gas exchange during exercise. K. Wasserman, B. J. Whipp, S. N. Koyal (Harbor General Hospital, Torrance; California, University, Los Angeles, Calif.), and W. L. Beaver (Harbor General Hospital, Torrance; California, University, Los Angeles; Varian Associates, Palo Alto, Calif.). *Journal of Applied Physiology*, vol. 35, Aug. 1973, p. 236-243. 28 refs. Grants No. PHS-HL-11907; No. PHS-RR-00425.

Alterations in gas exchange were studied in man during excerise increasing in increments of 15 W each minute, to determine the noninvasive indicators of the onset of metabolic acidosis (anaerobic metabolism). Expired airflow and CO2 and O2 tensions at the mouth during the breath were continuously monitored with rapidly responding gas analyzers. These measurements were recorded directly as well as processed by a minicomputer, on-line, to give minute ventilation, CO2 production, O2 consumption, and the gas exchange ratio, breath-by-breath. The anaerobic threshold (AT) could be identified in 85 normal subjects between 17 and 91 years of age, by these measurements. The patients studied with cardiac disease above functional class I have lower anaerobic thresholds than the least fit normal subjects. (Author)

A73-39786 # **Effects of tilting on pulmonary capillary blood flow in normal man.** N. Segel, R. Dougherty, and M. A. Sackner (Mount Sinai Medical Center, Miami Beach, Fla.). *Journal of Applied Physiology*, vol. 35, Aug. 1973, p. 244-249. 26 refs. Contract No. F41609-72-C-0004; Grant No. NIH-HL-10622.

Graded tilting of four subjects in a body plethysmograph from 0 to 90 deg head-up tilt position caused a progressive fall in pulmonary capillary blood flow (Qc), stroke volume, and capillary pulse amplitude (CPA) and a rise in heart rate at each angle of tilt. Changes were slight at 30 deg and most pronounced in the 90 deg head-up posture. When the subjects were tilted back from 90 deg through 30 deg to supine position, the pattern of circulatory changes was similar at each angle of tilt. Qc, peak systolic (PSF) and end-diastolic flows (EDF), and CPA of 10 resting subjects were measured in the supine and 90 deg vertical positions before, during, and after anti-G suit inflation and immediately after isometric excerise. From all our data a highly significant positive correlation between PSF and stroke volume was found both at rest and after exercise. (Author)

A73-39787 **FFA metabolism in thyroidectomized and normal dogs during rest and acute cold exposure.** P. Paul and W. L. Holmes (Lankenau Hospital, Philadelphia, Pa.). *Journal of Applied Physiology*, vol. 35, Aug. 1973, p. 250-258. 37 refs. Grants No. NIH-HE-07687; No. NIH-FR-5585.

Albumin-bound palmitate-1-C-14 was infused intravenously at a constant rate into unanesthetized surgically thyroidectomized (THY) and normal dogs, in the basal state at 22 C and during cold exposure at 4-5 C. O2 uptake, CO2 output, and free fatty acids (FFA) were determined from which the rates of FFA turnover and oxidation were calculated. (Author)

A73-39788 **Oxygen delivery and oxygen return to the lungs at onset of exercise in man.** J. Raynaud, H. Bernal, J. P. Bourdarias, P. David, and J. Durand (Centre Chirurgical Marie Lannelongue, Paris, France). *Journal of Applied Physiology*, vol. 35, Aug. 1973, p. 259-262. 18 refs. Research supported by the Délégation Générale à la Recherche Scientifique et Technique, Centre National de la Recherche Scientifique, and Institut National de la Santé et de la Recherche Médicale.

Right heart catheterization in 10 subjects allowed study of O2 delivery from the lungs to the tissues and oxygen return from the periphery to the lungs in response to the abrupt start of moderate work. Arterial and mixed venous blood samples were drawn simultaneously at intervals of 15 sec for the 1st min of work, and at 30-sec intervals afterwards. Cardiac output (Q) was measured by the Kr-85 constant-infusion technique; O2 content of arterial and mixed venous blood was determined by the Van Slyke manometric technique. (Author)

A73-39789 **Starch hydrolysis in man - An intraluminal process not requiring membrane digestion.** M. R. Fogel and G. M. Gray (Stanford University, Stanford, Calif.). *Journal of Applied Physiology*, vol. 35, Aug. 1973, p. 263-267. 22 refs. Grants No. PHS-RR-70; No. NIH-AM-11270.

Although pancreatic amylase is secreted into the intestinal lumen, it may act primarily after binding to the mucosal surface. To study the relative contribution to starch hydrolysis of intraluminal amylase versus amylase adsorbed to the microvillous membrane, jejunal perfusion and test meal experiments were performed in normal human subjects as well as in patients with exocrine pancreatic insufficiency (PI). Normal controls were able to hydrolyze 7.3 g of a 9.0-g infused starch load/hr to an average molecular weight of 610 g, whereas PI patients could only hydrolyze 4.3 g/hr to an average molecular weight of 1,836 g. The hydrolytic capacity of the intraluminal contents in both groups was more than adequate to explain the observed starch hydrolytic rate despite the fact that PI patients had only 10% of the hydrolytic capacity of the control subjects. (Author)

A73-39790 **Correlation between arterial carbon dioxide tension and regional cerebral blood volume by X-ray fluorescence.** M. E. Phelps, R. L. Grubb, Jr., and M. M. Ter-Pogossian (Edward Mallinckrodt Institute of Radiology; Washington University, St. Louis, Mo.). *Journal of Applied Physiology*, vol. 35, Aug. 1973, p. 274-280. 17 refs. Contract No. AT(11-1)-2011.

Regional cerebral blood volume (rCBV) was measured in vivo in seven rhesus monkeys over an arterial CO2 pressure range of 19-92 mm Hg. The rCBV measurements in each animal were made at four to five arterial carbon dioxide tension levels by the method of stimulated X-ray fluorescence. A significant correlation was found between the CO2 responsiveness of rCBV and arterial blood pressure. (Author)

A73-39791 **Heat conduction in blackened skin accompanying pulsatile heating with a xenon flash lamp.** K. K. Kraning (Washington, University, Seattle, Wash.). *Journal of Applied Physiology*, vol. 35, Aug. 1973, p. 281-287. 18 refs. Research supported by the Dermatology Foundation; Grants No. NIH-H-7293; No. NIH-AM-05250; No. DADA17-72-C-2103.

Temperatures of blackened forearm and heel skin were measured during exposure to short high-intensity irradiance pulses from a xenon flash lamp. Average energy absorption from each pulse was 0.047 cal/sq cm. Following the flash, the temperature of the skin surface rose abruptly by an average of 19.3 C within 2-5 msec. It was not possible to make clear distinctions between data obtained on the heel and the forearm on the basis of peak temperature times or amplitudes because of small variations in thickness of the blackening layer, thermocouple response time, and thermocouple contact resistance. However, by 10 msec, temperature data clustered into two distinctive groups representing the forearm, where the stratum corneum is less than 0.002 cm thick, and the heel, where the stratum corneum is 0.06 cm thick or greater. (Author)

A73-39792 **Adaptation to maximal effort - Genetics and age.** V. Klissouras, F. Pirnay, and J.-M. Petit (Liège, Université, Liège, Belgium; McGill University, Montreal, Canada). *Journal of Applied Physiology*, vol. 35, Aug. 1973, p. 288-293. 13 refs. Research supported by the Université de Liège; Medical Research Council of Canada Grant No. MA-3905.

Thirty-nine pairs of twins (23 monozygous and 16 dizygous) of both sexes, ranging in age from 9 to 52 years, were tested for maximal oxygen uptake, maximal work ventilation, and heart volume. The mean intrapair difference between twin pairs in maximal oxygen uptake was significant for dizygous (DZ) twins, but not for monozygous (MZ). On the basis of this evidence it was concluded that, regardless of age, existing individual differences in functional adaptability of man can be attributed to heredity. Further, it was noted that MZ twins demonstrated as much intrapair variability as DZ twins in the other two attributes studied. From this it was concluded that the pulmonary ventilation and the heart volume are nondecisive in the production of intrapair differences in maximal oxygen uptake. (Author)

A73-39793 **Positive-pressure breathing as a protective technique during +Gz acceleration.** S. J. Shubrooks, Jr. (USAF, School of Aerospace Medicine, Brooks AFB, Tex.). *Journal of Applied Physiology*, vol. 35, Aug. 1973, p. 294-298. 8 refs.

Use of continuous positive-pressure breathing (PPB) as a means of increasing tolerance to positive (+Gz) acceleration was investigated in healthy subjects experienced in riding a human centrifuge. Five were studied during PPB (25 to 35 mm Hg) and during an M-1 maneuver, both performed throughout 15-sec rapid-onset +Gz exposures without muscular tensing; tolerance increased 0.3 to 1.5 G with PPB, equal to the M-1 in two subjects and greater than the M-1 by 0.3 to more than 0.5 G in three. Ten other subjects were studied during 30-sec exposures with PPB increased to 40 mm Hg and generalized muscular straining added to PPB and the M-1; PPB increased tolerance by 0.7 to 2.2 G (mean 1.2 G), not significantly different from the M-1. (Author)

A73-39794 **A system for automatic end-tidal gas sampling at rest and during exercise.** H. L. Barlett, J. L. Loomis, N. S. Deno, J. Kollias, J. L. Hodgson, and E. R. Buskirk (Pennsylvania State University, University Park, Pa.). *Journal of Applied Physiology*, vol. 35, Aug. 1973, p. 301-303. 5 refs. Contract No. PHS-CPE-R-70-0043; Grant No. NIH-AM-08311.

A system for end-tidal gas collection was designed and fabricated to operate over the range of respiratory frequencies observed in human subjects at rest and during exercise. The system inherently eliminates the need for adjustable sample initiation and is simple to operate. End-tidal gas samples are obtained from near the mouth, thus reducing the likelihood of sampling mixed expired gas. The accuracy of the system was determined experimentally, and the system was then used to obtain data for determination of steady-state DL sub CO. The results were compared with those of Bates et al. (1955), and the suggestion is made that the differences in DL sub CO could possibly be accounted for by falsely high FET sub CO values obtained by Bates et al. (Author)

A73-39795 **Mechanism of oxygen transport augmentation by hemoglobin.** C. K. Colton, P. Stroeve, and J. G. Zahka (MIT, Cambridge, Mass.). *Journal of Applied Physiology*, vol. 35, Aug. 1973, p. 307-309. 22 refs. Research supported by the Camille and Henry Dreyfus Foundation and NSF.

Human hemoglobin was immobilized by sorption into swollen collodion films. The hemoglobin retained its ability to reversibly bind oxygen but did not augment oxygen transport, as measured by steady-state permeation experiments, whereas the same hemoglobin solution did augment transport through a Millipore filter. It was concluded that no facilitation mechanism is operative in the absence of hemoglobin mobility. (Author)

A73-39796 # **The problem of spiritual requirements and the theory of human higher nervous activity (Problema dukhovnykh potrebnostei i teoriia vysshei nervnoi deiatel'nosti cheloveka).** P. V. Simonov (Akademiia Nauk SSSR, Institut Vysshei Nervnoi Deiatel'nosti i Neirofiziologii, Moscow, USSR). *Zhurnal Vysshei Nervnoi Deiatel'nosti*, vol. 23, May-June 1973, p. 496-501. 37 refs. In Russian.

A73-39797 # **Bioelectric and vegetative components of conditioned reflexes of 'negative-emotional type' (Bioelektricheskie i vegetativnye komponenty uslovnykh refleksov 'otritsatel'no-emotsional'nogo tipa').** L. N. Paikova (Khar'kovskii Meditsinskii Institut, Kharkov, Ukrainian SSR). *Zhurnal Vysshei Nervnoi Deiatel'nosti*, vol. 23, May-June 1973, p. 517-522. 29 refs. In Russian.

A73-39798 # **Role of associations in the formation of evoked potentials from the human cerebral cortex (Rol' assotsiatsii v formirovanii vyzvannykh potentsialov kory golovnogo mozga cheloveka).** E. A. Kostandov and Iu. L. Arzumanov (Tsentral'nyi Nauchno-Issledovatel'skii Institut Sudebnoi Psikhiatrii, Moscow, USSR). *Zhurnal Vysshei Nervnoi Deiatel'nosti*, vol. 23, May-June 1973, p. 523-531. 11 refs. In Russian.

Experiments performed with 14 adult psychopaths in severe conflict situations involved measurements of cortical averaged evoked potentials in response to visual stimuli presented in pairs at fixed intervals between both stimuli in each pair. The first stimulus of each pair consisted of an illuminated arrow presented at an inclination of either 20 or 50 deg; the second stimulus consisted of an illuminated written word that had either a neutral meaning or was emotionally significant to the subject in his particular condition. Results show that the formation of temporary connections (associations) between two successively presented stimuli changes the character of the cortical response to the first stimulus in the pair. T.M.

A73-39799 # **Participation of cholinergic mechanisms in negative human emotions (Ob uchastii kholinergicheskikh mekhanizmov v otritsatel'nykh emotsiiakh cheloveka).** N. N. Zakharova (Tsentral'nyi Nauchno-Issledovatel'skii Institut Sudebnoi Psikhiatrii, Moscow, USSR). *Zhurnal Vysshei Nervnoi Deiatel'nosti*, vol. 23, May-June 1973, p. 532-537. 22 refs. In Russian.

The participation of cholinergic mechanisms in negative human emotions, in the perception of external signals, and in orientating reactions was studied experimentally with 30 subjects who exhibited emotional instability as a consequence of previously suffered cerebral trauma and who were experiencing severe conflict situations at the time of the study. Emotional stress arising in response to speech stimuli related to the particular conflict situation of the subject was reduced by application of the anticholinergic preparation amizyl in moderate therapeutic doses. This drug did not produce significant changes in the threshold of auditory signal perception. The anticholinergic drug galantamine did not have any significant effect on emotions. T.M.

A73-39800 # **Experimental analysis of conditions for onset of emotional stress (Eksperimental'nyi analiz uslovii vozniknoveniia emotsional'nogo napriazheniia).** O. V. Dashkevich (Gosudarstvennyi Tsentral'nyi Institut Fizicheskoi Kul'tury, Moscow, USSR). *Zhurnal Vysshei Nervnoi Deiatel'nosti*, vol. 23, May-June 1973, p. 538-544. 19 refs. In Russian.

The influence of motivation on emotional stress in humans was studied in experiments where subjects were frustrated by nonrealistic evaluations of their performance. Subjects were required to perform motor tasks in response to visual stimuli, with the speed of the reaction being the performance criterion. Tasks varied in difficulty, and the subjects were falsely briefed on the pattern of results generally obtained with others in order to provide social motivation. Displayed indications of success or failure in response to each task did not conform with reality and were under control of the experimenters according to a prescribed program. T.M.

A73-39801 # **Formation of various functional states in the symmetrical structures of the brain as a function of the intensity of unconditioned-excitation (Formirovanie razlichnykh funktsional'nykh sostoianii v simmetrichnykh strukturakh mozga v zavisimosti ot intensivnosti bezuslovnogo vozbuzhdeniia).** E. E. Fomicheva (Akademiia Meditsinskikh Nauk SSSR, Leningrad, USSR). *Zhurnal Vysshei Nervnoi Deiatel'nosti*, vol. 23, May-June 1973, p. 569-575. 28 refs. In Russian.

A73-39802 # **Functional properties of auditory cortex neurons in a controlled experiment (Funktsional'nye svoistva neironov slukhovoi kory v upravliaemom eksperimente).** U. G. Gasanov (Akademiia Nauk SSSR, Institut Vysshei Nervnoi Deiatel'nosti i Neirofiziologii, Moscow, USSR). *Zhurnal Vysshei Nervnoi Deiatel'nosti*, vol. 23, May-June 1973, p. 585-592. 14 refs. In Russian.

Interactions between neurons of the auditory cortex were studied in alert cats during experiments involving simultaneous recording of the activity of two cells. After establishing the nature of the evoked and background firing of two neighboring units, further studies were carried out with selective action on only one unit of the recorded pair by stimulating the cat with clicks triggered through background spikes of the selected neuron. The results are analyzed from the viewpoint of the formation of a sensori-specific conditioned reflex. T.M.

A73-39803 # **Diminution of uncertainty in the firing of hippocampal units in response to a stimulus (O snizhenii neopredelennosti v potoke impul'satsii ot neironov gippokampa v otvet na stimul).** G. I. Shul'gina and A. V. Korinevskii (Akademiia Nauk SSSR, Institut Vysshei Nervnoi Deiatel'nosti i Neirofiziologii, Moscow, USSR). *Zhurnal Vysshei Nervnoi Deiatel'nosti*, vol. 23, May-June 1973, p. 599-607. 15 refs. In Russian.

A73-39804 # **The form of the 'expectancy' wave and the psychic state in man (Forma volny 'ozhidaniia' i psikhicheskoe sostoianie cheloveka).** T. D. Filimonova (Tsentral'nyi Nauchno-

Issledovatel'skii Institut Sudebnoi Psikhiatrii, Moscow, USSR). *Zhurnal Vysshei Nervnoi Deiatel'nosti*, vol. 23, May-June 1973, p. 643-646. 9 refs. In Russian.

The relationship between parameters of the 'expectancy' wave (contingent negative variation) and the psychic state in man was studied in experiments with 25 healthy persons subjected to a preparatory visual stimulus followed by an imperative acoustic stimulus that signaled the subject to carry out a prescribed motor task. The results indicate that the terminal phase of the negative variation and the development of the subsequent positive waveform contain specific information relating to the correctness of the solution and expressing a critical evaluation of the subject's own response in a particular task. T.M.

A73-39805 # **Successive differentiation of visual stimuli in monkeys under various conditions of presentation (Posledovatel'noe differentsirovanie zritel'nykh razdrazhitelei v raznykh usloviiakh pred'iavleniia u obez'ian).** Iu. Ia. Zakher (Akademiia Meditsinskikh Nauk SSSR, Leningrad, USSR). *Zhurnal Vysshei Nervnoi Deiatel'nosti*, vol. 23, May-June 1973, p. 656-658. 5 refs. In Russian.

A73-39823 Hybrid biological power cells for cardiac pacemakers - Materials evaluation. J. B. Cooper (Massachusetts General Hospital, Boston, Mass.) and A. W. Hahn (Missouri, University, Columbia, Mo.). *IEEE Transactions on Biomedical Engineering*, vol. BME-20, Sept. 1973, p. 336-345. 12 refs. Research supported by the Missouri Heart Association and University of Missouri; Grant No. NIH-HE-12975-01.

A number of cathode and anode materials for an implantable hybrid biogalvanic fuel cell have been evaluated. Results of in vitro polarization tests and in vivo experiments with a voltage-sensing transmitter are presented. Experiments performed in an artificial interstitial-fluid (AIF) electrolyte are also discussed. A Pt activated-carbon cathode and zinc anode have exhibited the most suitable characteristics when all aspects of this type of power source are considered. This electrode pair has been used to power a cardiac pacemaker in two dogs with surgically created A-V blocks. (Author)

A73-39824 # **Evaluation of effects of the microwave oven /915 and 2450 MHz/ and radar /2810 and 3050 MHz/ electromagnetic radiation on noncompetitive cardiac pacemakers.** C. H. Bonney, P. L. Rustan, Jr. (USAF, School of Aerospace Medicine, Brooks AFB, Tex.), and G. E. Ford (California, University, Davis, Calif.). *IEEE Transactions on Biomedical Engineering*, vol. BME-20, Sept. 1973, p. 357-364. 17 refs.

A73-39866 * # **Applications of remote sensing in public health.** C. M. Barnes, C. E. Fuller, H. J. Schneider, E. E. Kennedy (NASA, Johnson Space Center, Health Services Div., Houston, Tex.), H. G. Jones (Boeing Co., Houston, Tex.), and D. R. Morrison. In: International Symposium on Remote Sensing of Environment, 8th, Ann Arbor, Mich., October 2-6, 1972, Proceedings. Volume 1. Ann Arbor, Mich., Environmental Research Institute of Michigan, 1973, p. 677-684.

Current research concerning the determination of the habitat of mosquito vectors of disease is discussed. It is shown how advanced interpretative processes have enabled recognition of the breeding areas of salt marsh mosquitoes and the breeding sites of the mosquito responsible for the transmission of St. Louis strain of encephalitis and of human filariasis. In addition, remote sensing data have also been useful in the study of the habitat of endemic strains of Venezuelan encephalitis virus in Florida. The beginning of the application of remote sensing to such public health aspects as air, water, and urban degradation is noted. V.P.

STAR ENTRIES

N73-27935*# Scientific Translation Service, Santa Barbara, Calif.
NOISE AND NOISE SICKNESS
Ye. Ts. AndreyevaGalanina, S. V. Alekseyev, A. V. Kadyskin, and G. A. Suvopov Washington NASA Jul. 1973 339 p refs Transl. into ENGLISH of the publ. "Shum i Shumovaya Bolezn" Leningrad, Meditsina, 1972 304 p
(Contract NASw-2035)
(NASA-TT-F-748) Avail: NTIS HC $6.00 CSCL 06S

Basic concepts and questions about noise, which contribute to a proper understanding of the characteristic of industrial noise as well as an experimental acoustical complex for the study of the noise factor, are examined. Special attention has been given to the effect of noise on the organ of hearing. Important data pertain to physiological research, including the questions of adaptation and fatigue. Changes in occupational hearing losses, caused by the prolonged effect of noise, are discussed. Data are given on the effect of an acoustic stimulus on the eye, motor analyze, on vibration sensitivity and the functional state of the vestibular analyze, involuntary functions, and the cardiovascular system. Data about the effect of noise on the functional state of the central nervous system are presented. It is concluded that both reactivity and lability of the cortex and subcortical structures are reduced, evidently in proportion to the noise effect. The degree of these effects is determined by the force of the noise. Author

N73-27936*# Massachusetts Inst. of Tech., Cambridge.
ROBOT VISION Final Report
Louis L. Sutro and Jerome B. Lerman Apr. 1973 78 p refs
(Contract NSR-22-009-138)
(NASA-CR-133458; R-635) Avail: NTIS HC $6.00 CSCL 06P

The operation of a system is described that is built both to model the vision of primate animals, including man, and serve as a pre-prototype of possible object recognition system. It was employed in a series of experiments to determine the practicability of matching left and right images of a scene to determine the range and form of objects. The experiments started with computer generated random-dot stereograms as inputs and progressed through random square stereograms to a real scene. The major problems were the elimination of spurious matches, between the left and right views, and the interpretation of ambiguous regions, on the left side of an object that can be viewed only by the left camera, and on the right side of an object that can be viewed only by the right camera. Author

N73-27937*# Florida State Univ., Tallahassee. Inst. of Molecular Biophysics.
RESEARCH IN PHOTOBIOLOGY AND PHOTOCHEMISTRY Final Report, 1964 - 1973
Hans Gaffron 18 Jul. 1973 22 p refs
(Grant NGR-10-004-018)
(NASA-CR-133459) Avail: NTIS HC $3.25 CSCL 06D

Publications are listed covering NASA research from 1966 to 1973. Several major works covering chloroplast reactions, aerobic green algae and hydrogenease, production of molecular hydrogen, and hydrogen and nitrogen metabolism in purple bacteria are summarized. E.H.W.

N73-27938*# Baylor Univ., Houston, Tex. Dept. of Microbiology and immunology.
PRODROMAL DISEASE: IMMUNE RESPONSES OF THE HOST MACROPHAGE SYSTEM TO HUMORAL FACTORS Final Report
B. S. Criswell and V. Knight Apr. 1973 115 p refs
(Grant NGR-44-003-044)
(NASA-CR-133455) Avail: NTIS HC $7.75 CSCL 06M

A composite is presented of nine studies, each yielding information contributing toward an understanding of methods designed to detect disease during the prodromal stages. The data further point to new areas of study that might be useful in early diagnoses. Five of the nine experiments were done in mice. Four of these involved acute infectious disease states and one involved a chronic autoimmune type disease. Of the numerous perimeters studied of the acute diseases, the uptake of H3- thymidine by peripheral blood lymphocytes appeared to yield the earliest indication of disease. This test was not useful in studying the chronic disease state. Four of the nine studies involved application of diagnostic technics to human disease. A normal baseline for H3-thymidine incorporation by human lymphocytes was determined. A subject with severe combined immunodeficiency disease was studied. A human volunteer study was done using Influenza A live attenuated vaccine. Finally, a human volunteer study of subjects infected with Influenza A was done. Author

N73-27939*# Battelle-Northwest, Richland, Wash.
MEASUREMENT OF RADIATION EXPOSURE OF ASTRONAUTS BY RADIOCHEMICAL TECHNIQUES Quarterly Research Report, 2 Oct. - 31 Dec. 1972
R. L. Brodzinski 15 Jan. 1973 20 p refs Sponsored in part by NASA
(Contract AT(45-1)-1830)
(NASA-CR-133378; BNWL-1183-13) Avail: NTIS HC $3.00

A cosmic radiation dose to the Apollo 16 crew of 180 + or - 100 mR was calculated from the specific activities of Na-22 and Na-24 in pre and postflight urine specimens. The specific activities of Cr-51 and Co-60 are higher in postflight specimens than in preflight specimens, presumably due to a postflight injection of radiochromium. The Fe-59 and Cs-137 specific activities are also reported and appear to be normal. The radiation doses received by a pilot and a navigator flying a high altitude mission during the solar flare of August 4 to 9, 1972 were calculated from the specific activity of Na-24 in their urine. These values are compared with the expected radiation dose calculated form the known shape and intensity of the proton spectrum. They demonstrate the magnitude of atmospheric shielding. Author

N73-27940# Institut Franco-Allemand de Recherches, St. Louis (France).
INFLUENCE OF PRESSURE RISE TIME OF AN N SHOCK WAVE, SIMULATING THE SONIC BOOM ON THE COCHLEAR AND ACOUSTICALLY EVOKED POTENTIALS OF THE GUINEA PIG [INFLUENCE DES TEMPS DE MONTEE EN PRESSION D'UNE ONDE EN N, SIMULANT LE BANG SONIQUE, SUR LES POTENTIELS COCHLEAIRES ET LES POTENTIELS EVOQUES AUDITIFS DU COBAYE]
A. Dancer and R. Franke 14 Sep. 1972 45 p refs In FRENCH
(Contract DRME-72/289)
(ISL-31/72) Avail: NTIS HC $4.25

The influence of pressure rise times of forward and backward fronts of N-type sound waves simulating sonic booms on the cochlea and acoustically evoke potential of the guinea pig were investigated. Experimental results have shown that at a given boom intensity, the front duration has an influence on the maxima amplitudes of cochlea and acoustically evoked potentials and, therefore, on the transmitted sound intensity. It was concluded that to characterize a sonic boom, it is necessary to determine not only its amplitude (or intensity) but also its forward and backward fronts. ESRO

N73-27941* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
ERGOMETER Patent
Raymond L. Gause and Bobby G. Bynum, inventors (to NASA) Issued 10 Jul. 1973 8 p Filed 29 Nov. 1971 Supersedes N72-20112 (10 - 11, p 1433)
(NASA-Case-MFS-21109-1; US-Patent-3,744,480; US-Patent-Appl-SN-202769; US-Patent-Class-128-2.05R; US-Patent-Class-73-379; US-Patent-Class-128-2.06R; US-Patent-Class-272-73) Avail: US Patent Office CSCL 06B

An ergometer is described that has a pedal driven direct current motor as a load and includes a frame for supporting the body of a person in either a sitting or a prone position. The pedals may be operated by either the feet or the hands. The electrical circuitry of the ergometer includes means for limiting the load applied to the pedals as a function of work being performed, heart rate, and increases in heart rate.
Official Gazette of the U.S. Patent Office

N73-27942# Flying Personnel Research Committee, London (England).
COLOUR VISION REQUIREMENTS IN DIFFERENT OPERATIONAL ROLES IN THE ROYAL AIR FORCE
D. H. Brennan Nov. 1972 22 p ref
(FPRC/1319) Avail: NTIS HC $3.25

The importance of color vision in the various operational roles of the Royal Air Force has been studied. It is considered that good color discrimination, although playing a valuable part in the total process of visual perception, is not of paramount importance. With present standards, the lantern is the best trade test for grading color defectives as fit or unfit for aircrew duties.
Author

N73-27943*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
AN EVALUATION OF SOME SPECIAL TECHNIQUES FOR NUCLEAR WASTE DISPOSAL IN SPACE
John S. MacKay Aug. 1973 25 p refs
(NASA-TM-X-62272) Avail: NTIS HC $3.25 CSCL 06I

A preliminary examination is reported of several special ways for space disposal of nuclear waste material which utilize the radioactive heat in the waste to assist in the propulsion for deep space trajectories. These include use of the wastes in a thermoelectric generator (RTG) which operates an electric propulsion device and a radioisotope - thermal thruster which uses hydrogen or ammonia as the propellant. These propulsive devices are compared to the space tug and the space tug/solar electric propulsion combination for disposal of waste on a solar system escape trajectory. Such comparisons indicate that the waste-RTG approach has considerable potential provided the combined specific mass of the waste container - RTG system does not exceed approximately 150 kg/kw sub e. Several exploratory numerical calculations have been made for high earth orbit and Earth escape destinations.
Author

N73-27944*# Minnesota Univ., St. Paul. Dept. of Food Science and Nutrition.
STORAGE STABILITY AND IMPROVEMENT OF INTERMEDIATE MOISTURE FOODS Final Report, 27 Mar. 1972 - 27 Mar. 1973
Theodore P. Labuza 17 Mar. 1973 277 p refs
(Contract NAS9-12560)
(NASA-CR-133978) Avail: NTIS HC $16.00 CSCL 06H

The rates of chemical reactions which deteriorate foods prepared to an intermediate moisture content and water activity (A sub w 0.6 to 0.9) were studied. The phenomenon of sorption hysteresis was used to prepare model systems and foods to similar A sub w's but different moisture levels so that the separate effects of water binding and water content could be elucidated. It was found that water content is the controlling factor for lipid oxidation in model systems comprised of a solid support and an oxidizable liquid. It was proposed that metal chelating agents like EDTA should give good protection to oxidation. EDTA exhibited the highest efficacy, about 10-15 times better than BHA which is a radical scavenger when studied in the model systems.
Author

N73-27945*# Hamilton Standard Div., United Aircraft Corp., Windsor Locks, Conn.
WASTE COLLECTION SUBSYSTEM DEVELOPMENT Technical Report, 1 Jul. 1971 - 31 Dec. 1972
Joseph E. Swider, Jr. Feb. 1973 146 p
(Contract NAS9-12150)
(NASA-CR-133977; SVHSER-6182) Avail: NTIS HC $9.50 CSCL 06I

Engineering studies, design activity and testing associated with the development of a waste collection system to accommodate both male and female crewmembers in a space environment are reported.
Author

N73-27946*# Scientific Translation Service, Santa Barbara, Calif.
SPACE ERGONOMICS
A. I. Menshov Washington NASA Jul. 1973 499 p refs Transl. into ENGLISH of the book "Kosmicheskaya Ergonomika" Leningrad, Nauka Press, 1971 296 p
(Contract NASw-2035)
(NASA-TT-F-750) Avail: NTIS HC $6.00 CSCL 05H

Problems arising in connection with the quantitative analysis of the characteristics of the man-technology system are considered with respect to human working conditions in space vehicles. A detailed description is given of the characteristics and properties of man as a receiver of information, his throughput capacity, and his ability to withstand discomfort conditions during space flight. The ability with which the astronaut can carry out certain specific operations and functions is analyzed. The basic characteristics of methods for supporting the vital activity and fitness for work of astronauts are examined, together with the principles governing the construction of onboard systems. A methodology is given for quantitative analysis of the activity of the astronaut and the effectiveness of his work, utilizing the mathematical apparatus of queuing theory and the generalized criteria of operations research theory. It is shown that the task of finding the optimum distribution of functions between the crew and automated equipment can be solved.
Author

N73-27947*# Linguistic Systems, Inc., Cambridge, Mass.
SIMPLIFIED METHOD OF MULTIPLE IMPLANTATION OF ELECTRODES IN THE SUBCORTICAL STRUCTURES OF THE BRAIN
V. N. Siderov Washington NASA Aug. 1973 8 p refs Transl. into ENGLISH from Zh. Vysshel Nervnoi Deyatelnosti (Moscow), v. 15, no. 5, 1965 p 943-946
(Contract NASw-2482)
(NASA-TT-F-15001) Avail: NTIS HC $3.00 CSCL 06B

A description is given of some special equipment that was constructed and used to implant electrodes in the cortical and subcortical structures of a cat's brain. The method uses a piece of plexiglass with holes cut in it as a template to guide a dentist's drill when drilling the holes for the electrodes. The method is simple and accurate and each implanation of electrodes into an animal provided useful information for many months.
Author

N73-27948*# AiResearch Mfg. Co., Los Angeles, Calif.
DEVELOPMENT OF DESIGN INFORMATION FOR MOLECULAR-SIEVE TYPE REGENERATIVE CO2-REMOVAL SYSTEMS
R. M. Wright, J. M. Ruder, V. B. Dunn, and K. C. Hwang Washington NASA Jul. 1973 254 p refs
(Contract NAS1-8559)
(NASA-CR-2277; Rept-72-8417) Avail: NTIS HC $3.00 CSCL 06K

Experimental and analytic studies were conducted with molecular sieve sorbents to provide basic design information, and to develop a system design technique for regenerable CO2-removal systems for manned spacecraft. Single sorbate

equilibrium data were obtained over a wide range of conditions for CO2, water, nitrogen, and oxygen on several molecular sieve and silica gel sorbents. The coadsorption of CO2 with water preloads, and with oxygen and nitrogen was experimentally evaluated. Mass-transfer, and some limited heat-transfer performance evaluations were accomplished under representative operating conditions, including the coadsorption of CO2 and water. CO2-removal system performance prediction capability was derived. Author

N73-27949*# Essex Corp., Alexandria, Va.
APPLICATIONS OF SPACE TELEOPERATOR TECHNOLOGY TO THE PROBLEMS OF THE HANDICAPPED
Thomas B. Malone, Stanley Deutsch, Gustav Rubin, and Sheldon W. Shenk Jul. 1973 241 p Sponsored by NASA
(NASA-CR-133357) Avail: NTIS HC $14.25 CSCL 05H

The identification of feasible and practical applications of space teleoperator technology for the problems of the handicapped were studied. A teleoperator system is defined by NASA as a remotely controlled, cybernetic, man-machine system designed to extend and augment man's sensory, manipulative, and locomotive capabilities. Based on a consideration of teleoperator systems, the scope of the study was limited to an investigation of these handicapped persons limited in sensory, manipulative, and locomotive capabilities. If the technology being developed for teleoperators has any direct application, it must be in these functional areas. Feasible and practical applications of teleoperator technology for the problems of the handicapped are described, and design criteria are presented with each application. A development plan is established to bring the application to the point of use. F.O.S.

N73-27950*# Virginia Univ., Charlottesville. Transportation Div.
ANALYSIS OF PASSENGER ACCEPTANCE OF COMMERCIAL FLIGHTS HAVING CHARACTERISTICS SIMILAR TO STOL
A. R. Kuhlthau and I. D. Jacobson Mar. 1973 37 p refs Presented at Flight Test Symp., Ottawa, 7-8 Mar. 1973
(Grant NGR-47-005-181)
(NASA-CR-132282; TR-403208) Avail: NTIS HC $4.00 CSCL 05E

Previous work in the development of quantitative models for the prediction of passenger reaction to motion and vehicle environment parameters in flight was extended to include a class of aircraft appropriate for low-density, short-haul service. The results indicate that it is possible to obtain quantitative response inputs from an usually small special test-subject group which will be representative of the general traveling public. Additional data which indicate the importance of comfort as a factor in evaluating ride quality was obtained, and identification of the factors which contribute to judgments regarding comfort level was improved. Seat comfort and seat spacing is very vital in the smaller aircraft. Mathematical modeling applied in conjuction with passenger reaction data was shown to be very useful for establishing ride-quality design criteria. Author

N73-27951# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Bad Godesberg (West Germany). Inst. fuer Flugmedizin.
CURRENT SCIENTIFIC PAPERS FROM THE AEROSPACE MEDICAL INSTITUTE
K. E. Klein, comp. 2 Jan. 1973 253 p refs In GERMAN; ENGLISH summaries
(DLR-FB-73-15) Avail: NTIS HC $14.75; DFVLR, Porz, West Ger. 64 DM

Results of experimental research are reported. The following topics are dealt with: selection and work load of air crews, effects of transmeridian flights on circadian rhythms, vibration, acceleration, and weightlessness, effects, and hyperbaric and underwater medicine and technology.

N73-27952 Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Bad Godesberg (West Germany).
WING ANOMALIES OF THE FLOUR BEETLE TRIBOLIUM CONFUSUM CAUSED BY O-g SIMULATION
W. Briegleb, A. Schatz, J. Neubert, and F. Schuster *In its* Current Sci. Papers from the Aerospace Med. Inst. 2 Jan. 1973 p 7-19 refs In GERMAN; ENGLISH summary Partly sponsored by Bundesmin. fuer Bildung und Wiss.

The effects of weightlessness simulation in a centrifuge on the flour beetle Tribolium confusum was investigated. The beetles' eggs were cultivated in 4 mm tubes, and the results were examined after 3 generations. A highly significant morphogenetic effect with a radiomimetic character was observed. In particular, teratogene wing anomalies were observed, similar to a spontaneous mutation, and with similar characteristics as those of beetles flown in Biosatellite 2. ESRO

N73-27953 Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Bad Godesberg (West Germany).
A NEW METHOD TO RECORD HEART RATE AND RESPIRATORY RATE INFLIGHT ON COCKPIT CREWS
H. Bruener and H. Hohlweck *In its* Current Sci. Papers from the Aerospace Med. Inst. 2 Jan. 1973 p 21-33 refs In GERMAN; ENGLISH summary

A method is described for inflight recording of heart and respiratory rate of pilots, by means of nose-clip transducers, in order to determine the total flight stress during short flights, and especially the psychophysical stress during take-off and landing. The sensors contain photo transistors for heart rate and NTC resistors for respiratory rate. The recording is done on a 12 decade printer at minute intervals. An example is given of a printout of heart and respiratory rate for pilot and co-pilot during approach and landing. ESRO

N73-27954 Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Bad Godesberg (West Germany).
RELATIONS BETWEEN SOCIOMETRIC VARIABLES AND CRITERIA OF PROFICIENCY OR BEHAVIOR OF STUDENT PILOTS
S. Fichtbauer *In its* Current Sci. Papers from the Aerospace Med. Inst. 2 Jan. 1973 p 35-54 refs In GERMAN; ENGLISH summary

Some hypotheses about positive relations between sociometric variables (choice for group-leader, choice for friend, coherence of group) and criteria of proficiency or behavior (flying proficiency, application to duties, emotional stability) were tested on two samples of student pilots at a civil flight training center. The data from the first sample were gathered at the end of final training, the data from the second one at the end of an early phase of training. The hypotheses are only partly verified by the results of the study. Author (ESRO)

N73-27955 Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Bad Godesberg (West Germany).
A NEW METHOD TO SALVAGE SUNKEN SHIPS AND TO WORK UNDERWATER IN GREAT DEPTH
H. D. Fust *In its* Current Sci. Papers from the Aerospace Med. Inst. 2 Jan. 1973 p 55-67 refs In GERMAN; ENGLISH summary

A method was developed for salvaging sunken bodies at great depth. The method combines diving bell and caisson techniques, and can be used to recover wrecks of maximally 20 m length, 4 m width, and 25 m height. An underwater crew compartment is foreseen for longer periods of work (6, 11, and 21 days). The first operation planned is salvaging a Viking ship at 5 m water depth, at the sea bottom. The problems of the application of this method at greater depth (30 to 50 m), in connection with an underwater station were investigated and observations were made concerning the safety measures necessary in case of long period work in an overpressure environment. ESRO

N73-27956 Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Bad Godesberg (West Germany).
PSYCHODIAGNOSTIC PROBLEMS IN THE SELECTION OF AVIATION PERSONNEL IN DEVELOPING COUNTRIES, TAKING APPLICANTS FROM YEMEN AS EXAMPLES [PSYCHODIAGNOSTISCHE PROBLEME BEI DER AUSLESE VON LUFTFAHRTPERSONAL IN ENTWICKLUNGSLAENDERN, DEMONSTRIERT AM BEISPIEL JEMENITISCHER BEWERBER FUER LUFTFAHRTHBERUFE]
K. M. Goeters *In its* Current Sci. Papers from the Aerospace Med. Inst. 2 Jan. 1973 p 69-102 refs In GERMAN; ENGLISH summary

Forty three subjects applying for three aviation occupations (pilot, air traffic controller, and technician) from the developing Yemen Arabic Republic were tested with psychological tests for seven cognitive abilities and two personality traits. Problems of test selection application are discussed. Normative data and reliabilities of the tests are reported. The structure of the cognitive performances and of the personality scores are analysed (partially with the help of a factor analysis). The results of the investigation could be relevant to general problems of differential psychology. Author (ESRO)

N73-27957 Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Bad Godesberg (West Germany).
TASKS OF CONCENTRATION UNDER PSYCHICAL STRESS
H. Kirsch *In its* Current Sci. Papers from the Aerospace Med. Inst. 2 Jan. 1973 p 103-115 refs In GERMAN; ENGLISH summary

Resulting factors of simple search and arithmetic problems were examined. The concentration stress test (CST) of Kirsch was applied. The test consisted of ten working columns, each of which is given one minute to work. Here the working times are changed so that initial working time is prolonged, while the working time for each column is steadily shortened. This resulted in an increasing time-stress which leads to a significant decrement of achievement below expected value with a sample of 300 applicants. Reliability and validity coefficients are given for the CST as a testing procedure in the selection of pilot applicants. Author (ESRO)

N73-27958 Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Bad Godesberg (West Germany).
RESYNCHRONIZATION OF DIURNAL PERFORMANCE RHYTHMS AFTER TRANSMERIDIAN FLIGHTS [DIE RESYNCHRONISATION DIANER LEISTUNGSRHYTMEN NACH TRANSMERIDIANEN FLUEGEN]
K. E. Klein and H. M. Wegmann *In its* Current Sci. Papers from the Aerospace Med. Inst. 2 Jan. 1973 p 117-132 refs In GERMAN; ENGLISH summary Sponsored in part by US Air Force, Deut. Lufthansa, and Bundesmin. fuer Verteidigung

The phase shifts in diurnal performance rhythms were observed in two groups of 8 students after transmeridian flights. It was found that the phase resynchronization takes between 4 to 5 days, is of an exponential character, and its speed is determined by the following factors: the direction of the flight (west-east resynchronization took longer than vice-versa), the nature of the tested biologic functions, and activity modes of the subject after the flight. ESRO

N73-27959 Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Bad Godesberg (West Germany).
EXTREME AEROEMBOLISM AND ITS SUCCESSFUL TREATMENT IN HYPERBARIC CHAMBER [EIN FALL VON ERFOLGREICHER UEBERDRUCKKAMMERTHERAPIE BEI MASSIVER LUFTEMBOLIE]
H. Oser *In its* Current Sci. Papers from the Aerospace Med. Inst. 2 Jan. 1973 p 133-149 refs In GERMAN; ENGLISH summary

The successful treatment of a patient suffering from massive aeroembolism with ambient hyperbaric air is investigated. Such treatment was accomplished using a hyperbaric chamber which medical personnel could enter for care and control of the patient. The condition of the patient and the success of the therapy during the compression-, isopression- and decompression phase are described. Some criteria of the hyperbaric treatment are discussed and recompression-tables for the treatment of caisson disease are recommended. It is shown that even in nearly hopeless cases of aero-embolism a hyperbaric treatment can still be successful. Author (ESRO)

N73-27960 Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Bad Godesberg (West Germany).
THE GLUTAMIC ACID METABOLISM OF THE BRAIN AND ITS MODIFICATION THROUGH HYPERBARIC OXYGENATION
G. Schaffer *In its* Current Sci. Papers from the Aerospace Med. Inst. 2 Jan. 1973 p 151-168 refs In GERMAN; ENGLISH summary

The relation between hyperbaric oxygenation and the functional activity of the differentiated brain is discussed with respect to an alteration of glutamic acid metabolism. In brain extracts the concentration of L-glutamic acid, gamma-aminobutyric acid (Gaba), and L-glutamine is significantly changed after breathing pure oxygen for about 70 hours. The reduction of the glutamic acid level occurring simultaneously with an increase of Gaba-concentration indicates an induction of inhibitory regulative mechanisms, whereas the elevation of the glutamine content seems to be an indication that larger amounts of ammonia are metabolized or detoxicated through O2 breathing. Author (ESRO)

N73-27961 Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Bad Godesberg (West Germany).
ELEMENTARY PHYSICS AND APPLICATION OF O-G SIMULATION ACCORDING TO H. J. MULLER
A. Schatz and W. Briegleb *In its* Current Sci. Papers from the Aerospace Med. Inst. 2 Jan. 1973 p 169-182 refs In GERMAN; ENGLISH summary

The theory of weightlessness simulation is developed for a single body system and applied to a simple cell model. The conditions for good simulation are discussed and results show these conditions can be fulfilled without difficulties. Modifications of the model necessary for a further approximation to biology are described. Author (ESRO)

N73-27962 Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Bad Godesberg (West Germany).
DIAGNOSIS AND PROGNOSIS OF PILOT REACTION AND RESISTANCE TO PSYCHICAL STRESS [BEITRAG ZUR DIAGNOSTIK UND PROGNOSTIK DER PSYCHISCHEN BELASTBARKEIT DES PILOTEN]
K. Steininger *In its* Current Sci. Papers from the Aerospace Med. Inst. 2 Jan. 1973 p 183-200 refs In GERMAN; ENGLISH summary

The prognosis of the resistance to any psychologically impairing stress is considered in view of its importance in selecting pilot applicants. The chance of predicting reliably enough such complex behavior as stress reactions depends on the more particular knowledge of the correlations between certain personality factors, the intensity of individually experienced feeling of stress, and the specific features of several psychical disorders. It should be possible to identify some personality factors as specific risk factors for the occurance of certain psychical failures or disorders. The state of knowledge and some methodical problems are discussed. Author (ESRO)

N73-27963 Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Bad Godesberg (West Germany).
INTERRELATIONSHIP BETWEEN GRAVITY AND MECHANICAL IMPEDANCE OF SUPINE HUMANS
L. Vogt, H. E. Krause (Dayton Univ. Res. Inst.), H. Hohlweck, and E. May *In its* Current Sci. Papers from the Aerospace

Med. Inst. 2 Jan. 1973 p 201-220 refs In GERMAN; ENGLISH summary Sponsored in part by NAS-NRC- and Bundesmin. fuer Bildung und Wiss.

Measurements of the mechanical impedance of the supine human body under sustained acceleration were conducted to investigate the nonlinearities of the body system. A hydraulically driven shake table was installed on a centrifuge, and the transmitted force acceleration of the platform on which the subject was lying, were recorded. The results show that sustained acceleration stiffens the human body with increasing + G sub x and shifts the resonance to higher values. The results are explained by way of a multi-degree-of-freedom-system. This contributes to a better insight into the behavior of the human body under high amplitude vibration, buffering, and impact environments. Author (ESRO)

N73-27964 Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Bad Godesberg (West Germany).
CHANGES IN THE 24-HOUR RHYTHM AFTER TWO TRANSATLANTIC FLIGHTS IN RAPID SEQUENCE
H. M. Wegmann, K. E. Klein, and P. Kuklinski *In its* Current Sci. Papers from the Aerospace Med. Inst. 2 Jan. 1973 p 221-235 refs In GERMAN; ENGLISH summary

The effects of two transatlantic flights in rapid sequence upon the 24-hour rhythm of body functions and performance were studied in 8 male subjects. Studies were made of outgoing and return flights between Frankfurt and Chicago with a time shift of 6 hours and a stopover time of 26 hours. The results and their operational significance for flying personnel are discussed. Author (ESRO)

N73-27965 Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Bad Godesberg (West Germany).
EFFECT OF DEFINED SHOCK WAVES ON TEST ANIMALS [DIE WIRKUNG SPEZIELLER STOSSWELLEN AUF VERSUCHSTIERE]
In its Current Sci. Papers from the Aerospace Med. Inst. 2 Jan. 1973 p 237-252 refs In GERMAN; ENGLISH summary

In connection with the problems of high speed impact, the special effect of shock waves transmitted through different materials upon the organism of miniature pigs were investigated. In particular, those typical and reproducible injuries of organs which are caused by defined shock waves on predetermined body regions are described in detail. In discussing the morphological findings the particulars of the special damage effects were considered. Author (ESRO)

N73-27966# Institut Franco-Allemand de Recherches, St. Louis (France).
DETERMINATION OF LESION THRESHOLD IN THE GUINEA PIG AUDITORY AREA DUE TO SONIC BOOM [NIVEAU LESIONNEL DU BANG SONIQUE SUR L'APPAREIL AUDITIF DU COBAYE]
A. Dancer, R. Franke, G. Evrard, C. Zeller, and P. Massard 22 Nov. 1972 64 p refs In FRENCH
(Contract DRME-72/289)
(ISL-33/72) Avail: NTIS HC $5.25

The effects of the sonic boom intensity (20 to 50 mbar, 300 msec) and repetition frequency on the guinea pig auditory sensation areas, especially on eardrum and middle ear, were investigated. The histological study of the inner ear and audiometric tests have determined the lesion threshold of sonic booms at 30 mbar. A slight auditory perception loss was noticed after exposure to a sonic boom, and slight lesions of eardrum after exposure to frequent booms. ESRO

N73-27967# Coast Guard, Washington, D.C.
PACSAR 1972: REPORT OF THE PACIFIC INTERNATIONAL AIR AND SURFACE SEARCH AND RESCUE SEMINAR
1972 101 p refs Seminar held in San Francisco, 4-7 Dec. 1972
(AD-761756) Avail: NTIS CSCL 06/7

The seminar was concerned with the following elements of the new program: Communications; An inventory of available SAR facilities and their response time; Utilization of existing position reporting systems and existing ocean station vessels; The utilization of transient ships and aircraft in SAR operations; Expanding regional arrangements and setting up joint exercises among participating countries; The rescue of persons from ditched aircraft, drilling and production platforms and other special cases; The rescue of space personnel in emergency landings; and The rescue of persons trapped in submerged vehicles. GRA

N73-27968# Naval Postgraduate School, Monterey, Calif.
AN INTERACTIVE HYBRID COMPUTER SYSTEM FOR TIME DOMAIN AUDIO SYNTHESIS M.S. Thesis
James William Mizerski Mar. 1973 200 p refs
(AD-761730) Avail: NTIS CSCL 06/4

A time domain oriented technique using periodic functions composed of first order segments was employed in the development of a real-time interactive computer audio synthesis system. A general purpose analog computer was programmed to create non-monotonic function generators which are used to generate sequences of periodic functions that can be frequency and amplitude modulated. The system is appropriate for experiments in psychoacoustics. Exploration of the relationships between the physical and the perceptual significance of synthesis parameters of the technique is aided by real-time frequency analysis programs and an audio output capability. The system includes an interactive graphics terminal for conversational I/O and conventional peripheral devices for creating permanent records. Author (GRA)

N73-27969# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
TACTILE INFORMATION PRESENTATION (TIP)
David E. Thorburn and Richard L. Ravenelle Mar. 1973 13 p (AF Proj. 7184)
(AD-761796; AMRL-TR-72-106) Avail: NTIS CSCL 05/5

The paper describes the Tactile Information Presentation (TIP), a device that avoids many of the disadvantages of previously proposed devices. The TIP produces a distinct tactile stimulus to the abdomen and thighs by inducing high pressure pulses of air into the pilot's anti-G suit. A special circuit senses a preset voltage from the angle-of-attack transmitter, accelerometer, or other sensors. This in turn triggers a low frequency oscillator which induces air pulses into the pilot's anti-G suit through a bypass around the standard anti-G valve. Experimental testing on a centrifuge has shown that, although the exact pulse frequency is not critical, three pulses per second provides a distinguishable stimulus under a variety of conditions. Although G-limit information can be presented by the TIP, angle-of-attack or maximum maneuvering alpha appear to be more useful information. Since a signal is obtained even when the G-suit is not inflated, landing angle-of-attack information could also be presented. This may be especially valuable in short-field or aircraft-carrier landings. Author (GRA)

N73-27970# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
BACKGROUND AND DEVELOPMENT OF BOYLE'S LAW ALTITUDE SUITS
J. D. Bowen Apr. 1973 52 p refs
(AD-761797; AMRL-TR-72-77) Avail: NTIS CSCL 06/17

All significant Aerospace Medical Research Laboratory (AMRL) investigations of design approaches and techniques applicable to emergency pressure suits for fliers during the 1960 to 1972 period are described and the results summarized. The first promising application of Boyle's Law; that is, the volume of a body of gas at constant temperature is inversely proportional to the absolute pressure, to the automatic pressurization of a suit was demonstrated at the School of Aerospace Medicine, Brooks AFB Tex., by Davis, Ritzinger, et al, in 1966. Subsequent efforts carried on by the AMRL are reviewed in sufficient detail to provide continuity and an overview of the program leading up to its termination at the Aerospace Medical Research

Laboratory in the Spring of 1972 and transfer to the School of Aerospace Medicine at Brooks AFB, Texas. Final configurations that would fulfill all aircrew operational requirements are not fully developed. However, major progress was achieved in fabrication techniques and in the validation of features that should find application in a nearly optimum prototype approaching the real needs of the potential users. (Modified Author Abstract)
GRA

N73-27971# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
TRACKING PERFORMANCE DURING WHOLE BODY VIBRATION WITH SIDE MOUNTED AND CENTER MOUNTED CONTROL STICKS
Richard W. Shoenberger and Darrell L. Wilburn Apr. 1973 19 p refs
(AF Proj. 7231)
(AD-761798; AMRL-TR-72-120) Avail: NTIS CSCL 05/5

To compare the relative susceptibility to vibration interference of a side-mounted control stick and a center-mounted control stick (both force-type, or isometric, controllers), pitch axis tracking performance was measured during sinusoidal whole-body Z-axis vibration. The tracking task had a dynamically unstable controlled element, which became increasingly unstable until the subject lost control. The tracking score was the highest level of instability at which control could be maintained. Subjects were seated upright and vibrated at plus or minus 0.4 g along the Z axis at frequencies of 2 Hz, 6 Hz, and 10 Hz. Results indicated that with either stick all frequencies of vibration produced significant decrements in tracking performance, compared to the no-vibration control condition. There was no clear cut superiority of one stick location over the other, but which stick produced better performance was dependent upon the frequency of the vibration. The side stick was slightly better at 2 Hz, but the center stick was slightly better at 6 Hz and significantly better at 10 Hz. The large difference between the sticks at 10 Hz was attributed to the fact that for the side stick the input vibration is transmitted directly to the arm and hand via the arm rest, but for the center stick the input is from the seat, and at 10 Hz the amount transmitted to the hand is attenuated by the body.
Author (GRA)

N73-27972# BioTechnology, Inc., Falls Church, Va.
A REVIEW OF PROBLEMS ENCOUNTERED IN THE RECOVERY OF NAVY AIRCREWMEN UNDER COMBAT CONDITIONS Final Report
Martin G. Every and James F. Parker, Jr. Jun. 1973 60 p refs
(Contract N00014-72-C-0101; NR Proj. 105-667)
(AD-761636) Avail: NTIS CSCL 06/7

The purpose of the study was to examine Navy aviation combat casualty experiences in Southeast Asia and to assess the adequacy of the procedures and material utilized in rescue and recovery operations. Subjects consisted of naval aviators flying fixed-wing jet aircraft who had been forced to eject as a direct result of enemy action. One hundred and four survivors of such an occurrence were located and administered an extensive questionnaire covering the circumstances leading to the ejection, the state of the aircraft at the time of escape, and all events prior to and during rescue. The returned questionnaires provided a data base from which problems with survival procedures, survival equipment, and biomedical support were tabulated. Conclusions of the study deal with the adequacy of medical support procedures, aviation protective and survival equipment, and the rescue process itself.
Author (GRA)

N73-27973# Naval Postgraduate School, Monterey, Calif.
ANALYSIS OF A DESCRIPTION MODEL FOR HAND MOTION DISTANCE IN A MANUAL DECISION TASK M.S. Thesis
Joseph Stanley Stewart, II Mar. 1973 56 p refs
(AD-761518) Avail: NTIS CSCL 05/10

An experimental investigation was conducted to examine a descriptive model for hand motion under discrete uncertainty of the stimulus set. The design and implementation of an automatic, on-line, data collection device using cyclegraphic motion collection methods is described. Eight subjects were exposed to 2.2 to 3 bits of choice uncertainty. Response times, error rates, and hand motion distances were collected and analyzed. Hand motion distances were compared to straight line distances used in control panel design. Further investigation indicated how the distributions of hand motion distances, for any stimulus, fit normal curves, and how variations in subject performance were significant. Perceptual aspects of the task and operator strategies are discussed. Further study is suggested.
Author (GRA)

N73-27974# Coast Guard, San Francisco, Calif.
MLR/SERV (MOTOR LIFE BOAT/SURFACE EFFECT RESCUE VEHICLE) Operational Study Report, 1 Jan. - 1 Jun. 1973
15 Jun. 1973 100 p refs
(AD-761460; MLB-SERV-3960-02) Avail: NTIS CSCL 06/7

The United States Coast Guard has completed the final phase of an extensive operational study which combined the all weather capabilities of the Coast Guard built 44 foot Motor Life Boat (MLB) and the 70 knot amphibious capabilities of the Bell SK-5 Model Surface Effect Rescue Vehicle (SERV). The objectives of the study were to develop more accurate operational/maintenance cost data on the SERV so as to enable an objective comparison with other Coast Guard surface and air facilities. The second, and equally important part of the study was to examine the overall effectiveness of this unique dual response concept of operation and whether or not this concept had a useful application in meeting the Coast Guard's expanding Search and Rescue mission responsibility. The results of this final phase of study are documented.
GRA

N73-27975# School of Aerospace Medicine, Brooks AFB, Tex.
HAZARD EVALUATION OF A GALLIUM ARSENIDE DIODE ARRAY LASER
James R. Gallagher and Peter C. Laudieri Jun. 1973 20 p refs
(AD-762277; SAM-TR-73-19) Avail: NTIS CSCL 06/18

The hazard of GaAs diode array lasers with their searchlight-like beams must be evaluated differently than conventional lasers. This report evaluates the ocular hazards of Solid State Laser, Type AN/AAQ-7, one of the GLINT series of illuminators. It was found that an optical density of 1.39 is required for protection within a distance of 22.4 m. from the laser for a 5-second exposure.
Author (GRA)

N73-27976# Navy Clothing and Textile Research Unit, Natick, Mass.
DAMAGE CONTROL SUIT SYSTEM
Norman F. Audet, Dale A. Reins, and Arthur H. Chadwick May 1973 37 p refs
(AD-762428; TR-107) Avail: NTIS CSCL 06/11

A prototype damage-control-suit system (DCSS) was designed and fabricated as part of the Navy Clothing and Textile Research Unit's (NCTRU) continuing program to conduct feasibility and prototype development studies on personnel life-support clothing systems for protection against various environmental hazards. The DCSS consists of a life-support pack; an impermeable suit with headpiece, boots, and gloves, and a communication headset. (Modified Author Abstract)
GRA

N73-27977# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
DESCRIPTION AND USE OF A MEASUREMENT SYSTEM FOR AIR BAG ACOUSTIC TRANSIENT DATA ACQUISITION AND ANALYSIS Final Report, Apr. 1971 - Jun. 1972
Henry C. Sommer Mar. 1973 42 p
(AD-761836; AMRL-TR-73-8) Avail: NTIS CSCL 13/12

In the development and test of air bag personal restraint systems for use in motor vehicles, various design concepts, sizes, and operations suggest that the impulsive noises may differ

significantly in both maximum intensity and frequency content. A program was implemented whereby a portable impulse measurement system was acquired and the air bag noises generated by various systems being developed throughout industry were recorded and analyzed. GRA

N73-27978# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
AN ANNOTATED BIBLIOGRAPHY OF UNITED STATES AIR FORCE APPLIED PHYSICAL ANTHROPOLOGY Bibliography, Jan. 1946 - May 1972
Betty Reid May 1973 69 p refs
(AF Proj. 7184)
(AD-762287; AMRL-TR-73-51) Avail: NTIS CSCL 05/5

The report contains the titles, authors, publication/source information, and the abstracts of 132 technical reports and articles published by Anthropology Branch of the Aerospace Medical Research Laboratory between January 1946 and May 1973. It is a detailed document of the scope of the effort of the Air Force in the field of applied physical anthropology to provide the information on human body size and biomechanical characteristics of Air Force personnel required for the development and evaluation of Air Force systems, personal-protective equipment and clothing. Work in the following areas is described: Anthropometry; workspace; biomechanics; and sizing and designing of personal equipment. (Modified Author Abstract) GRA

N73-27979# Goodyear Aerospace Corp., Akron, Ohio.
EFFECT OF TRAINING ON COORDINATE DETERMINATION OF SLAR (SIDE-LOOKING AIRBORNE RADAR) IMAGED FEATURES
R. Kause, J. A. Thomas, and T. E. Jeffrey (Army Res. Inst. for the Behavioral and Soc. Sci.) Apr. 1973 52 p refs
(Contract DAHC19-67-C-0051; DA Proj. 2Q6-62704-A-721)
(AD-762342; ARI-TRW-235) Avail: NTIS CSCL 17/9

Research was conducted dealing with the development and evaluation of a training program to improve the performance of operators in locating targets in side-looking airborne radar (SLAR) imagery. The primary objective of the study was to develop a trainee-participation instructional program with immediate feedback and to assess its effectiveness in enhancing image interpreter performance with respect to accuracy in locating and identifying map coordinates of detected targets. (Modified Author Abstract) GRA

N73-29018 Purdue Univ., Lafayette, Ind.
THE EFFECT OF HIGH INTENSITY NOISE OF VARYING FREQUENCIES ON NEUROENDOCRINE RESPONSE IN THE RAT Ph.D. Thesis
Henri Charles Rothschild 1972 88 p
Avail: Univ. Microfilms Order No. 73-6093

Urinary K/Na ratios were studied to determine whether the stress response of the organism to high intensity noise varies with the frequency of the sound. Twelve studies were undertaken: six studies at 65 db and six studies at 120 db. Pure tone frequencies of 1000, 2000, 4000, 8000, and 10,000 Hz were used, as well as a broad-band frequency at 1000-10,000 Hz. No effective difference in urinary K/Na ratios was observed between treated and control animals at any of the frequencies studied for 65 db. The 120 db study showed, in all frequencies except 2000 Hz, a drop in the urinary K/Na ratio of the noise treated rats relative to controls 6 hours after noise exposure. At 120 db and 10,000 Hz, the urinary K/Na ratio for the noise treated rats decreased 48.78% after 6 hours relative to the corresponding controls. The percent decrease of urinary K/Na ratios for the other studies at 120 db, 6 hours after the noise were 35.25%, 29.95%, 43.00%, and 30.85% for the studies at 1000, 4000, 8000, and 1-10,000 Hz respectively. Dissert. Abstr.

N73-29019 North Dakota Univ., Grand Forks.
PHYSIOLOGY OF THE RAT IN HYPERBARIC ENVIRONMENTS OF HELIUM, NITROGEN AND NITROUS OXIDE Ph.D. Thesis
Larry Charles Stetzner 1972 158 p
Avail: Univ. Microfilms Order No. 73-5977

Effects of high pressure on a small animal (rat) are reported. Body temperature, respiratory rhythm, heart rate, and oxygen consumption, all basic physiological parameters indicative of an animal's metabolic state, were recorded during exposure to different gaseous environments. Male rats were exposed to various gas mixtures and pressures of helium (He), nitrogen (N2), and nitrous oxide (N2O) with the oxygen O2 partial pressure within normal limits in order to relate different gas physical properties to an animal's physiological responses. Results show that in He environments heart rate, respiration rate, and surface and rectal temperature decreased. It the N2O environment heart rate was increased while rectal temperature and heart rate showed little change. In the N2 environment significant increases were observed in rectal temperature, heart rate, and respiration rate. Oxygen consumption in all three environments were also recorded. Dissert. Abstr.

N73-29020 New Mexico Univ., Albuquerque.
HEART RATES AND PREDICTED MAXIMAL OXYGEN UPTAKE FOLLOWING TRAINING AT LOW TO MODERATE DURATION AND INTENSITY Ph.D. Thesis
Ronald S. Feingold 1972 262 p
Avail: Univ. Microfilms Order No. 73-8365

The concept of minimum exercise, particularly for cardiac patients and the elderly is considered and the effects of three different work regimens of low to moderate intensity and duration are studied. Twenty-three healthy male students were randomly placed into one of three training groups: walking for forty minutes at a heart rate of approximately 130 BPM (N=8), jogging for ten minutes at a heart rate of approximately 160 BPM (N=7), and running for five minutes at a heart rate of approximately 175 BPM (N=8). The results indicated improvement ranging from 2.6 to 7.0 percent in predicted max VO sub 2 and work heart rates among all three experimental groups. On all of the criterion variables, excluding rest heart rate, the running group showed the largest improvements, followed by the joggers and walkers. simulation trends in improvement were noted by increases in training pace necessary to maintain the prescribed work heart rate. Dissert. Abstr.

N73-29021# Joint Publications Research Service, Arlington, Va.
SOVIET BIOLOGY AND MEDICINE, VOLUME 7, NO. 3, 1973
3 Aug. 1973 141 p refs Transl. into ENGLISH from Kosm. Biol. Med. (USSR), v. 7, no. 3, May-Jun. 1973 p 1-87
(JPRS-59702) Avail: NTIS HC $9.25

Aerospace medicine and exobiology research reported considers life support systems and human tolerances in long term space flight conditions.

N73-29022 Joint Publications Research Service, Arlington, Va.
IDEAS OF K. E. TSIOLKOVSKIY AND MODERN POINTS OF VIEW ON THE MECHANISMS OF THE INFLUENCE OF WEIGHTLESSNESS **c05**
P. I. Isakov and V. I. Kopanev *In its* Space Biol. and Med., Vol. 7, No. 3, 1973 (JPRS-59702) 3 Aug. 1973 p 1-8 refs Transl. into ENGLISH FROM Kosm. Biol. Med. (USSR), v. 7, no. 3, May-Jun. 1973 p 3-7

The effects of weightlessness and acceleration on the human body during space flight are briefly discussed. Prevention of unfavorable physiological responses requires the creation of artificial gravity aboard a spacecraft, the use of cuffs on body extremities and of drugs to regulate blood circulation, as well as increased fluid intake during periods of restricted mobility. G.G.

N73-29023 Joint Publications Research Service, Arlington, Va.
MORPHOLOGICAL CHANGES IN THE KIDNEYS DURING MULTIHOUR EXPOSURE TO 4-g ACCELERATIONS IMPARTED IN DIFFERENT DIRECTIONS
A. S. Pankova and Ye. A. Savina *In its* Space Biol. and Med., Vol. 7, No. 3, 1973 (JPRS-59702) 3 Aug. 1973 p 9-15 refs Transl. into ENGLISH from Kosm. Biol. Med. (USSR), v. 7, no. 3, May-Jun. 1973 p 8-13

Kidneys of 76 rats exposed to different accelerations of 4 g for 3, 8, 16 and 24 hours were studied morphologically. The distal tubules exhibited morphological signs of blood shunting and antidiuresis. The collected data seem to indicate compensatory-adaptive reactions aimed at stabilizing hemodynamics and water balance in the animal body during exposure to accelerations. Author

N73-29024 Joint Publications Research Service, Arlington, Va.
CENTRAL NERVOUS SYSTEM REACTION TO MECHANICAL FACTORS
I. Kudrin, G. A. Akimov, F. V. Sudziovskiy, B. S. Glushkov, Yu. M. Zagorskiy, S. D. Kumanichkin, and Z. K. Sulimo-Samuyllo *In its* Space Biol. and Med., Vol. 7, No. 3, 1973 (JPRS-59702) 3 Aug. 1973 p 16-22 refs Transl. into ENGLISH from Kosm. Biol. Med. (USSR), v. 7, no. 3, May-Jun. 1973 p 13-17

Experiments on rabbits have demonstrated that impact accelerations induce microscopic changes in nerve tissue and dystonic changes in cerebral vessels. Different compartments of the central nervous system exhibit varying resistance to mechanical effects. Sensitivity to impact accelerations applied transversely declines in the following order: sensitive ganglia of the spinal cord, subcortical formations, cortical cells. It is concluded that the mechanical immunity of the central nervous system is in general dependent on both the state of nerve elements and resistance of cerebral vessels. Author

N73-29025 Joint Publications Research Service, Arlington, Va.
INFLUENCE OF HYPOXIA ON ELIMINATION OF SOME GASEOUS PRODUCTS OF VITAL FUNCTIONS IN WHITE RATS
T. S. Kolosova and L. A. Tiunov *In its* Space Biol. and Med., Vol 7, No. 3, 1973 (JPRS-59702) 3 Aug. 1973 p 23-28 refs Transl. into ENGLISH from Kosm. Biol. Med. (USSR), v. 7, no. 3, May-Jun. 1973 p 17-21

White male rats were exposed to hypoxia and its effect on the release of gaseous wastes -- carbon monoxide, ammonia, acetone, and carboxylic acids and indole -- was studied. Four-day exposure to hypoxia at normal barometric pressure increased the release of carbon monoxide, acetone, and carboxylic acids and decreased that of ammonia. A 24-hour exposure to hypoxia increased the release of gaseous wastes until the 10th to 11th day, after which stabilization was observed. Possible mechanisms underlying changes in the release of gaseous wastes under the influence of hypoxia are discussed. Author

N73-29026 Joint Publications Research Service, Arlington, Va.
TEMPERATURE REGIMES AND CEREBRAL BLOOD SUPPLY OF ANIMALS
O. Ye. Ozerova *In its* Space Biol. and Med., Vol. 7, No. 3, 1973 (JPRS-59702) 3 Aug. 1973 p 29-35 refs Transl. into ENGLISH from Kosm. Biol. Med. (USSR), v. 7, no. 3, May-Jun. 1973 p 21-25

The temperature level in the rat brain and measurements of the temperature relationship between brain tissues and the arterial blood supplied to them were studied. The temperature of the arterial blood was higher than that of most of the rat brain. This difference increased toward the surface compartments and reached a maximum of 0.8-0.9 C near the surface. This value decreased when the animals inhaled ammonia vapor and when they were placed head downwards. Experimental findings suggest that a large part of the brain is within the confines of the thermolabile envelope and is subjected to the direct influence of ambient temperature. Author

N73-29027 Joint Publications Research Service, Arlington, Va.
MORPHOLOGICAL AND ELECTRON MICROSCOPE CHANGES IN THE CARDIAC MUSCLE OF DOGS EXPOSED TO CHRONIC GAMMA IRRADIATION
L. A. Bespalova *In its* Space Biol. and Med., Vol. 7, No. 3, 1973 (JPRS-59702) 3 Aug. 1973 p 36-41 refs Transl. into ENGLISH from Kosm. Biol. Med. (USSR), v. 7, no. 3, May-Jun. 1973 p 26-30

A group of dogs was exposed to chronic Co-60 gamma irradiation in doses of 21, 63, 120, 125 and 190 rad per year. At the same time, another group of dogs was exposed to chronic three year irradiation with a total dosage of 560 rad and was treated specifically. A light optic study of the myocardium of these dogs revealed no pathological changes in the muscle fibers, stroma or intramural vessels. An electron microscope study of the myocardium revealed insignificant changes in the cell ultrastructure only in the dogs exposed to 190 rad per year and 560 rad per three years. These changes included high polymorphism of mitochondria and lysosomes. The number of lysosomes increased. Endothelial cells of capillaries exhibited enhanced micropinocytosis. Author

N73-29028 Joint Publications Research Service, Arlington, Va.
INFLUENCE OF THE DISCONTINUITY BETWEEN TWO MEDIA ON THE DISTRIBUTION OF ABSORBED ENERGY IN A CHARGED PARTICLE TRACK
Ye. I. Kudryashov, A. M. Marennyy, O. M. Meshcheryakova, and V. Popov *In its* Space Biol. and Med., Vol. 7, No. 3, 1973 (JPRS-59702) 3 Aug. 1973 p 42-47 refs Transl. into ENGLISH from Kosm. Biol. Med. (USSR), v. 7, no. 3, May-Jun. 1973 p 30-34

The influence of a vacuum tissue interface on the radial distribution of absorbed energy in the track of a heavy particle was investigted. The interface effect was analyzed with respect to the relationship between the absorbed energy and the depth of particle penetration for different distances from the track axis. The computation results given in graphic form make it possible to determine the dose decrease under the influence of the vacuum tissue interface on irradiation of thin layers of biosamples with 1 to 500 MeV/nucleon charged particles. Author

N73-29029 Joint Publications Research Service, Arlington, Va.
SEARCH FOR EFFECTIVE REGIMES FOR DESATURATION OF THE HUMAN BODY FOR PREVENTING HIGH-ALTITUDE DECOMPRESSION DISORDERS
A. M. Genin, I. N. Chernyakov, I. V. Maksimov, and V. A. Glazkova *In its* Space Biol. and Med., Vol. 7, No. 3, 1973 (JPRS-59702) 3 Aug. 1973 p 48-55 refs Transl. into ENGLISH from Kosm. Biol. Med. (USSR), v. 7, no. 3, May-Jun. 1973 p 34-39

The effect of different denitrogenization procedures preventing altitude decompression disturbances was investigted with respect to man's work in a pressurized suit in a highly rarefied atmosphere. Eighty experiments in which 23 test subjects participated demonstrated that exposure to a 100% oxygen atmosphere for 10 hours at 430 mm Hg is an effective method for preventing decompression disease in a man working intensively for five to six hours at 200 mm Hg. Exposure to a 100% oxygen atmosphere for two hours at 430 mm Hg is sufficient to prevent decompression disturbances in a man working intensively at 300 mm Hg. Author

N73-29030 Joint Publications Research Service, Arlington, Va.
INFLUENCE OF STEPPED ADAPTATION TO HIGH-MOUNTAIN CONDITIONS ON THE RESPIRATORY FUNCTION AND ACID-ALKALI EQUILIBRIUM IN THE BLOOD DURING DIFFERENT MOTOR ACTIVITY REGIMES OF SUBJECTS
V. I. Korolkov, I. Ya. Lunev, O. N. Narbekov, and V. G. Vasilyev *In its* Space Biol. and Med., Vol. 7, No. 3, 1973 (JPRS-59702) 3 Aug. 1973 p 56-60 refs Transl. into ENGLISH from Kosm. Biol. Med. (USSR), v. 7, no. 3, May-Jun. 1973 p 40-43

Respiratory function and blood acid base balance were studied in 12 test subjects who adapted gradually to high elevations (2,200 and 3,200 m) and who performed work of different intensity. During the exposure an increase in oxygen capacity, hemoglobin content and number of erythrocytes, as well as a decrease in carbon dioxide content and pressure in the arterial blood were noted. During this period there was a pronounced respiratory alkalosis. It is concluded that the main pathogenic factor responsible for these changes is the effect of a high elevation environemnt and not that of the motor activity of these subjects. Author

N73-29031 Joint Publications Research Service, Arlington, Va.
EFFECT OF HYPODYNAMIA AND OTHER SPACEFLIGHT FACTORS ON THE EXCRETION OF 17-HYDROXYCORTICOSTEROIDS AND ALDOSTERONE
I. G. Dlusskaya, L. A. Vinogradov, V. B. Noskov, and I. S. Balakhovskiy *In its* Space Biol. and Med., Vol. 7, No. 3, 1973 (JPRS-59702) 3 Aug. 1973 p 61-68 refs Transl. into ENGLISH from Kosm. Biol. Med. (USSR), v. 7, no. 3, May-Jun. 1973 p 43-48

The excretion of 17-hydroxycorticosteroids and aldosterone in the urine was investigated under hypodynamic conditions. In different experimental runs diminished motor activity was combined with other exposures, such as water immersion, altered work-rest cycle, physical exercises of known intensity and electric stimulation of limb muscles. The excretion of 17-hydroxycorticosteroids decreased mostly during exposure to hypodynamia and water immersion or hypodynamia and a fixed, invariable work-rest cycle. The aldosterone excretion increased during an exposure to prolonged hypodynamia brought about by the body being in a recumbent position. Author

N73-29032 Joint Publications Research Service, Arlington, Va.
EFFECT OF DECOMPRESSION OF THE LOWER HALF OF THE BODY ON THE CONDITION OF THE HUMAN CARDIOVASCULAR SYSTEM (BASED ON X-RAY KYMOGRAPHY DATA)
V. G. Voloshin, I. G. Krasnykh, and L. A. Tyutin *In its* Space Biol. and Med., Vol. 7, No. 3, 1973 (JPRS-59702) 3 Aug. 1973 p 69-73 refs Transl. into ENGLISH from Kosm. Biol. Med. (USSR), v. 7, no. 3, May-Jun. 1973 p 48-50

The effect of negative pressure on the lower body (LBNP) on the functional state of the cardiovascular system was studied by the X-ray kymography method. Twenty-two experiments were carried out on 16 healthy male test subjects. X-ray kymograms were recorded before LBNP and during the 10th-16th minutes of LBNP of -40 and -80 mm Hg. LBNP was shown to induce drastic hemodynamic changes involving a decrease in the diastolic, systolic and stroke volumes and cardiac output, a decline of the contractile function and an increase in tilting of the myocardium axis. Author

N73-29033 Joint Publications Research Service, Arlington, Va.
ANALYSIS OF VESTIBULAR EFFECTS IN EXPERIMENTS IN SWIGS
I. Yu. Sarkisov and A. A. Shipov *In its* Space Biol. and Med., Vol. 7, No. 3, 1971 (JPRS-59702) 3 Aug. 1973 p 74-83 refs Transl. into ENGLISH from Kosm. Biol. Med. (USSR), v. 7, no. 3, May-Jun. 1973 p 51-57

A physicomathematical analysis is presented of the vestibular effects which a man experiences on vertical, horizontal, two- and four-shaft swings. Formulas required for computing the effective accelerations which exert an influence on any vestibular apparatus system are given. Possible methods for modifying the swings used in occupational screening are discussed. Author

N73-29034 Joint Publications Research Service, Arlington, Va.
SOME CHARACTERISTICS OF HEMODYNAMICS IN AN ORTHOSTATIC TEST FOR PERSONS WITH DIFFERENT VESTIBULAR-AUTONOMIC TOLERANCE
V. V. Usachev, G. P. Mikhaylovskiy, N. V. Tatarinova, and I. P. Shinkarevskaya *In its* Space Biol. and Med., Vol. 7, No. 3, 1971 (JPRS-59702) 3 Aug. 1973 p 84-91 refs Transl. into ENGLISH from Kosm. Biol. Med. (USSR), v. 7, no. 3, May-Jun. 1973 p 57-62

Hemodynamic changes in persons with different vestibular autonomic tolerance during tilt tests are presented. Test subjects with a high tolerance to vestibular effects revealed minimum changes in systemic circulation. Test subjects with a low tolerance to low accelerations exhibited changes of considerable magnitude in arterial pressure, volume rate of circulation and vascular tone. Possible mechanisms of these correlations are discussed. Author

N73-29035 Joint Publications Research Service, Arlington, Va.
INFORMATIVE PARAMETERS OF THE PSYCHOPHYSIOLOGICAL STATE OF FLIGHT PERSONNEL WHEN WORKING WITH AN INDICATOR
K. K. Ioseliani, L. D. Chaynova, and M. Ye. Beletskiy *In its* Space Biol. and Med., Vol. 7, No. 3, 1971 (JPRS-59702) 3 Aug. 1973 p 92-99 refs Transl. into ENGLISH from Kosm. Biol. Med. (USSR), v. 7, no. 3, May-Jun. 1973 p 62-68

The psychophysiological state of flight personnel when perceiving cartographic images on an information indicator are considered. The efficiency in recognizing cartographic objects with respect to speed and accuracy was determined and various physiological parameters were simultaneously recorded (electroencephalogram, electrooculogram, electrotensogram, skin-galvanic reflex, voice response, etc.). Demonstrated that a proper idea of the psychophysiological state of test subjects can be obtained only on the basis of an analysis of their complicated and tense visual activity involved in the recognition of cartographic images and records of their physiological parameters and that efficiency parameters and electrooculograms are most informative in evaluating functioning of the visual system. Author

N73-29036 Joint Publications Research Service, Arlington, Va.
STUDY OF THE POSSIBILITY OF HUMAN ADAPTATION TO DAYS OF 16-HOUR DURATION
S. I. Stepanova *In* Its Space Biol. and Med., Vol. 7, No. 3, 1971 (JPRS-59702) 3 Aug. 1973 p 100-109 refs Transl. into ENGLISH from Kosm. Biol. Med. (USSR), v. 7, no. 3, May-Jun. 1973 p 68-75

The possibility of adapting to a 16-hour work-sleep cycle (11 hours of wakefulness and five hours of sleep) was investigated in seven test subjects. The results gave evidence that the body temperature did not change under the influence of new daily schedule and remained related to the real time of day. The experimental findings also indicated that if the test subjects went to sleep prior to the usual time their sleep was short and superficial, the temperature curve remaining unchanged. If the test subjects went to sleep after the normal time their sleep was longer and quieter, the body temperature being altered. These facts are discussed from the point of view of the difficulties involved in adaptation to the time shifts accompanying west-to-east and east-to-west flights. Author

N73-29037 Joint Publications Research Service, Arlington, Va.
STUDY OF THE SPECIES COMPOSITION OF ENTERIC BACILLI DURING PROLONGED CONFINEMENT OF MAN IN A CLOSED SPACE
A. A. Lentsner, V. M. Shilov, N. N. Lizko, and M. E. Mikelsaar *In its* Space Biol. and Med., Vol. 7, No. 3, 1971 (JPRS-59702) 3 Aug. 1973 p 110-116 refs Transl. into ENGLISH from Kosm. Biol. Med. (USSR), v. 7, no. 3, May-Jun. 1973 p 76-79

The species composition of intestinal lactobacilli of test subjects who participated in a one year medical engineering experiment was studied. The species composition of fecal lactobacilli did not change noticeably during the prolonged isolation experiment. Every test subject regularly showed one or two lactobacilli species. In addition to the species living permanently in the gastrointestinal tract of the test subjects, significant numbers of transitory lactobacilli with varying species composition were found in their feces. Author

N73-29038 Joint Publications Research Service, Arlington, Va.
INVESTIGATION OF DECONTAMINATING PROPERTIES OF SORBENTS USED IN THE LIFE SUPPORT SYSTEM OF SPACESHIPS
S. V. Chizhov, Ye. S. Tepper, G. F. Korshunova, N. B. Kolesina, M. I. Shikina, and V. V. Krasnoshchekov *In its* Space Biol. and Med., Vol. 7, No. 3, 1971 (JPRS-59702) 3 Aug. 1973 p 117-122 refs Transl. into ENGLISH from Kosm. Biol. Med. (USSR), v. 7, no. 3, May-Jun. 1973 p 80-83

The disinfecting capacity of sorbents used in the water regeneration system aboard space vehicles was investigated. With respect to normal sorbents (ion-exchange resins, activated charcoals, minerals) the anion-exchange resin AV-17 (OH) gave the best results. Minerals were least effective with respect to E. coli, although they allowed purification of 35 to 90 volumes of water per one volume of the sorbent. The use of cation-exchange resins in cu-2(+) allowed a 10 to 20 fold increase in the disinfecting effect. Silver plating of the sorbents also allowed a 10 to 40-fold increase in their disinfecting effect. Author

N73-29039 Joint Publications Research Service, Arlington, Va.
SELECTION OF OPTIMUM LIGHT CHARACTERISTICS OF MARKS IN OPTICAL SIGHTING DEVICES
S. M. Zalkind *In its* Space Biol. and Med., Vol. 7, No. 3, 1971 (JPRS-59702) 3 Aug. 1973 p 123-128 Transl. into ENGLISH from Kosm. Biol. Med. (USSR), v. 7, no. 3, May-Jun. 1973 p 83-87

Measurements of the visibility of a colored mark with an angle of alpha = 2 minutes against a background brightness of 2,000 nit. Field experiments were carried out using a model of the optical sighting device. The procedure of selecting optimum light and color characteristics of marks for sighting devices is described. Against a background brightness of 2,000 nit the greatest visibility was found in the case of a green mark with a brightness of 270 nit which was obtained by passing the projected light of an incandescent lamp through a 3C-8 color filter of a standard OPS-15 optical apparatus. This mark produced a comparatively low inductive effect on the perception of the background. Author

N73-29040# Joint Publications Research Service, Arlington, Va.
SPACE MEDICINE INCORPORATED INTO PRACTICE ON EARTH
15 Aug. 1973 4 p Transl. into ENGLISH from Vyshka (USSR), 8 May 1973 p 4
(JPRS-59803) Avail: NTIS HC $3.00

The influence of discoveries in space medicine on various areas of science, technology, biology and medicine is discussed. Author

N73-29041*# Kanner (Leo) Associates, Redwood City, Calif.
GENERAL REGULARITIES OF THE REACTION OF THE HUMAN ORGANISM TO THE COMBINED INFLUENCE OF ENVIRONMENTAL FACTORS CHARACTERISTIC FOR A SPACECRAFT CABIN
A. V. Lebedinskiy, S. V. Lebinskiy, and Yu. G. Nefedov Washington NASA Aug. 1973 17 p Transl. into ENGLISH from "Obshchiye Zakonomernosti Reaktsiy Organizma Cheloveka na Kompleksnoye Vozdeystviye Faktorov Sredy, Kharakternoy Dlya Kabiny Kosmicheskikh Letatel'nykh Apparatov"
(Contract NASw-2481)
(NASA-TT-F-15020) Avail: NTIS HC $3.00 CSCL 06P

Sealed-chamber studies lasting 10 to 120 days were performed. The medium which formed in the chamber as a result of the presence of the human test subjects and the reactions of the subjects to these conditions were studied. These experiments also imitated certain other effects such as low doses of ionizing radiation, periodic temperature variations, noise and other factors. Several specific examples are presented to illustrate the interrelationship between man and medium in a sealed space. Author

N73-29042*# Techtran Corp., Silver Spring, Md.
THE MOLECULAR ORGANIZATION OF THE ACTIVE CENTER OF MICROSOMAL CYTOCHROME P-450
L. M. Raykhman, B. Annayev, V. S. Belova, and M. R. Borukayeva Washington NASA Aug. 1973 18 p refs Transl. into ENGLISH from Mol. Biol. (Moscow), v. 7, no. 3, 1973 p 399-409
(Contract NASw-2485)
(NASA-TT-F-15042) Avail: NTIS HC $3.00 CSCL 06M

The isocyanide spin label (ISL) which induces differential optical spectra in microsomes which are characteristic for isocyanide derivatives of cytochrome P-450 is discussed along with the quantitative correlation between the content of P-450 heme groups of cytochrome P-450 in the microsomes and the bound ISL. The close correlation between the intensity of induced ISL spectral changes of cytochrome P-450 and the degree of inhibition of its hydroxylating activity indicate binding of ISL to the heme group of P-450. The form of the ESR spectra of ISL indicate that the heme of cytochrome P-450, to which the label was bound, all located quite far apart from one another do not form dimeric structures. On the basis of the obtained result, it is concluded that the active center of cytochrome P-450 is a single heme group surrounded by nonpolar amino acid residues whose spatial arrangement relative to heme changes in a certain fashion during cytochrome interaction with substrates and under conditions of conversion of P-450 to P-420. Author

N73-29043*# Scripta Technica, Inc., Washington, D.C.
THE EFFECTS OF MUSCULAR EXERCISE ON URINARY EXCRETIONS OF ADRENAL HARMONES IN THE NORMAL MAN
M. Follenius, G. Brandenberger, M. Simeoni, Miles B. Reinhardt, and O. Walch NASA Aug. 1973 16 p refs Transl. into ENGLISH from Arch. Sci. Physiol. (Paris), v. 26, 1972 p 315-324
(Contract NASw-2484)
(NASA-TT-F-15046) Avail: NTIS HC $3.00 CSCL 06P

Subjects were placed under conditions of physical and psychological stress and under conditions of complete rest to determine urinary secretion changes with respect to aldosterone, hydrocortisone, K/Na and metabolites. Results for all tests except aldosterone were inconclusive. Author

N73-29044*# Techtran Corp., Silver Spring, Md.
THE INCIDENCE OF ABNORMAL LIVER FUNCTION TESTS IN DRUG ADDICTS WITHOUT A HISTORY OF JAUNDICE
A. Weizel, P. Linhart, B. Kommerell, and K. Heilmann Washington NASA Aug. 1973 10 p refs Transl. into ENGLISH from Deut. Med. Wochschr. (Stuttgart), v. 98, no. 20, 18 May 1973 p 1022-1025
(Contract NASw-2485)
(NASA-TT-F-15041) Avail: NTIS HC $3.00 CSCL 06E

Eight drug addicted patients, who were investigated for two months after a stationary treatment against viral hepatitis, showed a slow return to normal values in liver function tests; only in 3 cases was the normalization of the transaminase activity already found. Of 38 asymptomatic walking drug addicts the GOT was found increased in 21, the GPT in 19, and both transaminases in 16 cases. The Australia antigen indication turned out positive in 4 cases. The pathological liver values in asymptomatic drug addicts are probably the result of chronic hepatitis with additional toxic damage due to drug use. Author

N73-29045*# Scripta Technica, Inc., Washington, D.C.
NEW DATA IN THE USE OF THERAPEUTIC EXERCISE IN DISEASES OF THE PERIPHERAL VESSELS
V. N. Moshkov and A. I. Zhuravleva NASA Aug. 1973 11 p refs Transl. into ENGLISH from "Novyye Dannyye v Primenenii Lechebnoy Fizkultury pri Zabolevaniyakh Perifericheskikh Sosudov" p 18-22
(Contract NASw-2484)
(NASA-TT-F-15043) Avail: NTIS HC $3.00 CSCL 06E

Summaries are presented on experience gathered from the practice of exercise therapy in patients having diverse forms of occlusive lesions of arteries and veins and functional vascular

disorders. Emphasis is placed on the fact that the study of therapeutic exercise method reposes on the knowledge of clinical angiology. Observations showed an improvement in the cardiac function, peripheral circulation, along with an increased physical work capacity of the patients, which suggest recommending exercise therapy as a means of rehabilitation early after operations on peripheral vessels. Differential procedures of therapeutic exercise with due consideration of the form and stage of the affection were explained. Author

N73-29046*# Kanner (Leo) Associates, Redwood City, Calif.
ROLE OF LIVING MATTER IN CARBONATE FORMATION
I. N. Stepanov, L. F. Kamalov, and G. N. Stepanov Washington NASA Aug. 1973 6 p refs Transl. into ENGLISH from Uzbeksk. Geol. Zh. (Tashkent), no. 6, 1971 p 32-35
(Contract NASw-2481)
(NASA-TT-F-15028) Avail: NTIS HC $3.00 CSCL 06C

Blue-green algae in the waters of the Sukok and Parkent river basin of the western Tien-Shan absorb calcium from the river waters (57 to 156 mg/1). When the rivers fall and the algae are exposed to direct sunlight, chemical and microscopic analysis demonstrates formation of crystalline calcium carbonate, increasing from an initial 5 to 7% to 28% and more in a day, as the algae dry out and die. Similarities between the thermograms characterizing the stages of carbonate formation during drying-out of the algae and the carbonate beards on the lower surfaces of alluvial-colluvial detritus and soils in the area indicate a genetic similarity. Thus carbonate formation on river rocks, detritus, and in the soils is attributed to the activities of the blue-green algae and microorganisms, and not to carbonate precipitation from water solutions. Author

N73-29047# Joint Publications Research Service, Arlington, Va.
A BIBLIOGRAPHY OF SOVIET LITERATURE ON AVIATION, ALPINE AND SPACE BIOLOGY AND MEDICINE
A. A. Sergeyev, comp. 10 Jun. 1971 441 p refs Transl. into ENGLISH of the book "Otechestvennaya Literatura po Aviatsionnoy, Vysokogornoy, i Kosmicheskoy Biologii i Meditsine, Bibliografiya" Leningrad, Nauka Publishing House, 1969 p 3-190
(JPRS-53329) Avail: NTIS HC $24.25

A bibliography of aviation medicine and space medicine is presented. It covers the period from 1865 through 1967, and consists of works published in Russian. The publications are grouped in the following subjects: aviation physician and his work; air emergencies and injuries; aero-embolism, decompression sickness and barometric pressure drops; vibration; air sickness; flight surgeon examinations, the selection and training of flight personnel; hypoxia; respiration under excess oxygen pressure; weightlessness; and air medical service. F.O.S.

N73-29048*# National Aeronautics and Space Administration, Washington, D.C.
INVESTIGATION OF THE RHYTHM OF SLEEP AND WAKEFULNESS IN CREWS OF THE SPACESHIPS SOYUZ 3-9 BEFORE, DURING AND AFTER EXPOSURE TO SPACEFLIGHT
A. M. Litsov Sep. 1973 16 p refs Transl. into ENGLISH from Izd. Akad. Nauk SSSR, Ser. Biol. (Moscow), no. 6, Nov.-Dec. 1972 p 836-845
(NASA-TT-F-15103) Avail: NTIS HC $3.00 CSCL 06S

During the course of preparations for space flight and during its execution the crews of the Soyuz-3-9 exhibited similar disturbances in the rhythms of sleep and wakefulness associated, on the one hand, with the influence of modified daily schedules and on the other hand, neuropsychic stress and weightlessness. The dynamics of higher nervous activity of these cosmonauts during space flight revealed four stages: (1)deterioration in the general feeling of well being, performance and sleep, (2) recovery and retention of functional state and performance of the cosmonauts to a high level, (3) gradual decline in functional state and performance of the cosmonauts, and (4) brief increase in functional state and performance of the cosmonauts immediately before landing. During the postflight period there was a general slowing in the rate of resynchronization of the sleep and wakefulness rhythms. Author

N73-29049*# Naval Biomedical Research Lab., Oakland, Calif.
STUDIES ON POSSIBLE PROPAGATION OF MICROBIAL CONTAMINATION IN PLANETARY CLOUDS
R. L. Dimmick, M. A. Chatigny, and H. Wolochow Apr. 1973 12 p refs
(NASA Order W-13450)
(NASA-CR-133638) Avail: NTIS HC $3.00 CSCL 06M

One of the key parameters in estimation of the probability of contamintion of the outer planets (Jupiter, Saturn, Uranus, etc.) is the probability of growth (Pg) of terrestrial microorganisms on or near these planets. For example, Jupiter appears to have an atmosphere in which some microbial species could metabolize and propagate. This study includes investigation of the likelihood of metabolism and propagation of microbes suspended in dynamic atmospheres. It is directed toward providing experimental information needed to aid in rational estimation of Pg for these outer planets. Current work is directed at demonstration of aerial metabolism under near optimal conditions and tests of propagation in simulated Jovian atmospheres. Author

N73-29050# Massachusetts Inst. of Tech., Cambridge. Dept. of Psychology.
FACTORS AFFECTING DEPTH PERCEPTION Final Report
Whitman Richards Jan. 1973 103 p refs
(Contract F44620-69-C-0108; AF Proj. 9777)
(AD-759261; AFOSR-73-0439TR) Avail: NTIS CSCL 05/10

The primary cue to distance is stereopsis -- the ability of the brain to make use of the binocular parallax provided by the horizontal separation between the two eyes. Yet not all individuals can make full use of this cue. For these individuals, certain kinds of stimuli are incorrectly localized in depth. These observers, who possess reduced stereopsis, include about 30% of the population. The primary objective of this report is to present procedures and tests that will detect such individuals who have reduced stereoscopic abilities. The second objective is to describe the physiologic nature of the reduction of the normal stereoscopic mechanism. (Author Modified Abstract) GRA

N73-29051# Joint Publications Research Service, Arlington, Va.
ROBOT-MANIPULATOR CONTROL ALGORITHMS
M. B. Ignatyev, F. M. Kulakov, and A. M. Pokrovskiy 6 Aug. 1973 259 p refs Transl. into ENGLISH of the book "Algoritmy Upravleniya Robotami-Manipulyatorami" Leningrad, Izdatelstvo, Mashinostroyeniye, 1972 248 p
(JPRS-59717) Avail: NTIS HC $15.00

A study is reported of the problems involved in the automation of manual and auxiliary operations by using computer-controlled robot-manipulators. Author

N73-29052# National Aviation Facilities Experimental Center, Atlantic City, N.J.
A COMPARISON OF GENERAL AVIATION OCCUPANT RESTRAINT SYSTEMS Final Report, Jan. 1970 - Mar. 1972
John Sommers, Jr. Aug. 1973 19 p
(FAA-NA-73-30) Avail: NTIS HC $3.00

The majority of current general aviation aircraft are not equipped with upper torso restraint systems. Due to this, when an accident occurs, many severe and fatal injuries result from head impacts with surrounding passenger compartment structure and equipment. To cope with this, the provision of an automatic activating airbag restraint system triggered by an impact force was advocated. The results of some of the early deceleration test work conducted on an airbag system over reviewed. Follow-on static and dynamic tests of an automative system experimentally tailored to general aviation aircraft are described. Test results which show attenuation of the upper torso deceleration levels

and compared with tests of conventional systems are discussed. Some results of deceleration tests of restraint systems utilizing shoulder harness are also presented. A comparison of these results with those of the airbag tests indicate a nearly identical level of protection excepting that the airbag prevents flailing of the occupants' arms, whereas the shoulder harness does not. Static tests showed that inadvertent operation of the experimental airbag system tested could interfere with operation of the aircraft.
Author

N73-29053*# Techtran Corp., Silver Spring, Md.
MEDICAL ASPECTS OF THE SAFE DESCENT AND LANDING OF A SPACECRAFT ON THE EARTH AND OTHER CELESTIAL BODIES
V. G. Volovich Washington NASA Aug. 1973 22 p refs Transl. into ENGLISH from Osnovy Kosm. Biol. Med. (Moscow), v. 3, Pt. 4, Chapter 3, 1973 40 p
(Contract NASw-2485)
(NASA-TT-F-15047) Avail: NTIS HC $3.25 CSCL 05E

A survey is presented of various Soviet sources dealing with survival of pilots, sailors and cosmonauts in uninhabited areas, such as deserts on land, the open sea. Abstracts are presented for a number of papers. The results of tests to determine feasibility of optimum composition of emergency rations for use by crews whose craft has landed in the sea or in the desert are presented. It is concluded that powdered shark repellent is ineffective.
Author

N73-29054*# McDonnell-Douglas Astronautics Co., Huntington Beach, Calif.
STUDY OF CO2 SORBENTS FOR EXTRAVEHICULAR ACTIVITY
G. V. Colombo Jul. 1973 78 p refs
(Contract NAS2-6959)
(NASA-CR-114632; MDC-G4778) Avail: NTIS HC $6.00 CSCL 06K

Portable life support equipment was studied for meeting the requirements of extravehicular activities. Previous studies indicate that the most promising method for performing the CO2 removal function removal function were metallic oxides and/or metallic hydroxides. Mgo, Ag2, and Zno metallic oxides and Mg(OH)2 and Zn(OH)2 metallic hydroxides were studied, by measuring sorption and regeneration properties of each material. The hydroxides of Mg and Zn were not regenerable and the zinc oxide compounds showed no stable form. A silver oxide formulation was developed which rapidly absorbs approximately 95% of its 0.19 Kg CO2 Kg oxide and has shown no sorption or structural degeneration through 22 regenerations. It is recommended that the basic formula be further developed and tested in large-scale beds under simulated conditions. T.R.

N73-29055*# Scientific Translation Service, Santa Barbara, Calif.
THE RELATIONSHIP BETWEEN THE INTERMEDIATE MEDIUM AND THE TRANSFORMATION AND CONTRAST PHENOMENA
Thea Cramer Washington NASA Aug. 1973 38 p refs Transl. into ENGLISH from Z. fuer Sinnesphisiologie (West Germany), v. 54, 1923 p 214-242
(Contract NASw-2483)
(NASA-TT-F-15035) Avail: NTIS HC $4.00 CSCL 05E

Experiments on the apparent intermediate medium between observer and visual objects are described. These experiments were carried out in rooms having two chambers, subjected to different lighting conditions, and in open fields. Author

N73-29056# Defence and Civil Inst. of Environmental Medicine, Downsview (Ontario).
A STUDY OF ENERGY EXPENDITURE, DEHYDRATION AND HEALTH IN CANADIAN TROOPS DURING A SPRING EXERCISE IN THE SUBARCTIC: EXERCISE NORTHERN RAMBLE
J. E. M. St.Rose, C. L. Allen, W. S. Myles, B. H. Sabiston, T. E. Brown, P. J. Anderson, and S. D. Livingston Sep. 1972 42 p refs
(DCIEM-882) Avail: NTIS HC $4.25

The influence of the spring sub-Arctic environment on selected physiological aspects related to human effectiveness was investigated within the First Battalion Royal Canadian Regiment during the Battalion's participation on Exercise Northern Ramble. The state of hydration of troops living on hard rations for the duration of the exercise was assessed by measurement of total body weight and determination of hematocrit both pre- and post-exercise. Precise body water determinations were carried out by the deuterium oxide dilution technique on a small number of randomly chosen individuals. The effect of supplementary sodium chloride intake on the state of hydration was also examined. Total body weight determinations before and after the exercise showed no siginificant change and no evidence of hemoconcentration was observed. Absence of obvious symptoms of dehydration reflect the mild environmental conditions, lack of sustained strenuous physical activity, and the ready availability of potable water. The effect of supplementary vitamin C intake on the frequency and severity of upper respiratory symptoms was also examined. Supplementary vitamin C was observed to reduce the frequency and severity of respiratory symptoms.
Author

N73-29057# National Research Council of Canada, Ottawa (Ontario).
THE DIRECT ENDANGERING OF THE LIVING SPACE (A PROPOSED SET OF QUANTITATIVE CONCEPTS)
S. P. Mauch and Th. Schneider 1973 29 p refs Trans. into ENGLISH from Schweiz. Arch. (Switzerland), v. 37, no. 6, 1971 P 175-185
(NRC-TT-1636) Avail: NTIS HC $3.50

The typology, terminology, and methodology for solving the problem of endangered living space are discussed. Data cover rational responses to the danger and responses that are consciously consistent with a well defined system of values.
Author

N73-29058# Bureau of Mines, Pittsburgh, Pa. Technical Support Center.
RESPONSE VARIATIONS OF A MICROPHONE WORN ON THE HUMAN BODY
Terry L. Muldoon 1973 47 p refs
(BM-RI-7810) Avail: NTIS HC $4.50

The Bureau of Mines conducted an investigation to quantify microphone response variations that could result when the microphone is worn by a worker, as with a personal noise dosimeter, and to suggest an optimum placement and orientation of the microphone for noise exposure measurements. Previous studies have shown no significant variations in a diffuse field. This investigation, therefore, was conducted in the free field conditions of an anechoic chamber using an anthropometric dummy as a subject, and broad band noise as the acoustic stimulus. It was established that, in a free field, the wearer's body does significantly affect microphone response; the response variations are a function of aximuth, and orientation of the microphone. Results suggest that locating the microphone on top of the subject's shoulder, oriented parallel to the body axis, should yield data comparable to that obtained using a sound-level meter. Author

N73-29059*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
BIODETECTION GRINDER
F. J. Beyerle 9 Aug. 1973 30 p refs
(NASA-TM-X-64765) Avail: NTIS HC $3.50 CSCL 06B

A biodetection grinder for sampling aerospace materials for microorganisms without killing them was constructed. The device employs a shearing action to generate controllable sized particles with a minimum of energy input. Tests were conducted on materials ranging from soft plastics to hard rocks. Author

N73-29060*# City Univ. of New York.
NONLINEAR AND DIGITAL MAN-MACHINE CONTROL SYSTEMS MODELING Final Report
Ralph Mekel Nov. 1972 112 p refs
(Grant NGR-33-013-053)
(NASA-CR-132294; FR-72-447-01)Avail: NTIS HC$7.75 CSCL 05H

An adaptive modeling technique is examined by which controllers can be synthesized to provide corrective dynamics to a human operator's mathematical model in closed loop control systems. The technique utilizes a class of Liapunov functions formulated for this purpose, Liapunov's stability criterion and a model-reference system configuration. The Liapunov function is formulated to posses variable characteristics to take into consideration the identification dynamics. The time derivative of the Liapunov function generate the identification and control laws for the mathematical model system. These laws permit the realization of a controller which updates the human operator's mathematical model parameters so that model and human operator produce the same response when subjected to the same stimulus. A very useful feature is the development of a digital computer program which is easily implemented and modified concurrent with experimentation. The program permits the modeling process to interact with the experimentation process in a mutually beneficial way. Author

N73-29061# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
THE AEROSPACE MEDICAL RESEARCH LABORATORY GUIDE TO MEDICAL MONITORING OF ENVIRONMENTAL STRESS
Feb. 1973 32 p refs Revised
(AD-760813; AMRL-TR-66-208-Rev) Avail: NTIS CSCL 06/19

The guide was prepared as an aid to medical officers assigned to the Aerospace Medical Research Laboratory who must assume responsibility as medical monitors for laboratory studies of environmental stress. Medical problems associated with specific environmental stresses are reviewed by individuals actively engaged in research in these areas. A general guide to the treatment of medical emergencies is presented, as well as Aerospace Medical Research Laboratory policy to be used in the event of an accident. General problems of physiological monitoring and equipment safety are discussed. A bibliography is included. Author (GRA)

N73-29062# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
PERFORMANCE OF THE ANTI-G VALVE WHEN SUBJECTED TO VARYING LATERAL FORCES
John W. Frazier, Raymond U. Whitney, and Alan B. Ashare Feb. 1973 12 p refs
(AF Proj. 7222)
(AD-760814; AMRL-TR-72-67) Avail: NTIS CSCL 06/19

Human subjects on the Dynamic Environment Simulator (DES) were exposed to levels of 4, 5, 6, and 7 G in a variable back angle seat. A standard G valve (MIL-V-9370D) mounted on the seat back pan was used to furnish G-suit pressure. The seat back angle, and hence the G-valve, was run at angles of 30, 45, 55, and 65 deg to the resultant force vector. Although the opening points and suit pressures are altered, the G-valve functions in a reproducible and usable manner. Pressure curves and subject responses are reported. Author (GRA)

N73-29063# Harvard School of Public Health, Boston, Mass. Guggenheim Center for Aerospace Health and Safety.
ON ENHANCING VISUAL PERCEPTIONS OF SOLAR FLARE PRECURSORS Final Report, 20 Jan. 1971 - 31 Dec. 1972
Ronald M. Pickett Apr. 1973 115 p refs
(Contract F19628-71-C-0098; AF Proj. 8666)
(AD-760802; AFCRL-TR-73-0210) Avail: NTIS CSCL 05/10

The report describes research on ways to improve the performance of solar patrol observers, personnel who monitor the condition and activity of the sun through optical telescopes. Section 1 explains the need for visual monitoring to detect, evaluate, and predict solar flares. Section 2 discusses the need for increased objectivity and precision in sensory and perceptual evaluations for solar flare prediction. Section 3 is a report of research based on the foregoing rationale. (Modified author abstract) GRA

N73-29064# Naval Air Development Center, Warminster, Pa. Air Vehicle Technology Dept.
THE LANDING SIGNAL OFFICER: A PRELIMINARY DYNAMIC MODEL FOR ANALYSES OF SYSTEM DYNAMICS
Ralph H. Smith 23 Apr. 1973 51 p refs
(AD-762728; NADC-72078-VT) Avail: NTIS CSCL 05/9

A prototype model for the LSO (Landing Signal Officer) is developed. The model is derived based on considerations of the nature of the carrier landing task, human sensory characteristics, and LSO-to-pilot communications methodology. A central consideration in the derivation of the LSO model is seen to be the separate strategies that can be employed by the pilot and the LSO. The model is described via a digital computer program. It is used for two examples to demonstrate how, by appropriate calls, the LSO can prevent a ramp strike. A third example uses the MOVLAS to explore an alternative and far simpler approach to LSO modeling in those situations where the LSO-to-pilot communications can be linearized by an appropriate display. Author (GRA)

N73-29065# Tulane Univ., New Orleans, La.
MASS, VOLUME, CENTER OF MASS AND MASS MOMENT OF INERTIA OF THE HEAD AND NECK OF THE HUMAN BODY Final Report
Leon B. Walker, Jr., Edward H. Harris, and Uwe R. Pontius 15 Mar. 1973 35 p refs
(Contract N00014-69-A-0248-0001; N00203-71-M-1619)
(AD-762581) Avail: NTIS CSCL 05/5

The mass, volume, center of mass and mass moment of inertia of the head and neck and the head were determined for twenty human male cadavers. Anthropometric values and anatomic landmarks were obtained by external measurements and by use of X-ray procedures. The procedures used to determine the above measurements are described. Uniform planes for the separation of the head and neck from the torso and separation of the head from the neck were established and are described in detail. The values of the physical properties of the head and neck and the head are tabulated and compared to data reported in previous studies. Author (GRA)

N73-29066# School of Aerospace Medicine, Brooks AFB, Tex.
A UNIVERSAL CALIBRATOR FOR STEADINESS OF STANCE MEASURING PLATFORMS Final Report, Aug. 1972 - Apr. 1973
Yuriy V. Terekhov Jun. 1973 13 p refs
(AF Proj. 7996)
(AD-763093; SAM-TR-73-16) Avail: NTIS CSCL 06/2

A calibrator for biaxial electronic platforms designed to measure postural equilibrium is described. The device provides a convenient means of calibrating platforms of varying design and purpose. Author (GRA)

N73-29067# School of Aerospace Medicine, Brooks AFB, Tex.
NEW INSTRUMENTATION FOR MEASUREMENT OF MAN'S STABILITY OF STANCE Final Report, 1 Feb. - 15 Oct. 1972
Yuriy V. Terekhov and Eric D. Grassman Jun. 1973 48 p refs
(AF Proj. 7996)
(AD-763096; SAM-TR-73-12) Avail: NTIS CSCL 06/2

An instrumentation system for measurement of postural equilibrium in man was developed. The device consists of an electronic platform which continuously measures the location of the physiologic gravicenter in the horizontal plane and a circuit which reduces this measurement to quantitative indices of stability of stance. The instrument is shown to be highly accurate and convenient to operate. Three recording versions of the system, each differing in cost and complexity, are described. Author (GRA)

N73-29321 Israel Program for Scientific Translations, Ltd., Jerusalem.
ABSORPTION AND UTILIZATION OF SOLAR ENERGY BY CROPS UNDER VARIOUS GROWTH CONDITIONS
A. P. Larin and S. I. Lebedev *In its* Actinometry and Atmospheric Optics (TT-70-50159) 1971 p 282-286 Transl. into ENGLISH from the book "Aktinometriya i Atmosfernaya Optika" Izdatelstvo Valgus, Tallin, 1968 390 p

N73-29322 Israel Program for Scientific Translations, Ltd., Jerusalem.
DISTRIBUTION OF THE LONG-WAVE RADIATION FLUXES AND THE RADIATION BALANCE IN PLANT COVER
A. I. Budagovskii, J. K. Ross, and H. G. Tooming *In its* Actinometry and Atmospheric Optics (TT-70-50159) 1971 p 287-296 refs Transl. into ENGLISH from the book "Aktinometriya i Atmosfernaya Optika" Izdatelstvo Valgus, Tallin, 1968 390 p

N73-29323 Israel Program for Scientific Translations, Ltd., Jerusalem.
THE RADIATION REGIME AND THE HEAT BALANCE OF A COTTON FIELD AND THE COTTON CROP
F. A. Muminov *In its* Actinometry and Atmospheric Optics (TT-70-50159) 1971 p 297-302 refs Transl. into ENGLISH from the book "Aktinometriya i Atmosfernaya Optika" Izdatelstvo Valgus, Tallin, 1968 390 p

N73-29325 Israel Program for Scientific Translations, Ltd., Jerusalem.
DETERMINATION OF THE LIGHT STATUS IN SUSPENSIONS OF ALGAE
F. Ya. Sidko, I. A. Nemchenko, V. I. Belyanin, and N. S. Eroshin *In its* Actinometry and Atmospheric Optics (TT-70-50159) 1971 p 308-315 refs Transl. into ENGLISH from the book "Aktinometriya i Atmosfernaya Optika" Izdatelstvo Valgus, Tallin, 1968 390 p

N73-29326 Israel Program for Scientific Translations, Ltd., Jerusalem.
THE THEORY OF PHOTOSYNTHESIS OF ALGAE
F. Ya. Sidko, V. N. Belyanin, N. S. Eroshin, G. F. Beresnev, and I. A. Nemchenko *In its* Actinometry and Atmospheric Optics (TT-70-50159) 1971 p 315-321 refs Transl. into ENGLISH from the book "Aktinometriya i Atmosfernaya Optika" Izdatelstvo Valgus, Tallin, 1968 390 p

N73-29327 Israel Program for Scientific Translations, Ltd., Jerusalem.
THE PHOTOSYNTHESIS OF SUBMERGED AQUATIC PLANTS AS A FUNCTION OF THE INTENSITY OF PENETRATING RADIATION
K. A. Mokievskii and M. A. Rychkova *In its* Actinometry and Atmospheric Optics (TT-70-50159) 1971 p 321-326 refs Transl. into ENGLISH from the book "Aktinometriya i Atmosfernaya Optika" Izdatelstvo Valgus, Tallin, 1968 390 p

N73-29328 Israel Program for Scientific Translations, Ltd., Jerusalem.
RADIATION REGIME AND THE BIOMETRIC INDICES OF FOREST VEGETATION
Yu. L. Rauner *In its* Actinometry and Atmospheric Optics (TT-70-50159) 1971 p 325-332 refs Transl. into ENGLISH from the book "Aktinometriya i Atmosfernaya Optika" Izdatelstvo Valgus, Tallin, 1968 390 p

N73-29329 Israel Program for Scientific Translations, Ltd., Jerusalem.
DISTRIBUTION OF PHOTOSYNTHETICALLY ACTIVE RADIATION IN THE OPEN AND IN THE FOREST UNDER VARIOUS WEATHER CONDITIONS
Yu. L. Tselniker *In its* Actinometry and Atmospheric Optics (TT-70-50159) 1971 p 333-338 Transl. into ENGLISH from the book "Aktinometriya i Atmosfernaya Optika" Izdatelstvo Valgus, Tallin, 1968 390 p

N73-29330 Israel Program for Scientific Translations, Ltd., Jerusalem.
THE INCREMENTAL PART OF THE ORGANIC MATTER BALANCE OF THE UNDERWOOD DEPENDING ON THE LIGHT CONDITIONS
I. S. Malkina *In its* Actinometry and Atmospheric Optics (TT-70-50159) 1971 p 338-342 refs Transl. into ENGLISH from the book "Aktinometriya i Atmosfernaya Optika" Izdatelstvo Valgus, Tallin, 1968 390 p

N73-29331 Israel Program for Scientific Translations, Ltd., Jerusalem.
THE LOSS PART OF THE ORGANIC MATTER BALANCE IN OAK UNDERWOOD DEPENDING ON THE LIGHT CONDITIONS
A. M. Yakshina *In its* Actinometry and Atmospheric Optics (TT-70-50159) 1971 p 342-346 refs Transl. into ENGLISH from the book "Aktinometriya i Atmosfernaya Optika" Izdatelstov Valgus, Tallin, 1968 390 p

N73-29332 Israel Program for Scientific Translations, Ltd., Jerusalem.
MEASUREMENTS OF THE RADIATION CHARACTERISTICS IN A MULTI-STOREYED STAND
N. N. Vygodskaya *In its* Actinometry and Atmospheric Optics (TT-70-50159) 1971 p 346-352 refs Transl. into ENGLISH from the book "Aktinometriya i Atmosfernaya Optika" Izdatelstvo Valgus, Tallin, 1968 390 p

N73-29333 Israel Program for Scientific Translations, Ltd., Jerusalem.
SCATTERING OF POLARIZED LIGHT BY PLANT COVER ELEMENTS
V. P. Rvachev, S. G. Guminetskii, and V. K. Polyanskii *In its* Actinometry and Atmospheric Optics (TT-70-50159) 1971 p 352-356 refs Transl. into ENGLISH from the book "Aktinometriya i Atmosfernaya Optika" Izdatelstvo Valgus, Tallin, 1968 390 p

N73-29334 Israel Program for Scientific Translations, Ltd., Jerusalem.
THE BRIGHTNESS COEFFICIENT OF THE SOIL-VEGETATION SYSTEM AS A FUNCTION OF SOME PARAMETERS OF THE PLANT COVER
V. I. Rachkulik and M. V. Sitnikova *In its* Actinometry and Atmospheric Optics (TT-70-50159) 1971 p 356-360 refs Transl. into ENGLISH from the book "Aktinometriya i Atmosfernaya Optika" Izdatelstvo Valgus, Tallin, 1968 390 p

N73-29335 Israel Program for Scientific Translations, Ltd., Jerusalem.
UTILIZATION OF SOLAR ENERGY FOR PHOTOSYNTHESIS BY SPRING WHEAT CULTIVATED IN MOUNTAINS
V. P. Bedenko *In its* Actinometry and Atmospheric Optics (TT-70-50159) 1971 p 361-366 refs Transl. into ENGLISH from the book "Aktinometriya i Atmosfernaya Optika" Izdatelstvo Valgus, Tallin, 1968 390 p

N73-29337 Israel Program for Scientific Translations, Ltd., Jerusalem.
MEASUREMENTS OF THE PHOTOSYNTHETICALLY ACTIVE RADIATION IN FORESTS WITH AN INTENSITY METER
V. S. Khazanov and Yu. L. Tselniker *In its* Actinometry and Atmospheric Optics (TT-70-50159) 1971 p 373-376 refs Transl. into ENGLISH from the book "Aktinometriya i Atmosfernaya Optika" Izdatelstvo Valgus, Tallin, 1968 390 p

N73-29347 Israel Program for Scientific Translations, Ltd., Jerusalem.
MEDICAL SERVICES
A. L. Matusov *In its* The Tenth Soviet Antarctic Expedition, 1965-1966 (TT-70-50072) 1971 p 223-242 Transl. into ENGLISH from Tr. Sov. Antarkt. Eksped. (USSR), v. 49, 1969 474 p

N73-29348 Israel Program for Scientific Translations, Ltd., Jerusalem.
MEDICAL INVESTIGATIONS
N. R. Deryapa *In its* The Tenth Soviet Antarctic Expedition, 1965-1966 (TT-70-50072) 1971 p 243-249 Transl. into ENGLISH from Tr. Sov. Antarkt Eksped. (USSR), v. 49, 1969 474 p

N73-29349 Israel Program for Scientific Translations, Ltd., Jerusalem.
ORIBATID MITES (ACARINA, ORBATEI) IN ANTARCTICA
L. G. Sitnikova *In its* The Tenth Soviet Antarctic Expedition, 1965-1966 (TT-70-50072) 1971 p 250-266 refs Transl. into ENGLISH from Tr. Sov. Antarkt. Eksped. (USSR), v. 49, 1969 474 p

N73-29357 Israel Program for Scientific Translations, Ltd., Jerusalem.
THE PERSONNEL'S VITAMIN BALANCE AT VOSTOK STATION
A. Ya. Shamis *In its* The Tenth Soviet Antarctic Expedition, 1965-1966 (TT-70-50072) 1971 p 391-395 Transl. into ENGLISH from Tr. Sov. Antarkt. Eksped. (USSR), v. 49, 1969 474 p

N73-29358 Israel Program for Scientific Translations, Ltd., Jerusalem.
DIET AT VOSTOK STATION
N. I. Makarov and A. Ya. Shamis *In its* The Tenth Soviet Antarctic Expedition, 1965-1966 (TT-70-50072) 1971 p 396-399 Transl. into ENGLISH from Tr. Sov. Antarkt. Eksped. (USSR), v. 49, 1969 474 p

N73-29359 Israel Program for Scientific Translations, Ltd., Jerusalem.
HYGIENIC INVESTIGATIONS AT VOSTOK STATION
N. I. Makarov *In its* The Tenth Soviet Antarctic Expedition, 1965-1966 (TT-70-50072) 1971 p 400-406 refs Transl. into ENGLISH from Tr. Sov. Antarkt. Eksped. (USSR), v. 49, 1969 474 p

N73-29363# Israel Program for Scientific Translations, Ltd., Jerusalem.
PRELIMINARY DESCRIPTION OF SEASONAL PLANKTON COLLECTIONS AT MOLODEZHNAYA STATION
Zh. A. Zvereva *In its* The Tenth Soviet Antarctic Expedition, 1965-1966 (TT-70-50072) 1971 p 448-452 refs Transl. into ENGLISH from Tr. Sov. Antarkt. Eksped. (USSR), v. 49, 1969 474 p

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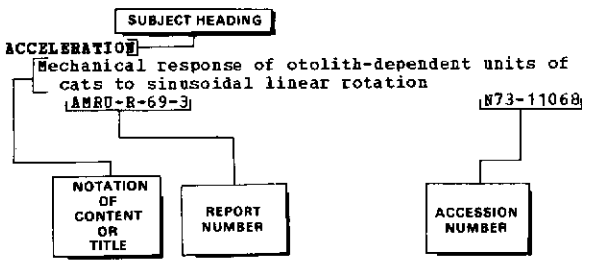

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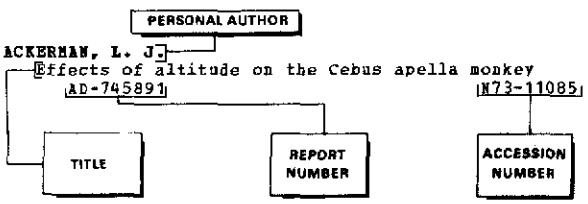

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