



Aerospace Medicine
and Biology
A Continuing
Bibliography
with Indexes

NASA SP-7011 (199)
November 1979

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ACCESSION NUMBER RANGES

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

STAR (N-10000 Series) N79-28118 – N79-30137

IAA (A-10000 Series) A79-43833 – A79-46967

AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES

(Supplement 199)

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 1979 in

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



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1979

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INTRODUCTION

This Supplement to *Aerospace Medicine and Biology* (NASA SP-7011) lists 82 reports, articles and other documents announced during October 1979 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA)*. The first issue of the bibliography was published in July 1964; since that time, monthly supplements have been issued.

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

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

Two indexes -- subject and personal author -- are included.

An annual index will be prepared at the end of the calendar year covering all documents listed in the 1979 Supplements.

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TABLE OF CONTENTS

	Page
IAA Entries (A79-10000)	251
STAR Entries (N79-10000)	259
Subject Index	I-1
Personal Author Index	I-11

TYPICAL CITATION AND ABSTRACT FROM STAR

NASA SPONSORED DOCUMENT		AVAILABLE ON MICROFICHE
NASA ACCESSION NUMBER	N79-10741*	
TITLE	McDonnell-Douglas Astronautics Co., Huntington Beach, Calif.	CORPORATE SOURCE
AUTHOR	GENERALIZED ENVIRONMENTAL CONTROL AND LIFE SUPPORT SYSTEM COMPUTER PROGRAM (G1894), PHASE 3 Final Report	
REPORT NUMBER	R. E. McNulty Sep. 1978 23 p refs (Contract NAS9-14877)	PUBLICATION DATE
COSATI CODE	(NASA-CR-151836; MDC-G7699) Avail: NTIS HC A02/MF A01 CSCL 06K	CONTRACT OR GRANT
	The work performed during Phase 3 of the Generalized Environmental Control Life Support System (ECLSS) Computer Program is reported. Phase 3 of this program covered the period from December 1977 to September 1978. The computerized simulation of the Shuttle Orbiter ECLSS was upgraded in the following areas: (1) the payload loop of the Shuttle simulation was completely recoded and checked out; (2) the Shuttle simulation water and freon loop initialization logic was simplified to permit easier program input for the user; (3) the computerized simulation was modified to accept the WASP subroutine, which is a subroutine to evaluate thermal properties of water and freon; (4) the 1108 operating system was upgraded by LEC; (5) the Shuttle simulation was modified to permit failure cases which simulate zero component flow values; and (6) the Shuttle SEPS version was modified and secure files were setup on the 1108 and 1110 systems to permit simulation runs to be made from remote terminals.	AVAILABILITY SOURCE
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TYPICAL CITATION AND ABSTRACT FROM IAA

NASA SPONSORED DOCUMENT		
AIAA ACCESSION NUMBER	A79-12869*	TITLE
AUTHOR'S AFFILIATION	Studies on the erythron and the ferrokinetic responses in beagles adapted to hypergravity. D. A. Beckman, J. W. Evans (California, University, Davis, Calif.), and J. Oyama (NASA, Ames Research Center, Biomedical Research Div., Moffett Field; California, University, Davis, Calif.).	AUTHORS
PUBLICATION DATE	Aviation, Space, and Environmental Medicine, vol. 49, Nov. 1978, p. 1331-1336. 23 refs. Grant No. NCA2-OR180-505.	TITLE OF PERIODICAL
	Red cell survival, ferrokinetics, and hematologic parameters were investigated in beagle dogs exposed to chronic hypergravity (2.6 Gx). Ineffective erythropoiesis, red cell mass, plasma volume, and Cr-51-elution were significantly increased; maximum Fe-59 incorporation was decreased; and there was no change in the mean erythrocyte life span following autologous injection of Cr-51-labeled red cells and Fe-59-labeled transferrin. Red cell count, F(cells), total body hemoglobin (Hb), susceptibility to osmotic lysis, and differential reticulocyte count were increased. White blood cell count, venous blood %Hb, mean cell volume, mean cell Hb, mean cell Hb concentration, and serum iron were decreased. No changes were observed for body mass, mg Fe per g Hb, iron binding capacity, percent saturation of iron carrying capacity, or the electrophoretic mobility of purified Hb. This study indicated that chronic exposure to hypergravity induced changes in red cell size, volume, total mass, and membrane permeability.	CONTRACT, GRANT OR SPONSORSHIP
	(Author)	

AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 199)

NOVEMBER 1979

IAA ENTRIES

A79-43835 # The role of the neurohormone system of the hypothalamus in physiology and pathology (Rol' neurogornonal'nykh sistem gipotalamusa v fiziologii i patologii). A. F. Makarchenko, A. D. Dinaburg, and A. D. Lauts. Kiev, Izdatel'stvo Naukova Dumka, 1978. 216 p. 515 refs. In Russian.

The anatomy and physiology of the hypothalamus are considered with emphasis on the role of the neurohormone system in homeostasis and its breakdown. Interactions of the neurohormone system with other physiological systems, particularly the sympathico-adrenal and the hypothalamo-hypophyso-adrenal systems, are discussed for the normal state and for cases of hypothalamic lesions. Attention is given to the effects of neurohormonal disorders on homeostasis in autonomic-vascular hypothalamic syndromes and on the integration and regulation of autonomic functions, immunological functions, muscular tonus, lipid metabolism and adaptation processes. Finally, a therapeutic treatment for autonomic-vascular hypothalamic syndromes is presented. A.L.W.

A79-43950 # Central and reflex mechanisms of controlling movements (Tsentral'nye i reflektornye mekhanizmy upravleniia dvizheniiami). A. G. Fel'dman. Moscow, Izdatel'stvo Nauka, 1979. 184 p. 225 refs. In Russian.

Biomechanical and neurophysiological foundations of movements in man and higher animals are the subject of the study. Mechanical properties of muscle and the organization of the motoneuron pool are investigated, and the role of the extension reflex in movement control is studied. Posture stability is analyzed, and some evidence is put forward supporting the hypothesis that shifting the equilibrium point is a means of controlling posture. P.T.H.

A79-44057 # Attempt to describe a class of man-machine dialogue systems based on a natural language (Proba opisu pewnej klasy systemow naturalnej konwersacji czlowieka z maszyną cyfrową). S. Mazon and R. Tadeusiewicz (Akademia Gorniczo-Hutnicza, Instytut Informatyki i Automatyki, Krakow, Poland). *Archiwum Automatyki i Telemekhaniki*, vol. 24, no: 2, 1979, p. 293-299. 11 refs. In Polish.

An attempt is made to construct a formal description of dialogue systems based on the concept of key words. A set of system operations to be employed by the user is formulated. An attempt is then made to formalize operations consisting of the transformation of grammatical forms of component parts of statements and the extraction of semantic content on the basis of recognized key words. B.J.

A79-44081 Stabilization of the horizontal motion of a bipedal walking robot. V. B. Larin. (*Akademiia Nauk SSSR, Izvestiia, Mekhanika Tverdogo Tela*, Sept.-Oct. 1978, p. 35-44.) *Mechanics of Solids*, vol. 13, no. 5, 1978, p. 29-37. Translation.

The optimal controller for a biped walking machine is synthesized within the framework of linear quadratic Gaussian theory. For a particular case of the performance criterion, the desired periodic solution of the Riccati equation is found in explicit form. Asymptotic stability of the closed system 'object/controller' is demonstrated. B.J.

A79-44166 The evolutionary pattern of exercise-induced ST segment depression. R. A. Chahine, A. E. Raizner, R. J. Luchi (Baylor University; U.S. Veterans Administration Hospital, Houston, Tex.), M. R. Awdeh (Tennessee, University, Memphis, Tenn.), and M. Mnayer. *Journal of Electrocardiology*, vol. 12, July 1979, p. 235-239. 21 refs.

The present study was designed to determine whether dynamic morphologic analysis of the various slopes of exercise-induced ST segment depression in EKG may improve the predictive value of treadmill testing, and whether such analysis may help identify the patients with more severe disease. Treadmill-test subjects showing 1 mm or more of horizontal or downsloping ST depression were categorized into either of two morphologic patterns: (1) those with 'evolutionary' ST depression with complete or partial inversion of the T-wave and gradual return toward baseline; and (2) those with 'simple' ST depression with horizontal or downsloping ST depression returning directly to baseline without any significant T-wave inversion. The results point out that the exercise-induced evolutionary ST depression is a more specific predictor of coronary artery disease and can be for noninvasive recognition of patients with more severe disease. S.D.

A79-44300 * Computer design synthesis of a below knee-Syme prosthesis. P. T. Elangovan (Eindhoven, Technische Hogeschool, Eindhoven, Netherlands), D. N. Ghista (NASA, Ames Research Center, Biomedical Research Div., Moffett Field, Calif.), and R. S. Alwar (Indian Institute of Technology, Madras, India). *Computer Programs in Biomedicine*, vol. 9, Mar. 1979, p. 169-210. 24 refs.

A detailed design synthesis analysis of the BK Syme prosthesis is provided, to determine the socket's cutout orientation size and shape, cutout fillet shape, socket wall thickness distribution and the reinforced fiber distribution in the socket wall, for a minimally stressed structurally safe lightweight prosthesis. For analysis purposes, the most adverse socket loading is obtained at the push-off stage of gait; this loading is idealized as an axial in-plane loading on the bottom edge of the circular cylindrical socket shell whose top edge is considered fixed. Finite element stress analysis of the socket shell (with uniform and graded wall thickness) are performed for various orientations of the cutout and for various types of corner fillets. A lateral cutout with a streamline fillet is recommended. The wall material (i.e., thickness) distribution is determined so as to minimize the stresses, while ensuring that the wall material's stress limits are not exceeded. For such a maximally stressed lightweight socket shell, the panels in the neighborhood of the cutout are checked to ensure that they do not buckle under their acquired stresses. A fiber-reinforced laminated composite socket shell is also analyzed in order to recommend optimum variables in orientations and densities of reinforcing fibers. (Author)

A79-44582 **Enhancement of luminance flicker by color-opponent mechanisms.** P. Gouras (Columbia University, New York, N.Y.) and E. Zrenner (Max-Planck-Institut für physiologische und klinische Forschung, Bad Nauheim, West Germany). *Science*, vol. 205, Aug. 10, 1979, p. 587-589. 21 refs. Grant No. NIH-EY-02591.

Color-opponent ganglion cells in the monkey retina respond to luminance flicker at high temporal frequencies. Color opponency, which makes these cells so selective of wavelength at low temporal frequencies, is progressively lost at high frequencies. This loss is due to a frequency-dependent phase shift between the responses of spectrally different center and surround mechanisms in the receptive field of each of these cells. Center and surround responses, which are antagonistic at low temporal frequencies, become synergistic at high ones, making these cells most responsive at high frequencies to those wavelengths to which they are least responsive at low frequencies. This phenomenon can explain the differences between chromatic and luminance flicker in human vision. (Author)

A79-44775 * **Hyperthermia and exercise.** J. E. Greenleaf (NASA, Ames Research Center, Laboratory of Human Environmental Physiology, Moffett Field, Calif.). In: MTP International Review of Physiology, Volume 20 - Environmental Physiology III. Baltimore, Md., University Park Press, 1979, p. 157-208. 173 refs.

The paper emphasizes fluid and electrolyte parameters that affect the hyperthermia of physical exercise (metabolic heat production). The major hypothesis discussed is that fluid and electrolyte changes influence thermal regulation within the fine control boundaries. A second working hypothesis is that the elevation of core temperature during exercise is a regulated phenomenon that is beneficial to the organism in terms of efficiency and potential for survival and is not merely a failure of the thermoregulatory control system. The central thermoregulatory mechanism seems more responsive to the hypothermic effect of calcium than to the hyperthermic effect of sodium. The mechanisms controlling plasma fluid-electrolyte shifts, particularly during exercise and recovery from exercise, may play an important part in exercise thermoregulation. S.D.

A79-44797 * **Insulin-like effect of bovine growth hormone in vivo as demonstrated by oxidation of C/14-U-glucose in diabetic rats.** D. D. Feller and E. D. Neville (NASA, Ames Research Center, Biomedical Research Div., Moffett Field, Calif.). *Physiological Chemistry and Physics*, vol. 10, no. 4, 1978, p. 291-304. 14 refs.

A79-44798 * **Effects of high-LET neon /Ne-20/ particle radiation on the brain, eyes and other head structures of the pocket mouse - A histological study.** L. M. Kraft, M. A. Kelly, J. E. Johnson, Jr., W. Haymaker (NASA, Ames Research Center, Moffett Field; San Francisco, University, San Francisco, Calif.), E. V. Benton, R. P. Henke, R. Cassou (San Francisco, University, San Francisco, Calif.), D. E. Philpott (NASA, Ames Research Center, Moffett Field, Calif.), F. S. Vogel (Duke University Medical Center, Durham, N.C.), and W. Zeman (Indiana University, Indianapolis, Ind.). *International Journal of Radiation Biology*, vol. 35, no. 1, 1979, p. 33-61. 30 refs. Grant No. NSG-2063; Contract No. NAS2-7927.

A79-44799 * **Quantitative analysis of mating behavior in aging male *Drosophila Melanogaster*.** A. C. Economos (Technology, Inc., Life Sciences Div., Mountain View, Calif.), J. Miquel, R. Binnard (NASA, Ames Research Center, Biomedical Research Div., Moffett Field, Calif.), and S. Kessler (Stanford University, Stanford, Calif.). *Mechanisms of Ageing and Development*, vol. 10, 1979, p. 233-240.

A79-44865 **Carbon suboxide and the genetic code.** M. Shimizu (Tokyo, University, Tokyo, Japan). *Astrophysics and Space Science*, vol. 62, no. 2, May 1979, p. 509-513. 20 refs.

This letter points out a close correlation between the genetic scheme of terrestrial life and carbon suboxide (C3O2) polymers. Evidence is discussed which indicates that carbon suboxide polymers

are likely to have yielded amino acids and nucleic acid bases in the primitive oceans. A correlation between C3O2 and t-RNA is also noted. It is concluded that the C3O2 scheme for the origin of life is in accord with both the essence of the present genetic code and the 'central dogma' of biochemistry. F.G.M.

A79-45388 # **Pilot-optimal augmentation of the air-to-air tracking task.** D. K. Schmidt (Purdue University, West Lafayette, Ind.). In: Guidance and Control Conference, Boulder, Colo., August 6-8, 1979, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, Inc., 1979, p. 388-395. 9 refs. Contract No. F44620-76-C-0052; Grant No. AF-AFOSR-79-0042. (AIAA 79-1747)

A method based on optimal control techniques, closed-loop task-oriented design objectives, and an optimal control model of the human pilot was applied to augment the system dynamics in a longitudinal air-to-air tracking task. The plant dynamics included not only the vehicle short period mode but the dynamics of two different lead-computing sight displays, at different tracking ranges and levels of target acceleration. Previously obtained experimental results were duplicated, a family of full-state feedback linear control laws developed, tracking improvements predicted, and augmented system dynamics (eigenvalues) investigated. The results demonstrate the dependence of the desirable vehicle (short period) dynamics on the dynamics of the other system modes (e.g., the display), thus emphasizing the importance of considering all the system dynamics in handling qualities investigation and stability augmentation synthesis. (Author)

A79-45411 * # **A structural model of the adaptive human pilot.** R. A. Hess (NASA, Ames Research Center, Moffett Field, Calif.). In: Guidance and Control Conference, Boulder, Colo., August 6-8, 1979, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, Inc., 1979, p. 573-583. 25 refs. (AIAA 79-1784)

A compensatory tracking model of the human pilot is offered which attempts to provide a more realistic representation of the human's signal processing structure than that which is exhibited by pilot models currently in use. Two features of the model distinguish it from other representations of the human pilot. First, proprioceptive information from the control stick or manipulator constitutes one of the major feedback paths in the model, providing feedback of vehicle output rate due to control activity. Implicit in this feedback loop is a model of the vehicle dynamics which is valid in and beyond the region of crossover. Second, error-rate information is continuously derived and independently but intermittently controlled. An output injected remnant model is offered and qualitatively justified on the basis of providing a measure of the effect of inaccuracies such as time variations in the pilot's internal model of the controlled element dynamics. The data from experimental tracking tasks involving five different controlled element dynamics and one nonideal viewing condition were matched with model generated describing functions and remnant power spectral densities. (Author)

A79-45476 **Skin-resistance measuring device with higher resolution (Hautwiderstandsmessgerät mit hoher Auflösung).** H. B. Brinkhus (Heidelberg, Universität, Heidelberg, West Germany) and P. v. Walter. *Elektronik*, vol. 28, July 26, 1979, p. 50-54. 5 refs. In German. Research supported by the Bundesministerium für Forschung und Technologie.

The process of detecting small variations in biological skin resistance is described, using a varying-level measuring device that employs a balancing bridge which automatically sets the resistance level to zero. The device is capable of increasing or decreasing its preset resistance level if the recorded neutralized level of skin moisture exceeds a 5-ohm spread. The minimum stimulus needed for base resistance is measured in binary quantities between (0) and 1 H-ohm and can be instantaneously visualized on the digital display. Attention is given to the digital-to-analog converter and the balancing bridge, using various schematic diagrams, as well as the linear analog

readout form, that records the resolution in 2, 4, and 10 k-ohm/cm for recorder sensitivities of 1 v/cm. C.F.W.

A79-45639 Goodman et al.'s method for augmenting the number of nucleotide substitutions. Y. Tateno and M. Nei (Texas, University, Houston, Tex.). *Journal of Molecular Evolution*, vol. 11, May 12, 1978, p. 67-73. 10 refs. NSF Grant No. DEB-76-06069; Grant No. NIH-GM-20293.

Statistical properties of Goodman et al.'s (1974) method of compensating for undetected nucleotide substitutions in evolution are investigated by using computer simulation. It is found that the method tends to overcompensate when the stochastic error of the number of nucleotide substitutions is large. Furthermore, the estimate of the number of nucleotide substitutions obtained by this method has a large variance. However, in order to see whether this method gives overcompensation when applied together with the maximum parsimony method, a much larger scale of simulation seems to be necessary. (Author)

A79-45640 On investigating the statistical properties of the populous path algorithm by computer simulation - Counterconclusions to those of Tateno and Nei. J. Czelusniak, M. Goodman (Wayne State University, Detroit, Mich.), and G. W. Moore (Johns Hopkins Hospital, Baltimore, Md.). *Journal of Molecular Evolution*, vol. 11, May 12, 1978, p. 75-85. 18 refs. NSF Grant No. DE-72-02429.

A computer simulation confirming the accuracy of the populous path algorithm proposed by Goodman et al. (1974) for estimating the numbers of hidden nucleotide substitutions in protein evolution is presented in contradiction to the conclusions of the simulation by Tateno and Nei (1978). The simulation employed is essentially similar to the procedure of Tateno and Nei, however the maximum parsimony method is employed to construct from amino acid sequences ancestral and descendant mRNA sequences, which are used to find augmented mutational distances by the populous path algorithm. In contrast to the results of Tateno and Nei, an underaugmentation of the true distance is observed and the populous path algorithm is found to provide generally better estimates of mutational distances between contemporary amino acid sequences than the Poisson correction. The bias of the maximum parsimony method towards the overrepresentation of shared sequences especially in sparser evolutionary trees is considered to make the maximum parsimony/populous path approach more accurate as larger numbers of closely related species are considered. A.L.W.

A79-45641 * A proposal concerning the origin of life on the planet earth. C. R. Woese (Illinois, University, Urbana, Ill.). *Journal of Molecular Evolution*, vol. 13, July 18, 1979, p. 95-101. 20 refs. NASA-supported research.

It is proposed that, contrary to the widely accepted Oparin thesis, life on earth arose not in the oceans but in the earth's atmosphere. Difficulties of the Oparin thesis relating to the nonbiological nature of prebiotic evolution are discussed, and autotrophic, photosynthetic cells are proposed as the first living organisms to emerge, thus avoiding these difficulties. Recent developments in the geology of the earth at the time of the emergence of life are interpreted as requiring the absence of liquid surface water, with water partitioned between a molten crust and a dense, CO₂-rich atmosphere, similar to the present state of Venus. Biochemistry in such an atmosphere would be primarily membrane chemistry on the interfaces of atmospheric salt water droplets, proceeding at normal temperatures without the absorption of electrical discharges or UV light. Areas not sufficiently accounted for by this scenario include the development of genetic organization and the breaking of the runaway greenhouse condition assumed. A.L.W.

A79-45643 Inadequacy of prebiotic synthesis as origin of proteinous amino acids. J. T.-F. Wong and P. M. Bronskill (Toronto, University, Toronto, Canada). *Journal of Molecular Evolution*, vol. 13, July 18, 1979, p. 115-125. 37 refs. Research supported by the Medical Research Council of Canada.

The production of some nonproteinous, and lack of production of other proteinous, amino acids in model prebiotic synthesis, along with the instability of glutamine and asparagine, suggest that not all of the 20 present-day proteinous amino acids gained entry into proteins directly from the primordial soup. Instead, a process of active co-evolution of the genetic code and its constituent amino acids would have to precede the final selection of these proteinous amino acids. (Author)

A79-45644 Augmentation algorithm - A reply to Holmquist. M. Nei and Y. Tateno (Texas, University, Houston, Tex.). *Journal of Molecular Evolution*, vol. 13, July 18, 1979, p. 167-171. 8 refs.

The criticism by Holmquist (1978) of a letter by Tateno and Nei (1978) in which the invalidity of the method of Goodman et al. (1974) for augmenting the number of nucleotide substitutions is demonstrated, is discussed. It is argued that, contrary to the claims of Holmquist, the procedure of Goodman et al. requires the assumption of the equality of nucleotide substitution rates in different evolutionary branches, while it introduces a systematic difference between the true number of substitutions and the augmented number that depends on their magnitudes, as demonstrated by computer simulations. Holmquist's criticism of the results that the augmented substitution numbers exhibit more variance than the true rates and that changes in the topology of the evolutionary tree have an effect on the augmented number of substitutions are attributed to a misconception of the probability space in question. A.L.W.

A79-45645 * Molecular phylogenetic trees - On the validity of the Goodman-Moore augmentation algorithm. R. Holmquist (California, University, Berkeley, Calif.). *Journal of Molecular Evolution*, vol. 13, July 18, 1979, p. 173-178. 12 refs. NSF Grant No. PCM-76-18627; Grant No. NGR-05-003-460.

A response is made to the reply of Nei and Tateno (1979) to the letter of Holmquist (1978) supporting the validity of the augmentation algorithm of Moore (1977) in reconstructions of nucleotide substitutions by means of the maximum parsimony principle. It is argued that the overestimation of the augmented numbers of nucleotide substitutions (augmented distances) found by Tateno and Nei (1978) is due to an unrepresentative data sample and that it is only necessary that evolution be stochastically uniform in different regions of the phylogenetic network for the augmentation method to be useful. The importance of the average value of the true distance over all links is explained, and the relative variances of the true and augmented distances are calculated to be almost identical. The effects of topological changes in the phylogenetic tree on the augmented distance and the question of the correctness of ancestral sequences inferred by the method of parsimony are also clarified. A.L.W.

A79-45768 A revised model of gas transport in human lungs. D. A. Scrimshire (Aston, University, Birmingham, England). *Applied Mathematical Modelling*, vol. 3, Aug. 1979, p. 289-294. 18 refs.

A critical reappraisal is made of the boundary conditions assumed in contemporary models of gas transport in the human lungs. It is demonstrated that the previously assumed zero concentration gradient at the alveolar wall does not guarantee zero flux for an insoluble tracer gas at this point and, more importantly, causes an unrealistically rapid equilibration of gaseous concentrations to occur. In view of these major shortcomings, a revised set of boundary conditions are proposed which are shown to yield results in close agreement with experimental findings. (Author)

A79-45771 Test of the 10 bits/sec channel-capacity hypothesis for human tracking. T. O. Kvalseth (Norges Tekniske Hogskole, Trondheim, Norway). *Applied Mathematical Modelling*, vol. 3, Aug. 1979, p. 307, 308. Research supported by the Norges Tekniske Hogskole.

An experiment involving a time-discrete and amplitude-continuous input course generated by a zero-mean and band-limited white Gaussian noise is examined. Twenty-five amplitude values of a complete response or output track produced by a subject were measured perpendicularly to the time axis; and for the time-continuous responses, these measurements were made at the same time-axis points as those of the corresponding input sequences. It was determined that there was no general effect on the information ratio for either the continuous or discrete responses. This study provided the empirical evidence that 10 bits/sec is the maximum capacity for tracking; specifically the absolute maximum capacity is about 9 bits/sec for continuous tracking and 11 bits/sec for discrete tracking. C.F.W.

A79-46226 * Portable device for detection of petit mal epilepsy. R. G. Smith (Arizona, University, Tucson, Ariz.), J. C. Houge, and J. G. Webster (Wisconsin, University, Madison, Wis.). *IEEE Transactions on Biomedical Engineering*, vol. BME-26, Aug. 1979, p. 445-450. 20 refs. Contract No. NASw-2716; No. NASw-2819; No. NAS5-23500.

A portable device that analyzes the electroencephalogram to determine if petit mal epilepsy waveforms are present is developed and tested. Clinicians should find it useful in diagnosing seizure activity of their patients. The micropower, battery-operated, portable device indicates a seizure has occurred if three criteria are satisfied: (1) frequencies of 2.5-7 Hz, (2) large-amplitude waves, and (3) minimum number of waves per second. Levels and counts are adjustable, thus insuring high reliability against noise artifacts and permitting each subject to be individually fitted. The device has shown promise in giving the patient a possible mechanism of seizure control or suppression. (Author)

A79-46268 # Mathematical model of the respiration rhythm generation process (Matematicheskaya model' protsessy generatsii dykhatel'nogo ritma). V. M. Nekrasova, P. I. Kuznetsov, and V. A. Safonov (II Moskovskii Gosudarstvennyi Meditsinskii Institut, Moscow, USSR). *Akademiia Nauk SSSR, Doklady*, vol. 245, Apr. 21, 1979, p. 1315-1318. 5 refs. In Russian.

An attempt is made to construct a mathematical model of the respiration center (in the medulla oblongata), capable of interpreting the principal adaptive reactions of the respiration center in the generation of the respiration rhythm. The model is based on Nekrasov and Safonov's (1973) classification of respiration neurons and on Posin and Shul'pin's (1970) isolated-neuron model. V.P.

A79-46276 # Relationship between the reproduction tactics and the major indices of speech retention-reproduction processes (Sviaz' taktiki vosproizvedeniia s osnovnymi pokazateliami protsessov zapominaniia-vosproizvedeniia rechevogo materiala). L. N. Vinogradova (Nauchno-Issledovatel'skii Institut po Biologicheskimi Ispytaniiam Khimicheskikh Soedinenii, Kupavna, USSR). *Akademiia Nauk SSSR, Doklady*, vol. 245, Apr. 21, 1979, p. 1504-1507. 5 refs. In Russian.

In the tests described, human subjects were required to memorize successively 15 lists of 12, 20, and 30 words (two-syllable nouns), read to them from tape at a frequency of one word per 2 seconds. The time to reproduce (in arbitrary order) the words of one list was 1 min. The averaged results were used to plot reproduction probability curves as a function of the position of the word in the list. V.P.

A79-46286 Temporary threshold shift from transportation noise. M. Kabuto and S. Suzuki (Tokyo, University, Tokyo, Japan). *Acoustical Society of America, Journal*, vol. 66, July 1979, p. 170-175. 28 refs.

Temporary threshold shifts (TTS) induced by recordings of aircraft noise, road traffic noise, and interior railroad car noise were examined to estimate their auditory effects. The aircraft noise used was of a Boeing 747 landing recorded adjacent to the end of a

runway. Six hours of binaural exposure to the noise developed a TTS at 4 kHz of 1.0 plus or minus 2.7 dB as the mean value. The road traffic noise was recorded with traffic volume of 49.5 vehicles per minute, and the interior railroad commuter car noise was also recorded. The TTS measurements of these noises were described, and it was concluded that affected populations may have TTS induced by road traffic noise but that little effect is expected from aircraft noise or interior railroad car noise. A.T.

A79-46399 A study of the available evidence on duration effects on comfort and task proficiency under vibration. M. J. Clarke (Swansea, University College, Swansea, Wales). *Journal of Sound and Vibration*, vol. 65, July 8, 1979, p. 107-123. 22 refs.

Data on the effect of duration of exposure to vibration on human reaction and data on time dependence extracted from the results of comfort studies on passengers in hovercraft, railway trains, and aircraft are critically reviewed. It is concluded that there is little or no evidence to support the assertion of a time dependence effect, at least for durations up to two and a half hours. V.P.

A79-46461 Polymers produced by heating an amino acid mixture in sea water enriched with transition elements. H. Okihana and F. Egami (Mitsubishi-Kasei Institute of Life Sciences, Machida, Tokyo, Japan). *Origins of Life*, vol. 9, July 1979, p. 171-180. 5 refs.

A mixture of 18 protein amino acids was heated in medium sea water enriched with metal ions to determine the possible environment of the earth's origin. The solution yielded both dialyzable and undialyzable polymers. Hydrolysis produced Glu, Asp, Ser, and Thr for dialyzable polymers and also (besides these) Gly, Leu, Pro, His, Phe, and a few unidentifiable ninhydrin positive substances after acid hydrolysis. Results showed that the total amount of protein amino acids recovered after hydrolysis was only about 5 wt % of the polymer, suggesting a complex chemical composition rather than a simple polypeptide. C.F.W.

A79-46462 Mirror symmetry breaking in biochemical evolution. L. Morozov (All-Union Research and Design Institute Transprogress, Moscow, USSR). *Origins of Life*, vol. 9, July 1979, p. 187-217. 65 refs.

The origination of molecular asymmetry in biochemical evolution is discussed and theoretical analysis of the chiral purity of biomolecules and their significance for self-reproduction of organisms is examined. A mathematical presentation of the evolution of matter is given, where asymmetrical conditions could arise such that the homogeneous distribution of antipodal elements becomes unstable. It is concluded that the strategy of these investigations will be to study the basic laws linking the chiral evolutionary processes with the general evolutionary process and those for the functioning of modern organisms. C.F.W.

A79-46463 * An ultraviolet light induced bacteriophage in *Beneckea gazogenes*. M. Rambler and L. Margulis (Boston University, Boston, Mass.). *Origins of Life*, vol. 9, July 1979, p. 235-240. 9 refs. Research supported by Boston University; Grant No. NGR-22-004-025.

The effects of UV and high intensity irradiation on microorganisms growing under conditions prevalent during the early Precambrian Aeon are examined. The study employed the anaerobic red pigmented marine vibrio, *Beneckea gazogenes* (Harwood, 1978), using an extreme UV sensitivity of 2537 Å, extensive cell lysis, and committant production of bacteriophage induced by the UV light. Three types of white mutant, pink colony mutant, and red wild type isolates of *B. gazogenes* were grown showing differential irradiation sensitivity and phage particles from all three lysates were collected and examined. C.F.W.

A79-46464 * Solar-driven chemical energy source for a Martian biota. B. C. Clark (Martin Marietta Aerospace, Planetary Sciences Laboratory, Denver, Colo.). *Origins of Life*, vol. 9, July 1979, p. 241-249. 40 refs. Contract No. NAS1-900.

Microorganisms deep in the Martian soil could derive energy indirectly from the sun via chemical reactions involving atmospheric photolysis products of the solar ultraviolet flux. The Viking discovery of a chemically uniform regolith which, though poor in organics, is rich in sulfur-containing compounds suggests reaction sequences in which sulfur is recycled through reduced and oxidized states by biologically catalyzed reactions with photochemically-produced atmospheric constituents. One candidate reaction, reduction of soil sulfate minerals by molecular hydrogen, is already exploited on earth by bacteria of the ubiquitous and tenacious *Desulfovibrio* genus. (Author)

A79-46465 Some comments on interpretations of Viking biological experiments. S. I. Aksenov (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR). *Origins of Life*, vol. 9, July 1979, p. 251-256. 15 refs.

Data from Viking experiments conducted on Martian soil are examined from a biological viewpoint, citing a lack of organic matter, possibly due to the specificity of regions with optimal landing sites. Four experiments at two different landing sites showed a similarity of the elemental soil composition indicative of the presence of some constant active reagent in the soil. The assumed existence of psychrophilic organisms cultivated at temperatures above optimal ones, as well as unusual UV-resistant organisms that retain viability at low temperatures, are discussed and speculation on photosynthesizing organisms is made. C.F.W.

A79-46499 # Changes in optokinetic, postoptokinetic, and reverse postoptokinetic nystagmus after bilateral labyrinthectomy (Izmenenie optokineticheskogo postoptokineticheskogo i reversivnogo postoptokineticheskogo nistagmov posle dvustoronnei labirintektomii). V. P. Neverov (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR) and V. E. Koriukin (Voenno-Meditsinskaya Akademiia, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 65, May 1979, p. 687-693. 20 refs. In Russian.

A79-46500 # Effect of adaptation to high-altitude hypoxia on cardiac adrenoreactivity and the state of the adenylcyclase and phosphodiesterase systems in the myocardium (Vlianie adaptatsii k vysotnoi gipoksii na adrenoreaktivnost' serdtsa i sostoianie ademiltskizlanoi i fosfodiesteraznoi sistem miokarda). F. Z. Meerson, E. G. Krauze, M. G. Pshennikova, L. Iu. Golubeva, P. Karchevski, and A. Wollenberger (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR; Deutsche Akademie der Wissenschaften, Zentralinstitut für Herz- und Kreislauf-Regulationsforschung, Berlin, East Germany). *Fiziologicheskii Zhurnal SSSR*, vol. 65, May 1979, p. 727-732. 14 refs. In Russian.

A79-46595 Sensory illusions - The ophthalmologist's point of view (Illusions sensorielles - Le point de vue de l'ophtalmologiste). J.-P. Chevaleraud (Service de Santé des Armées, Paris, France). *Médecine Aéronautique et Spatiale, Médecine Subaquatique et Hyperbare*, vol. 17, 4th Quarter, 1978, p. 319-321. In French.

Examples of three types of visual illusions experienced by aircraft pilots are discussed. Vestibulo-ocular illusions, which account for about 90 percent of all illusions reported, are explained by a nystagmus of vestibular origin, and are exemplified by disturbances of visual acuity during turns, the oculogyric illusion and the oculogravic illusion. Illusions of false equilibration include the visual autokinetic illusion, which was responsible for recorded dives into the ocean of aircraft flying in formation at night. Purely visual illusions, responsible for 10 percent of aircraft accidents due to disorientation, are illustrated by the misinterpretation of ground lights and the poor estimation of altitude during takeoff and landing due to the topography of the adjoining terrain. Recommendations for the prevention of visual illusions during flight are also presented. A.L.W.

A79-46596 Sensory illusions of vestibular origin (Illusions sensorielles d'origine vestibulaire). P. Blanc. *Médecine Aéronautique et Spatiale, Médecine Subaquatique et Hyperbare*, vol. 17, 4th Quarter, 1978, p. 322-324. In French.

The anatomy and physiology of the vestibular system are reviewed in order to illustrate the pathogenesis of vestibular errors leading to sensory illusions, and illusions experienced by aircraft pilots and believed to be of vestibular origin are examined. Examples of somatogyric illusions accounted for by the thresholds and sensitivities of the vestibular system are the illusions of linear motion when turning at a constant angular velocity and rotation in the opposite direction when coming out of a turn, erroneous perceptions of inclination and the Coriolis effect. Somatogravic illusions explained by the functions of the semicircular canals and the utricle and the saccule are illusions of climbing during a turn, Cabré's illusion and illusions of climbing during final descent. A.L.W.

A79-46597 The physiologist's view of sensory illusions (Le point de vue du physiologiste sur les illusions sensorielles). J. Colin (Service de Santé des Armées; Centre de Recherche de Médecine Aéronautique, Paris, France). *Médecine Aéronautique et Spatiale, Médecine Subaquatique et Hyperbare*, vol. 17, 4th Quarter, 1978, p. 325-328. 5 refs. In French.

Physiological mechanisms associated with spatial disorientation during air and space flight are reviewed. Attention is given to the effects of linear and radial accelerations on the otolithic apparatus and other sensory receptors, including misperceptions of the vertical, postural and vestibulo-ocular reflexes and vestibulo-autonomic responses. Reactions brought about by angular accelerations, sensed by the semicircular canals, including illusions of rotation as well as postural, vestibulo-ocular and vestibulo-autonomic reflexes, are also discussed. Factors influencing the intensity of these responses, including state of wakefulness, adaptation and visual dominance and vestibular suppression levels are considered, and recommendations for preventing disorientation by relying on visual information are presented. A.L.W.

A79-46598 The vestibule and flying (Vestibule et pilotage). J.-C. Wanner (ONERA, Châtillon-sous-Bagneux, Hauts-de-Seine, France). *Médecine Aéronautique et Spatiale, Médecine Subaquatique et Hyperbare*, vol. 17, 4th Quarter, 1978, p. 329-333. In French.

Consideration is given to typical cases of flight-induced sensory disorientation. It is seen that the inability of human gravireceptors to distinguish gravity from inertia leads to misperceptions of the vertical, while the detection thresholds and insensitivity to angular velocities of the semicircular canals lead to sensations of continuous turning at high inclinations during linear, level flight and the Coriolis effect on the semicircular canals causes apparent rotations. Flight and pilot conditions favoring the occurrence of disorientation are outlined and pilot procedures to lessen their effects are suggested. A.L.W.

A79-46599 The influence of intermittent aircraft noise on sleep. I (Influence des bruits intermittents d'avion sur le sommeil. I). M. V. Strumza. *Médecine Aéronautique et Spatiale, Médecine Subaquatique et Hyperbare*, vol. 17, 4th Quarter, 1978, p. 334-337. In French.

The results of various investigations on the effects of intermittent aircraft noise on the sleep of persons living near an airport are discussed. Subjects' sleep disturbances were monitored objectively by observations of waking, changes in the depth of sleep (as indicated by EEG, EOG and EMG patterns), neuro-autonomic reactions and body movements. In subjects exposed to various types of intermittent noise over the course of several consecutive nights, indications of sleep disturbances were observed less frequently during the later nights of the experiments than the first nights, with the least disturbances observed on the sixth and subsequent nights of exposure. The observed adaptation effect is attributed to a loss of the information content of the subjects, however orthosympathetic and parasympathetic responses were not observed to exhibit adaptation, indicating a continued physiological disturbance. A.L.W.

A79-46600 The electrocardiogram recorded by telemetry during a parachute jump, compared to a trace during stress tests - A preliminary study of 29 cases (L'électrocardiogramme enregistré par télé-mesure pendant le saut en parachute, comparé au tracé durant l'épreuve d'effort - A propos de 29 cas: étude préliminaire). A. Didier, L. Jouffray, P.-C. Pesquies, S.-P. Rosier, J.-F. Perrenoud, H. Ille, and C. Hiltenbrand (Hôpital d'Instruction des Armées du Val de Grace, Paris, France). *Médecine Aéronautique et Spatiale, Médecine Subaquatique et Hyperbare*, vol. 17, 4th Quarter, 1978, p. 338-344. 19 refs. In French. Direction des Recherches, Etudes et Techniques Contract No. 78,1032.

The electrocardiograms of 29 experienced military parachutists were monitored during maximal exertion tests and parachute jumps and the results compared. The heart functions of subjects undergoing stress tests on a treadmill which increased in speed and slope until the maximal heart rate was attained were recorded by a six-lead electrocardiogram placed identically to an electrocardiogram which transmitted its data by means of a telemetry system during a parachute jump from an altitude of 2000 m. The parachute jump was found to be accompanied by tachycardia and various cases of extrasystole and minor modifications in repolarization, which differed from the results of the stress tests. The levels of biochemical and hormonal blood and urine constituents analyzed did not exhibit a specific response to the jump situation. It is concluded that the existence of a cardiac risk specific to parachuting necessitates a new definition of cardiological norms for the selection, testing and medical surveillance of parachutists. A.L.W.

A79-46601 Pulmonary functional tolerance to ionizing radiation - An experimental study (Tolérance fonctionnelle pulmonaire aux radiations ionisantes - Etude expérimentale). A. Boulter, J. Fabre, J.-L. Hauttemment, and J.-S. Abbaticchi. *Médecine Aéronautique et Spatiale, Médecine Subaquatique et Hyperbare*, vol. 17, 4th Quarter, 1978, p. 345-348. 14 refs. In French. Direction des Recherches et Moyens d'Essais Contract No. 74/408.

The functional tolerance of the lungs to weak doses of ionizing radiation is investigated. The pulmonary functions of 19 subjects undergoing radiation therapy for extra-pulmonary tumors at a pulmonary dose of 1500 rads of Co-60 (870 rets) administered in four doses over the course of seven days were monitored before the beginning of the therapy and up to a period of three years afterward. A discrete restrictive functional syndrome was observed in the first six months, together with anomalies in gas exchange. The symptoms are observed to be similar to those found in pulmonary fibroses, however the stability of the global ventilation rate indicates a good pulmonary tolerance to the radiation. It is concluded that thoracic radiation doses should not be allowed to exceed 870 rets under any conditions. A.L.W.

A79-46602 The application of vectorcardiography to aerospace medicine (Apport de la vectocardiographie à la médecine aérospatiale). A. Seigneuric and G. Leguay (Hôpital d'Instruction des Armées Dominique Larrey, Versailles, France). *Médecine Aéronautique et Spatiale, Médecine Subaquatique et Hyperbare*, vol. 17, 4th Quarter, 1978, p. 349-351. In French.

The technique of vectorcardiography is presented and its applications in aerospace medicine are discussed. The recording technique of the Frank system, in which seven electrode traces yield three vectors, is outlined. Vector-cardiography is compared to traditional electrocardiography, and the advantages of vectorcardiography in information content, uniformity of normal traces and compression of data into functions of three orthogonal variables are pointed out. Applications in experimental aerospace medicine suggested by these advantages are discussed, including population studies, and studies of the effects of acceleration and of prolonged exposure to weightlessness, and the results of 200 h of Skylab experiments are surveyed. A.L.W.

A79-46603 Adaptation to chronic hyperoxia in the rat - A study of pulmonary surfactant, tissue levels of superoxide dismutases and histology (Adaptation à l'hyperoxie chronique chez le rat - Etude du surfactant pulmonaire, dosage des superoxyde-dismutases tissulaires et étude histologique). H. Burnet, A. Baret, P. Michel, B. Broussolle (Hôpital d'Instruction des Armées Sainte-Anne, Toulon Naval, Var, France), B. Foliguet, and L. Marchal (Nancy I, Université, Vandoeuvre, Meurthe-et-Moselle, France). *Médecine Aéronautique et Spatiale, Médecine Subaquatique et Hyperbare*, vol. 17, 4th Quarter, 1978, p. 371-375. 14 refs. In French.

A79-46623 Retinal site of transient tritanopia. J. M. Valetton and D. van Norren (Centrale Organisatie voor Toegepast-Natuurwetenschappelijk Onderzoek, Instituut voor Zintuigfysiologie, Soesterberg, Netherlands). *Nature*, vol. 280, Aug. 9, 1979, p. 488-490. 16 refs.

An attempt is made to localize the site of blue cone inhibition through intraretinal recordings from the eye of a rhesus monkey. The signal was recorded with a microelectrode positioned in the central fovea of the eye; the local electroretinogram consists mainly of the positive-going cone late receptor potential, with a superimposed negative-going b-wave, representing activity in the bipolar cell level. Transient tritanopia was found to be absent at the receptor level, suggesting that it originates at a site between the receptors and bipolar cells. Electrophysiological data confirms the hypotheses that short-wave length flashes, after switching off a yellow adaptation light, are visible in green but not blue cones. C.F.W.

A79-46651 * Eye torsion and visual tilt are mediated by different binocular processes. J. M. Wolfe and R. Held (MIT, Cambridge, Mass.). *Vision Research*, vol. 19, no. 8, 1979, p. 917-920. 10 refs. Grants No. NGL-22-009-308; No. NIH-1-R01-EY-02649; No. NIH-1-T31-GM-07484.

Viewing a large, patterned field rotating about the line of sight produces two measurable effects; cyclotorsion of the eyes (torsion) and a perceived displacement of vertical and horizontal (tilt). Experiments examining binocular interaction for these effects show: (1) both effects demonstrate summation in normal individuals and thus both involve a binocular process; (2) the process for tilt is different than for torsion, since summation for torsion is spared in stereodeficient individuals while that for tilt is eliminated. (Author)

A79-46679 # Some forms of adaptation to extreme influences in the blood system (Nekotorye formy adaptatsii v sisteme krovi k ekstremal'nym vozdeistviyam). N. A. Troitskaia, G. V. Kobozov, E. I. Goncharova, and G. A. Kaminskaia (Krymskii Gosudarstvennyi Meditsinskii Institut, Simferopol, Ukrainian SSR). *Fiziologicheskii Zhurnal (Kiev)*, vol. 25, May-June 1979, p. 227-234. 14 refs. In Russian.

Experiments are carried out on rabbits to assess the process of blood regeneration after 40% blood loss. It is shown that the blood regeneration process may be regarded as adaptation of the organism to adverse environmental conditions. The experimental data presented point to a rigorous organization of this process: the recovery of hemoglobin and erythrocytes correlates with the recovery of plasma proteins, and is characterized by drastic changes in the structure of hemoglobin. S.D.

A79-46680 # Epiphysis of rats under the combined action of hypoxia, hypercapnia and cooling (Epifiz krys pri sochetannom vozdeistvii gipoksii, giperkapnii i okhlazhdeniia). V. I. Bertash, V. I. Baev, and S. V. Zozuliakova (Leningradskii Pediatricheskii Meditsinskii Institut, Leningrad, USSR). *Fiziologicheskii Zhurnal (Kiev)*, vol. 25, May-June 1979, p. 251-254. 14 refs. In Russian.

A biochemical and morphological-functional study on white male rats (150-210 g) is conducted with a view toward analyzing the changes in epiphysis under conditions of increasing CO2 concentra-

tions, decreasing O₂ concentrations and constant cooling (2-3 C). These changes are compared with some biochemical indices of metabolism. The results support the hypothesis that there exists a definite pattern for the changes in the functional activity of the epiphysis and the biochemical indices considered. S.D.

A79-46681 # Circadian rhythm of electrolyte uresis in healthy persons (Sutochnyi ritm elektrolituroza u zdorovykh liudei). E. I. Krimkevich, N. A. Futerman, and Iu. V. Persidskii (Kievskii Meditsinskii Institut, Kiev, Ukrainian SSR). *Fiziologicheskii Zhurnal /Kiev/*, vol. 25, May-June 1979, p. 270-274. 17 refs. In Russian.

Results are presented for an experimental study on 21 healthy human subjects with a view to evaluate the circadian rhythm of renal excretion of potassium, sodium, chlorine, calcium and magnesium. It is found that maximum excretions of water, potassium, chlorine and calcium occur from noon to 3 p.m., and of sodium and magnesium from 6 to 9 p.m. Minimum excretions of the electrolytes take place during the night. Similarities and differences are observed in the behavior of the circadian-rhythm curves for the excretion of individual electrolytes. S.D.

A79-46967 Isolation of a shock-induced circulating cardiodepressant substance. R. D. Goldfarb, P. Weber, and J. Eisenman (Albany Medical College, Albany, N.Y.). *American Journal of Physiology*, vol. 237, Aug. 1979, p. H168-H173. 14 refs. Grants No. NIH-HL-19977; No. NIH-HL-00947.

Cardiodepressant activity was detected in plasma or serum obtained from dogs in the irreversible states of hemorrhagic shock. After sequential fractionation, L-leucine was identified as one compound that can exert significant cardiodepressant activity; however, it appears that leucine in the concentrations observed in shock serum may only exert 25% of the total cardiodepressant activity of the whole shock serum. It is suggested that other, unidentified cardiodepressant substances in the shock serum are probably of higher molecular weight than leucine. B.J.

STAR ENTRIES

N79-28867* National Aeronautics and Space Administration.
Lyndon B. Johnson Space Center, Houston, Tex.

OPERATOR PERFORMANCE AND LOCALIZED MUSCLE FATIGUE IN A SIMULATED SPACE VEHICLE CONTROL TASK

James L. Lewis, Jr. Jun. 1979 83 p refs
(NASA-TM-58220; JSC-16033) Avail: NTIS
HC A05/MF A01 CSCL 05H

Fourier transforms in a special purpose computer were utilized to obtain power spectral density functions from electromyograms of the biceps brachii, triceps brachii, brachioradialis, flexor carpi ulnaris, brachialis, and pronator teres in eight subjects performing isometric tracking tasks in two directions utilizing a prototype spacecraft rotational hand controller. Analysis of these spectra in general purpose computers aided in defining muscles involved in performing the task, and yielded a derived measure potentially useful in predicting task termination. The triceps was the only muscle to show significant differences in all possible tests for simple effects in both tasks and, overall, was the most consistently involved of the six muscles. The total power monitored for triceps, biceps, and brachialis dropped to minimal levels across all subjects earlier than for other muscles. However, smaller variances existed for the biceps, brachioradialis, brachialis, and flexor carpi ulnaris muscles and could provide longer predictive times due to smaller standard deviations for a greater population range. Author

N79-28868# Civil Aeromedical Inst., Oklahoma City, Okla.
A LOWER BODY NEGATIVE PRESSURE BOX FOR +Gz SIMULATION IN THE UPRIGHT SEATED POSITION
Michael T. Lategola and Charles C. Trent Feb. 1979 9 p refs
(AD-A069326; FAA-AM-79-8) Avail: NTIS HC A02/MF A01
CSCL 06/19

The cost of purchasing and operating a human centrifuge is substantial. Lower body negative pressure (LBNP) is considered an acceptable experimental substitute for the +Gz stress of the centrifuge. Since civil aviation pilots are usually subjected to +Gz stress in an upright seated position, an upright seated version of the supine LBNP box was developed. In this version, a negative pressure of -40 mm Hg is considered the equivalent of a +2 Gz stress. This box has successfully withstood a test pressure of -120 mm Hg. Pedal ergometry within the box is easily accomplished. The box was anthropometrically engineered to accommodate a human height range of 160-195 cm. Locating the box within an altitude chamber allows the application of LBNP at any level of chamber altitude. Author

N79-28869* General Electric Co., Philadelphia, Pa.
SKYLAB MEDICAL DATA EVALUATION PROGRAM (SMEDEP)
G. W. Hoffer, C. L. Huntoon, S. L. Kimzey, and J. A. Rummel
[1979] 869 p
(Contract NAS9-14523)
(NASA-CR-160279) Avail: NTIS HC A99/MF A01 CSCL
06P

A day-by-day summary of selected data collected during the experiment is presented. The clinical and environmental data are presented in a mission-day format along with a tabulation of biomedical measurements whose values exceed three standard deviations from the preflight measurements. F.O.S.

N79-28870# California Univ., Irvine, Dayton, Ohio.
TOXICITY OF HIGH DENSITY JET FUEL COMPONENTS Final Report
C. C. Haun, J. D. MacEwen, and E. H. Vernot Wright-Patterson
AFB, Ohio AMRL Apr. 1978 29 p refs

(Contract F33615-76-C-5005; AF Proj. 6302)
(AD-A068596; AMRL-TR-78-16) Avail: NTIS
HC A03/MF A01 CSCL 06/20

Two constituents of a synthetic jet engine fuel were evaluated for toxicologic effects. These constituents of JP-9 fuel were perhydromethylcyclopentadiene (RJ-4) and bicycloheptadiene (RJ-5). Excess tumor lesions over control levels were seen in a small number of rats and mice held for a one year observation period following six months repeated daily inhalation exposures to RJ-5. Author (GRA)

N79-28871# Naval Air Development Center, Warminster, Pa.
THERMAL CONDUCTION EFFECTS IN HUMAN SKIN. 1: EXPERIMENTAL DATA ACQUISITION

M. A. Chianta, A. M. Stoll, and J. R. Piergallini 15 Jan. 1979
19 p refs
(AD-A068479; NADC-79033-60) Avail: NTIS
HC A02/MF A01 CSCL 06/16

To determine the maximum permissible temperature any material may attain without causing pain or burn on contact with bare skin, over 2000 observations were made of pain threshold during contact with materials at elevated temperatures. Six materials were used representing the full range of thermal properties of good conductors to good insulators. Initial specimen and skin temperatures, interface (material-skin) temperatures throughout contact, and time to pain threshold were noted. An orderly relationship was found between pain threshold and material temperature, either longer exposures or higher specimen temperatures being associated with better insulative properties. Variations in thickness of the epidermis affect these times and temperatures so that families of curves are generated from data obtained at sites of increasing thickness. On the basis of the relationship demonstrated between pain sensation and thermal properties the material temperature which will cause a blister on contact may be predicted. Author (GRA)

N79-28872# Naval Air Development Center, Warminster, Pa.
THERMAL CONDUCTION EFFECTS IN HUMAN SKIN. 3: INFLUENCE OF EPIDERMAL THICKNESS AND EXPOSURE TIME

A. M. Stoll, J. R. Piergallini, and M. A. Chianta 15 Jan. 1979
26 p refs
(AD-A068481; NADC-79035-60) Avail: NTIS
HC A03/MF A01 CSCL 06/16

Empirical data relating temperatures and thermal properties of materials to pain and blister end points have provided graphs and equations for predicting safe temperatures for any material in contact with bare skin for 1 to 5 seconds solely from a knowledge of its thermal properties. Conversely, the thermal inertia (kpc) of the optimal material for a specific use, and safe skin contact, can be predicted from a knowledge of the maximum material temperature and the length of contact time anticipated. Increasing epidermal thickness causes can cause orderly elevation of the material temperature at pain threshold at fixed contact times, or lengthened contact times at fixed material temperatures, as indicated in the graphs and equations. The data base and procedures described provide a simple means of evaluating the thermal safety of materials in contact with bare skin and pre-determining the khoc required for such safety in selecting suitable materials in myriad construction and manufacturing applications. Author (GRA)

N79-28873# Oak Ridge National Lab., Tenn.
DOSE-RATE CONVERSION FACTORS FOR EXTERNAL EXPOSURE TO PHOTON AND ELECTRON RADIATION FROM RADIONUCLIDES OCCURRING IN ROUTINE RELEASES FROM NUCLEAR FUEL CYCLE FACILITIES

D. C. Kocher Feb. 1979 181 p refs
(Contract W-7405-eng-26)
(NUREG/CR-0494; ORNL/NUREG/TM-283) Avail: NTIS
HC A09/MF A01

Dose-rate conversion factors for immersion in contaminated air, immersion in contaminated water, and exposure to a contaminated ground surface were estimated for tissue equivalent material at the body surface of an exposed individual. For

each exposure mode, photon dose-rate conversion factors were also estimated for 22 body organs. The calculations assumed that the contaminated air, water, and ground surface were infinite in extent and that the radionuclide concentration was uniform. Dose-rate conversion factors for immersion in contaminated air and water were based on the requirement that all energy emitted in the decay of a radionuclide was absorbed in the infinite medium. Dose-rate conversion factors for ground surface exposure was calculated for a height of 1 m using the point-kernel integration method and known specific absorbed fractions for photons and electrons in air. The computer code written to perform the calculations is described and documented. DOE

N79-28874# National Technical Information Service, Springfield, Va.

CARDIOVASCULAR DISEASES, VOLUME 3. A BIBLIOGRAPHY WITH ABSTRACTS Progress Report, Mar. 1977 - Feb. 1979

Elizabeth A. Harrison Mar. 1979 147 p Supersedes NTIS/PS-78/0103; NTIS/PS-77/0095; NTIS/PS-76/0118; NTIS/PS-75/264

(NTIS/PS-79/0063/2; NTIS/PS-78/0103; NTIS/PS-77/0095; NTIS/PS-76/0118; NTIS/PS-75/264) Avail: NTIS HC \$28.00/MF \$28.00 CSCL 06E

Research reports are cited on the epidemiology, etiology, risk factors, prevention, diagnosis, pathology, therapy, surgery, and rehabilitation of cardiovascular diseases. Reports on cardiac assist devices, health services, and facilities were excluded. GRA

N79-28875 Arizona Univ., Tucson.

STRESS MANAGEMENT: A COMPARISON OF EDUCATIONAL, AEROBIC AND AUTOSUGGESTIVE APPROACHES Ph.D. Thesis

Sandra Mary Sylvester 1979 71 p

Avail: Univ. Microfilms Order No. 7914432

Three commonly used procedures for managing stress: (1) stress education, (2) aerobics, and (3) autosuggestion as to their relative effectiveness are analyzed. The use of education for stress management is based on a common belief that if one is informed about the nature of stress and taught specific procedures to cope more effectively with stress, then a rational person will utilize these procedures to reduce his personal stress level. The aerobics procedure which emphasizes physical exercise is a system of strengthening the cardiovascular and respiratory systems. In autosuggestion or self-hypnosis, subjects are taught to couple deep psychophysiological relaxation with ego strengthening suggestions regarding strengths and competencies in handling stress. The results indicated participants in the treatment groups significantly reduced their levels of trait anxiety over controls, the most effective being autosuggestion, followed by aerobics and then stress education. Dissert. Abstr.

N79-28876 Missouri Univ. - Columbia.

SELECTIVE ATTENTION: THE INFLUENCES OF SUBJECT SEX AND DEGREE OF PRIOR HABITUATION ON PERFORMANCE OF AN ATTENTION TASK WITH DISTRACTION Ph.D. Thesis

Elizabeth Anne Beck 1978 118 p

Avail: Univ. Microfilms Order No. 7915211

An investigation was performed to determine: (1) whether varying the degree of prior habituation of the phasic orienting response (OR) to stimuli which were later to be used as distractors in an attention demanding task, would influence task performance and reduce OR frequency to distractors during the task; and (2) if there were sex differences in the effects of this prior habituation as well as sex differences in performance with distraction. The task was the solution of mathematical problems from immediate memory, and the distractors were random numbers and mathematical signs. The data did not support, in fact was contrary to, the hypothesis that females are more distractible than males. Dissert. Abstr.

N79-28877# Naval Postgraduate School, Monterey, Calif.

DEVELOPMENT OF INFORMATION THEORY CONCEPTS AND EQUATIONS FOR HUMAN MENTAL PROCESSING M.S. Thesis

Jose Alberto Martinez Mar. 1979 34 p refs (AD-A068606) Avail: NTIS HC A03/MF A01 CSCL 09/4

This report presents the research and analysis accomplished in order to develop new concepts of information theory and new equations that could allow the researcher to compute with more precision, the amount of information processed by a subject during the execution of a sequential mental task. A very sophisticated piece of equipment was used in order to simulate a sequential task of military nature. The results of the experiment proved that new equations to compute the amount of information processed should be used when the task to be performed implies that the operator has to go through different levels of 'thinking' before he reacts to a stimulus. Author (GRA)

N79-28878# New Mexico Univ., Albuquerque. Technology Application Center.

STRESS FACTORS ON PILOT PERFORMANCE. CITATIONS FROM THE INTERNATIONAL AEROSPACE ABSTRACTS DATA BASE Progress Report, 1974 - Jan. 1979

Gerald F. Zollars Jun. 1979 27 p Sponsored by NTIS (NTIS/PS-79/0506/0) Avail: NTIS HC \$28.00/MF \$28.00 CSCL 05J

Articles on biological aspects of flight, stress, psychophysiology, acceleration stresses, flight, fitness, and physiological effects and responses are presented. This bibliography contains 100 citations. GRA

N79-28879 Ohio State Univ., Columbus.

COMBINED DISCRETE NETWORK-CONTINUOUS CONTROL MODELING OF MAN-MACHINE SYSTEMS Ph.D. Thesis

Deborah Jayne Roeckner Seifert 1979 204 p

Avail: Univ. Microfilms Order No. 7916025

The role of the human operator in control systems is evolving towards that of a supervisor who plans, sequences, and monitors away from strictly tracking. New modeling approaches and techniques are required to realistically represent and examine these new system configurations and resulting performance issues. An alternate modeling approach comprised of discrete network models in combination with elements of an open-loop optimal control model formulation was proposed. The feasibility of employing this combined modeling approach was demonstrated through its application to the DAIS (Digital Avionics Information System) system in which pilot duties involve information retrieval and cognitive processing tasks in addition to flight control. Dissert. Abstr.

N79-28880# Massachusetts Inst. of Tech., Cambridge. Dept. of Nutrition and Food Science.

MAXIMIZING STORAGE STABILITY OF FOODS TO BE USED FOR RESUPPLY IN A CONTROLLED ECOLOGICAL LIFE SUPPLY SYSTEM: EVALUATION OF RESEARCH

M. Karel, I. Saguy, R. Villota, and H. D. Heidelbaugh Jul. 1979 187 p refs

(Grant NsG-2334)

(NASA-CR-158846) Avail: NTIS HC A09/MF A01 CSCL 06H

The state of the art and research needs of storage stability of dehydrated foods were evaluated. A critical literature review is also included. R.E.S.

N79-28881# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

INTRAOCULAR PRESSURE REDUCTION AND REGULATION SYSTEM

Edward F. Baehr, James E. Burnett, Sanford F. Felder, and William J. McGannon 1979 14 p Presented at Symp. on Glaucoma Surgery, Detroit, 17-18 May 1979

(NASA-TM-79187; E-038) Avail: NTIS HC A02/MF A01 CSCL 06E

An intraocular pressure reduction and regulation system is described and data are presented covering performance in: (1) reducing intraocular pressure to a preselected value, (2) maintaining a set minimum intraocular pressure, and (3) reducing the dynamic increases in intraocular pressure resulting from external loads applied to the eye. Author

N79-28882# Aeronautical Research Labs., Melbourne (Australia).
COLD WATER SURVIVAL SUITS FOR AIRCREW
 G. R. White Mar. 1978 27 p refs
 (ARL/Sys-Note-56; AR-001-119) Avail: NTIS
 HC A03/MF A01

Laboratory and sea trials were used to evaluate the effectiveness of three aircrew cold water survival garments: the British Mark 10 suit, the United States CWU 21/P suit, and the Canadian U.VIC Thermofloat jacket. It was concluded that the three alternatives provided similar thermal protection but with regard to several other important features, the U.VIC Thermofloat jacket was superior. Consequently, in this evaluation the U.VIC Thermofloat jacket was shown to provide the most effective form of aircrew protection. Author

N79-28883*# Life Systems, Inc., Cleveland, Ohio.
TECHNOLOGY ADVANCEMENT OF AN OXYGEN GENERATION SUBSYSTEM Final Report

M. K. Lee, K. A. Burke, F. H. Schubert, and R. A. Wynveen
 May 1979 78 p refs
 (Contract NAS2-9795)
 (NASA-CR-152257; LSI-ER-336-4) Avail: NTIS
 HC A05/MF A01 CSDL 06K

An oxygen generation subsystem based on water electrolysis was developed and tested to further advance the concept and technology of the spacecraft air revitalization system. Emphasis was placed on demonstrating the subsystem integration concept and hardware maturity at a subsystem level. The integration concept of the air revitalization system was found to be feasible. Hardware and technology of the oxygen generation subsystem was demonstrated to be close to the preprototype level. Continued development of the oxygen generation technology is recommended to further reduce the total weight penalties of the oxygen generation subsystem through optimization. R.E.S.

N79-28884# Honeywell, Inc., Minneapolis, Minn. Systems and Research Center.

CREW WORKLOAD ASSESSMENT. DEVELOPMENT OF A MEASURE OF OPERATOR WORKLOAD Final Technical Report, 15 Jun. 1977 - 1 Sep. 1978

James D. Wolf Dec. 1978 93 p refs
 (Contract F33615-77-C-3065)
 (AD-A068616; HONEYWELL-78SRC74; AFFDL-TR-78-165)
 Avail: NTIS HC A05/MF A01 CSDL 01/2

The study objective was to develop a quantitative measure of workload useful in crewstation evaluation. Flight tasks of varying difficulty were simulated, and 35 pilot response variables analyzed. Selected physiological and visual response variables were applied in a stepwise regression procedure to the prediction of a composite performance/opinion measure, which reflected differing levels of task difficulty. The resulting linear equation was reformulated as a preliminary operationally-defined measure of information-processing workload. Author (GRA)

N79-29784*# National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, Tex.

BIOSPEX: BIOLOGICAL SPACE EXPERIMENTS, A COMPENDIUM OF LIFE SCIENCES EXPERIMENTS CARRIED ON US SPACECRAFT

Michele Anderson (Technology, Inc., Houston, Tex.), John A. Rummel, ed., and Stanley Deutsch, ed. (NASA, Washington) Jun. 1979 310 p refs
 Ann Uddgard Sep. 1977 65 p refs In SWEDISH; ENGLISH summary

(FOA-C-40063-C1) Avail: NTIS HC A04/MF A01

Peptides consisting of a maximum of 14 amino acids and their biological possessing activity are described. The substances are broken down according to the physiological systems mainly affected by them. Among peptides affecting the nervous system, the most interesting are endorphines, apamine, PCPA and scotophobine. Apamine and PCPA cause powerful mental and motor disturbance over relatively long periods. Scotophobine raises questions as to the learning and transference of specialized behaviour by a chemical substance. Many peptides exert their effect on the blood-pressure level, and produce marked symptoms. They include elodiosine, hypotensine and MDF. Amatoxins and phallotoxins affect the liver and are highly toxic. A convulsion-

producing peptide which is effective in small doses is bombesine. R.E.S.

N79-29785# Research Inst. of National Defence, Stockholm (Sweden).

BIOLOGICALLY ACTIVE SHORT-CHAIN PEPTIDES (NASA-TM-58217) Avail: NTIS HC A14/MF A01 CSDL 06C

United States space life science experiments, encompassing 27 years of experience beginning with sounding rocket flights carrying primates (1948) to the last U.S. spaceflight, the joint US/USSR Apollo Test Project (1975), are presented. The information for each experiment includes Principal Investigators, the program and mission on which it was flown, the specimens used, the objectives, protocol, equipment, results, conclusions, and bibliographic reference citations for publications derived from each experiment. J.M.S.

N79-29786# Scientific Translation Service, Ann Arbor, Mich.
CELL BIOLOGY BASIS FOR THE LIFE OF AN ORGANISM IN THE RADIATION FIELD

T. M. Flidner, K. H. Steinbach, and H. Raffler Nov. 1978 16 p refs Transl. into ENGLISH from Atomwirtschaft (West Germany), v. 21, no. 6, Jun. 1976 p 292-297 Sponsored by DOE Prepared for Argonne Natl. Lab., Ill.
 (ANL-Trans-1152) Avail: NTIS HC A02/MF A01

The following topics are discussed: the human biosphere; temperature control mechanisms; the radiation field in the human environment; extraordinary isolated radiation exposure; chronic radiation exposure; structure, function, and regulation of cell regeneration systems; stimulation of the radiation reaction of cell systems; and effects of dose rate on the content of the pluripotential stem cell pool. Author (DOE)

N79-29787# Chemical Lab. RVO-TNO, Rijswijk (Netherlands).
BINDING OF BIOLOGICALLY ACTIVE AGENTS TO PLASMA PROTEINS

J. Mourik Aug. 1977 38 p refs In DUTCH; ENGLISH summary
 (CL-1977-22) Avail: NTIS HC A03/MF A01

Some factors that influence binding to plasma proteins are discussed. Biologically active agents of low molecular weight are transported by the bloodstream. The origin of these agents can be endogenous or exogenous. Binding to plasma proteins, particularly to albumin, is of great influence on the distribution and activity of the agents in the body. The binding builds up a buffer store of a biologically active agent resulting in a prolonged time of action and a decreased acute activity. The binding to plasma proteins in vitro can be determined quantitatively with methods on separation of free and bound ligand or with methods based on the difference of physical properties of free and bound ligand. The last mentioned methods can give insight also into the molecular mechanism of protein binding. Quantitative data on binding is evaluated with statistical or graphic methods. A review is also given of data on binding to protein-insecticide complexes obtained from studies with organochlorine and organophosphate insecticides. Author (ESA)

N79-29788# Maryland Univ., Solomons. Chesapeake Biological Lab.

RESULTS OF BENTHIC STUDIES AT CALVERT CLIFFS

A. F. Holland, N. K. Mountford, M. Hiegel, K. Kaumeyer, and D. Cargo Dec. 1978 245 p refs

(Contract AT(40-1)-4238)
 (PB-294261/3; UMCEES-78-165-GBL; PPSP/MMC/CC-78/2)
 Avail: NTIS HC A11/MF A01 CSDL 13B

The effect of the thermal plume on the benthic communities near the Calvert Cliffs nuclear power plant during the 1976-1977 period were evaluated using ANOVA, cluster analysis, and multivariate community analysis. Several changes in community structure were noted. GRA

N79-29789 Michigan Univ., Ann Arbor.

A STOCHASTIC MODEL OF MUSCLE FATIGUE IN FREQUENT STRENUOUS WORK CYCLES Ph.D. Thesis

Myun Woo Lee 1979 224 p
 Avail: Univ. Microfilms Order No. 7916756

An analytic and quantitative muscle fatigue model is important for the selection of effective work and rest periods for jobs requiring strenuous static strength and high frequency of exertions. Three Markov models of muscle fatigue are developed. These models are based on motor unit fatigue-recovery characteristics obtained from information on motor unit behavior, in particular, the amplitude, duration, and frequency of the muscle action potential (MuAP) as it relates to fatigue and graded exertions. These models also depend on a relationship developed between the recruitment of motor units and the EMG amplitude to explain muscle fatigue for various sequences of static contractions.

Dissert. Abstr.

N79-29790 Michigan Univ., Ann Arbor.
ISOMETRIC STRENGTH TESTING IN SELECTING WORKERS FOR STRENUOUS JOBS Ph.D. Thesis

William Monroe Keyserling 1979 224 p
Avail: Univ. Microfilms Order No. 7916744

Research was conducted to determine if strength testing can be used to reduce occupational illness and injuries which result from a mismatch between the strength abilities of workers and the strength demands of their jobs. To accomplish this, two field studies were performed in industrial plants. It was concluded that strength testing can be used to identify workers who would be at increased risk of suffering a medical incident if placed on jobs with strength demands above their strength abilities.

Dissert. Abstr.

N79-29791# Istituto Superiore di Sanita, Rome (Italy).
COMPUTED AXIAL TOMOGRAPHY (CAT)

F. P. Gentile, F. Sabetta, and V. Troi (Ospedale S. Camillo, Rome) 15 Mar. 1978 76 p refs In ITALIAN; ENGLISH summary (ISS-R-78/4) Avail: NTIS HC A05/MF A01

Current literature on computed tomography (CT) is reviewed. The working procedures for the CT machine are presented, and the contribution of this new radiological technique to the medical field is analyzed. Finally, the risk-benefit ratio is considered with particular attention to the dose received by the patient during a typical tomographic examination.

Author (ESA)

N79-29792# Unilever Research, Vlaardingen (Netherlands).
ASPECTS OF DIETARY PREVENTION OF ARTERIOSCLEROSIS

A. J. Vergroesen, J. J. Gottenbos, and F. Tenhoo 1978 39 p refs Submitted for publication
Avail: NTIS HC A03/MF A01

After a brief characterization of the chronic, degenerative disease, atherosclerosis, a dietary approach to a cure, concentrating on some less well-known physiological effects of increased linoleic acid and decreased saturated-fat consumption on arterial blood pressure, thrombotic tendency of blood platelets, cardiac function, and carbohydrate metabolism in diabetes mellitus, is described. In conclusion it is claimed hypoenergetic diets will induce significant decreases in body weight and blood cholesterol, triglyceride and insulin levels, and will normalize most cases of maturity onset diabetes. After ideal body weight is reached, it is recommended that a normal maintenance diet be used.

Author (ESA)

N79-29793# Medical Physics Inst. Utrecht (Netherlands).
GENERAL ACTIVITIES RELATED TO MEDICAL RESEARCH Progress Report, 1978

B. vanEijnsbergen and F. L. LopesdaSilva Dec. 1978 241 p refs
(TNO-MFI-PR-6) Avail: NTIS HC A03/MF A01

Highlights of the activities of the three departments (Medical technology; Physics in Medicine; and Biomedical and Brain Research) of the institute during a two year period are presented. Fields of study include 'rehabilitation and motorfunctions', 'brain functions and structure', 'biomathematics', and 'circulation'. Progress made in the field of instrumentation and computer techniques is also reported. Results are presented relative to the main objective of the Institute's investigations, which is 'the recording and analysis of biomedical signals'. Clinical applications are emphasized.

Author (ESA)

N79-29794*# Life Systems, Inc., Cleveland, Ohio.
ELECTROCHEMICALLY REGENERABLE CARBON DIOXIDE ABSORBER Final Report

R. R. Woods, R. D. Marshall, F. H. Schubert, and D. B. Heppner Aug. 1979 63 p refs
(Contract NAS2-8666)
(NASA-CR-152099; LSI-ER-290-3) Avail: NTIS
HC A04/MF A01 CSCL 06K

Preliminary designs were generated for two electrochemically regenerable carbon dioxide absorber concepts. Initially, an electrochemically regenerable absorption bed concept was designed. This concept incorporated the required electrochemical regeneration components in the absorber design, permitting the absorbent to be regenerated within the absorption bed. This hardware was identified as the electrochemical absorber hardware. The second hardware concept separated the functional components of the regeneration and absorption process. This design approach minimized the extravehicular activity component volume by eliminating regeneration hardware components within the absorber. The electrochemical absorber hardware was extensively characterized for major operating parameters such as inlet carbon dioxide partial pressure, process air flow rate, operational pressure, inlet relative humidity, regeneration current density and absorption/regeneration cycle endurance testing.

R.E.S.

N79-29795# Navy Clothing and Textile Research Unit, Natick, Mass.

INSULATED FIREFIGHTERS' CRASH-CREW RESCUE BOOTS AND COMPONENTS: FIELD AND LABORATORY EVALUATION Final Report, Oct. 1976 - Sep. 1977

Milton Bailey Tyndall AFB, Fla. CEEDO Dec. 1978 43 p refs

(AFCEC Proj. 77-02; AF Proj. 414N)
(AD-A068264; NCTRF-137; CEEDO-TR-78-07) Avail: NTIS
HC A03/MF A01 CSCL 06/17

The Navy Clothing and Textile Research Facility (NCTRF) conducted an evaluation of commercial insulated firefighters' boots worn by crash firefighters representing three Navy Air Stations and three Air Force Bases. The evaluation revealed that the insulated footwear was significantly superior to the standard firefighters' boots currently in the supply system. Reflective spats, accessories sometimes used to cover boots for additional protection against high heat, were considered unnecessary by the subjects who thought the insulation of the test boots provided sufficient protection. Laboratory findings, however, showed that spats would indeed be needed if personnel became immobilized and were subjected to 1.89 gcal/sq cm/sec heat for 30 seconds or longer. The laboratory tests also showed that the heat rapidly penetrates and destroys soiled aluminized fabrics. Based on these findings, NCTRF recommends: (1) insulated firefighters' boots replace standard firefighters' boots; (2) commercial aluminized spats be stocked as supporting gear; and (3) reflectivity of aluminized fabrics generally, and of spats particularly, be policed and maintained daily to assure peak personnel protection at all times.

GRA

N79-29796# Gulf and Western Applied Science Labs., Waltham, Mass.

SENSORY MECHANISM MODELING Final Report, Jun. 1977 - Sep. 1978

Joshua Borah, Laurence R. Young, and Renwick F. Curry Feb. 1979 87 p refs

(Contract F33615-76-C-0039; AF Proj. 6114)
(AD-A069439; AFHRL-TR-78-83) Avail: NTIS
HC A05/MF A01 CSCL 06/4

Pilots use information from a variety of sensory mechanisms to determine their estimate of orientation and motion. An understanding of this process and a quantitative model are essential for development of effective simulator motion cueing devices. A multisensory model for dynamic spatial orientation is being developed for this purpose. Aircraft or simulator motion is translated into stimuli which are processed by dynamic models of the appropriate sensors (visual, vestibular, tactile, and proprioceptive), and are then fed to a central estimator which has been modeled as a linear optimal estimator, specifically a steady state Kalman Filter. In addition to the linear estimation process, some non-linear effects, such as the well documented

delay in onset of visually induced motion, require non-linear additions to the model. Such additions have been kept to a minimum so as to retain the uniqueness and conceptual appeal of a linear optimization algorithm. The model has been implemented as a computer program and has predicted some of the important qualitative characteristics of human dynamic spatial orientation under combined wide field visual motion and platform motion. Several types of special tactile and proprioceptive cues are also being considered but have not been validated. The modeling effort has underscored the need for additional data in some areas and several experiments have been suggested to help fill these gaps. GRA

N79-29797# Research Inst. of National Defence, Stockholm (Sweden).

HUMAN PROCESSING OF INFORMATION AND THE COMPUTERIZED MODE OF PRESENTATION: ERGONOMIC PARAMETERS [MAANSKLAG INFORMATIONSBEARBETNING OCH DATORISERAT PRESENTATIONSSAATT: EN REFERENSRAM]

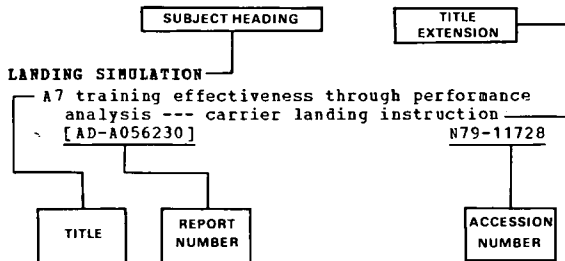
Mette Holmgren Nov. 1978 25 p refs
(FOA-C-56018-H9) Avail: NTIS HC A02/MF A01

A theoretical frame of reference for human processing of computerized information is given. The definition of an average person's cognitive ability was primarily sought, but individual behavioral differences were also taken into account. Experimental psychology and the theory of personality development were used along with statistical analysis. The abstraction level, the stress involved in real time work, and individual difference mainly due to training and emotional factors were topics considered.

Author (ESA)

SUBJECT INDEX

Typical Subject Index Listing



The title is used to provide a description of the subject matter. When the title is insufficiently descriptive of the document content, a title extension is added, separated from the title by three hyphens. The NASA or AIAA accession number is included in each entry to assist the user in locating the abstract in the abstract section of this supplement. If applicable, a report number is also included as an aid in identifying the document.

A

ABIOTENESIS

- A proposal concerning the origin of life on the planet earth A79-45641
- Polymers produced by heating an amino acid mixture in sea water enriched with transition elements A79-46461

ABSORBERS (EQUIPMENT)

- Electrochemically regenerable carbon dioxide absorber [NASA-CR-152099] N79-29794

ACCELERATION STRESSES (PHYSIOLOGY)

- A lower body negative pressure box for +Gz simulation in the upright seated position [AD-A069326] N79-28868

ACCELERATION TOLERANCE

- A lower body negative pressure box for +Gz simulation in the upright seated position [AD-A069326] N79-28868

ACTIVITY (BIOLOGY)

- Biologically active short-chain peptides [POA-C-40063-C1] N79-29785

ADAPTATION

- Some forms of adaptation to extreme influences in the blood system A79-46679

ADAPTIVE CONTROL

- A structural model of the adaptive human pilot [AIAA 79-1784] A79-45411

ADRENAL METABOLISM

- Effect of adaptation to high-altitude hypoxia on cardiac adrenoreactivity and the state of the adenylyclase and phosphodiesterase systems in the myocardium A79-46500

AEROSPACE MEDICINE

- The electrocardiogram recorded by telemetry during a parachute jump, compared to a trace during stress tests - A preliminary study of 29 cases A79-46600
- The application of vectorcardiography to aerospace medicine A79-46602
- Operator performance and localized muscle fatigue in a simulated space vehicle control task [NASA-TN-58220] N79-28867
- BIOSPEX: Biological space experiments, a compendium of life sciences experiments carried on US spacecraft [NASA-TN-58217] N79-29784

AGING (BIOLOGY)

- Quantitative analysis of mating behavior in aging male *Drosophila melanogaster* A79-44799

AIR PURIFICATION

- Technology advancement of an oxygen generation subsystem [NASA-CR-152257] N79-28883

AIRCRAFT NOISE

- Temporary threshold shift from transportation noise A79-46286
- The influence of intermittent aircraft noise on sleep. I A79-46599

AIRCRAFT PILOTS

- A structural model of the adaptive human pilot [AIAA 79-1784] A79-45411

ALBUMINS

- Binding of biologically active agents to plasma proteins [CL-1977-22] N79-29787

ALGORITHMS

- On investigating the statistical properties of the populous path algorithm by computer simulation - Counterconclusions to those of Tateno and Nei --- for mutational change in protein evolution A79-45640
- Augmentation algorithm - A reply to Holmquist --- for nucleotide substitutions A79-45644

- Molecular phylogenetic trees - On the validity of the Goodman-Moore augmentation algorithm A79-45645

ALTITUDE ACCLIMATIZATION

- Effect of adaptation to high-altitude hypoxia on cardiac adrenoreactivity and the state of the adenylyclase and phosphodiesterase systems in the myocardium A79-46500

AMINO ACIDS

- Inadequacy of prebiotic synthesis as origin of proteinous amino acids A79-45643
- Polymers produced by heating an amino acid mixture in sea water enriched with transition elements A79-46461

ARTERIOSCLEROSIS

- Aspects of dietary prevention of arteriosclerosis N79-29792

ASTRONAUT PERFORMANCE

- The physiologist's view of sensory illusions A79-46597

ATTENTION

- Selective attention: The influences of subject sex and degree of prior habituation on performance of an attention task with distraction N79-28876

AUGMENTATION

- Augmentation algorithm - A reply to Holmquist --- for nucleotide substitutions A79-45644
- Molecular phylogenetic trees - On the validity of the Goodman-Moore augmentation algorithm A79-45645

B

BACTERIOLOGY

- An ultraviolet light induced bacteriophage in *Beneckea gazogenes* --- organism growth on precambrian earth A79-46463

BACTERIOPHAGES

- An ultraviolet light induced bacteriophage in *Beneckea gazogenes* --- organism growth on precambrian earth

A79-46463

BEHAVIOR

- Quantitative analysis of mating behavior in aging male *Drosophila Melanogaster*

A79-44799

BIBLIOGRAPHIES

- Cardiovascular diseases, volume 3. A bibliography with abstracts

[NTIS/PS-79/0063/2] N79-28874

- Stress factors on pilot performance. Citations from the International Aerospace Abstracts data base

[NTIS/PS-79/0506/0] N79-28878

BINOCULAR VISION

- Eye torsion and visual tilt are mediated by different binocular processes

A79-46651

BIOASTRONAUTICS

- The application of vectorcardiography to aerospace medicine

A79-46602

- Technology advancement of an oxygen generation subsystem

[NASA-CR-152257] N79-28883

BIOCHEMISTRY

- Mirror symmetry breaking in biochemical evolution

A79-46462

- Solar-driven chemical energy source for a Martian biota

A79-46464

- Binding of biologically active agents to plasma proteins

[CL-1977-22] N79-29787

BIOCONTROL SYSTEMS

- Central and reflex mechanisms of controlling movements --- Russian book

A79-43950

BIODYNAMICS

- Central and reflex mechanisms of controlling movements --- Russian book

A79-43950

- Operator performance and localized muscle fatigue in a simulated space vehicle control task

[NASA-TM-58220] N79-28867

BIOINSTRUMENTATION

- Computer design synthesis of a below knee-Syme prosthesis

A79-44300

- Skin-resistance measuring device with higher resolution

A79-45476

- Portable device for detection of petit mal epilepsy

A79-46226

BIOLOGICAL EFFECTS

- Results of benthic studies at Calvert Cliffs

[PB-294261/3] N79-29788

BIOLOGICAL EVOLUTION

- Carbon suboxide and the genetic code --- in biochemical evolution

A79-44865

- Goodman et al.'s method for augmenting the number of nucleotide substitutions

A79-45639

- On investigating the statistical properties of the populous path algorithm by computer simulation - Counterconclusions to those of Tateno and Nei

--- for mutational change in protein evolution

A79-45640

- A proposal concerning the origin of life on the planet earth

A79-45641

- Inadequacy of prebiotic synthesis as origin of proteinous amino acids

A79-45643

- Augmentation algorithm - A reply to Holmquist --- for nucleotide substitutions

A79-45644

- Molecular phylogenetic trees - On the validity of the Goodman-Moore augmentation algorithm

A79-45645

- Mirror symmetry breaking in biochemical evolution

A79-46462

BIOMEDICAL DATA

- Intraocular pressure reduction and regulation system

[NASA-TM-79187] N79-28881

BIONICS

- A revised model of gas transport in human lungs

A79-45768

BIOSYNTHESIS

- Inadequacy of prebiotic synthesis as origin of proteinous amino acids

A79-45643

BIOTELEMETRY

- The electrocardiogram recorded by telemetry during a parachute jump, compared to a trace during stress tests - A preliminary study of 29 cases

A79-46600

BLOOD

- Some forms of adaptation to extreme influences in the blood system

A79-46679

BLOOD PLASMA

- Hyperthermia and exercise --- plasma fluid and electrolyte effects on human thermoregulation

A79-44775

BOOTS (FOOTWEAR)

- Insulated firefighters' crash-crew rescue boots and components: Field and laboratory evaluation

[AD-A068264] N79-29795

BRAIN DAMAGE

- Effects of high-LET neon /Ne-20/ particle radiation on the brain, eyes and other head structures of the pocket mouse - A histological study

A79-44798

C

CARBOHYDRATE METABOLISM

- Insulin-like effect of bovine growth hormone in vivo as demonstrated by oxidation of C/14/-U-glucose in diabetic rats

A79-44797

CARBON DIOXIDE REMOVAL

- Electrochemically regenerable carbon dioxide absorber

[NASA-CR-152099] N79-29794

CARBON SUBOXIDES

- Carbon suboxide and the genetic code --- in biochemical evolution

A79-44865

CARBON 14

- Insulin-like effect of bovine growth hormone in vivo as demonstrated by oxidation of C/14/-U-glucose in diabetic rats

A79-44797

CARDIOVASCULAR SYSTEM

- Isolation of a shock-induced circulating cardiodepressant substance

A79-46967

- Cardiovascular diseases, volume 3. A bibliography with abstracts

[NTIS/PS-79/0063/2] N79-28874

CELLS (BIOLOGY)

- Enhancement of luminance flicker by color-opponent mechanisms

A79-44582

- Cell biology basis for the life of an organism in the radiation field

[ANL-TRANS-1152] N79-29786

CHANNEL CAPACITY

- Test of the 10 bits/sec channel-capacity hypothesis for human tracking

A79-45771

CHEMICAL BONDS

- Binding of biologically active agents to plasma proteins

[CL-1977-22] N79-29787

CHEMICAL ENERGY

- Solar-driven chemical energy source for a Martian biota

A79-46464

CHEMICAL EVOLUTION

- Carbon suboxide and the genetic code --- in biochemical evolution

A79-44865

- Goodman et al.'s method for augmenting the number of nucleotide substitutions

A79-45639

- On investigating the statistical properties of the populous path algorithm by computer simulation - Counterconclusions to those of Tateno and Nei

--- for mutational change in protein evolution

A79-45640

A proposal concerning the origin of life on the planet earth
A79-45641

Polymers produced by heating an amino acid mixture in sea water enriched with transition elements
A79-46461

Mirror symmetry breaking in biochemical evolution
A79-46462

CHESAPEAKE BAY (US)
Results of benthic studies at Calvert Cliffs
[PB-294261/3] N79-29788

CIRCADIAN RHYTHMS
Circadian rhythm of electrolyte uresis in healthy persons
A79-46681

COLOR VISION
Enhancement of luminance flicker by color-opponent mechanisms
A79-44582

COMFORT
A study of the available evidence on duration effects on comfort and task proficiency under vibration
A79-46399

COMPENSATORY TRACKING
A structural model of the adaptive human pilot
[AIAA 79-1784] A79-45411

COMPUTERIZED DESIGN
Computer design synthesis of a below knee-Syme prosthesis
A79-44300

COMPUTERIZED SIMULATION
On investigating the statistical properties of the populous path algorithm by computer simulation - Counterconclusions to those of Tateno and Wei --- for mutational change in protein evolution
A79-45640

Test of the 10 bits/sec channel-capacity hypothesis for human tracking
A79-45771

Sensory mechanism modeling
[AD-A069439] N79-29796

CONSUMABLES (SPACECREW SUPPLIES)
Maximizing storage stability of foods to be used for resupply in a controlled ecological life supply system: Evaluation of research
[NASA-CR-158846] N79-28880

COOLING
Epiphysis of rats under the combined action of hypoxia, hypercapnia and cooling
A79-46680

CRITICAL FLICKER FUSION
Enhancement of luminance flicker by color-opponent mechanisms
A79-44582

CURES
Aspects of dietary prevention of arteriosclerosis
N79-29792

D

DATA PROCESSING
Human processing of information and the computerized mode of presentation: Ergonomic parameters
[FOA-C-56018-H9] N79-29797

DATA TRANSMISSION
Attempt to describe a class of man-machine dialogue systems based on a natural language
A79-44057

DEHYDRATED FOOD
Maximizing storage stability of foods to be used for resupply in a controlled ecological life supply system: Evaluation of research
[NASA-CR-158846] N79-28880

DEPRESSANTS
Isolation of a shock-induced circulating cardiodepressant substance
A79-46967

DIABETES MELLITUS
Insulin-like effect of bovine growth hormone in vivo as demonstrated by oxidation of C/14-U-glucose in diabetic rats
A79-44797

DIAGNOSIS
Portable device for detection of petit mal epilepsy
A79-46226

Computed axial tomography (CAT)
[ISS-R-78/4] N79-29791

DIETS
Aspects of dietary prevention of arteriosclerosis
N79-29792

DISORIENTATION
The vestibule and flying --- pilot disorientation
A79-46598

DISPLAY DEVICES
Pilot-optimal augmentation of the air-to-air tracking task
[AIAA 79-1747] A79-45388

DROSOPHILA
Quantitative analysis of mating behavior in aging male Drosophila Melanogaster
A79-44799

DYNAMIC STABILITY
Stabilization of the horizontal motion of a bipedal walking robot
A79-44081

E

EARTH (PLANET)
A proposal concerning the origin of life on the planet earth
A79-45641

ECOLOGY
Results of benthic studies at Calvert Cliffs
[PB-294261/3] N79-29788

EDUCATION
Stress management: A comparison of educational, aerobic and autosuggestive approaches
N79-28875

ELECTRICAL RESISTANCE
Skin-resistance measuring device with higher resolution
A79-45476

ELECTROCARDIOGRAPHY
The evolutionary pattern of exercise-induced ST segment depression
A79-44166

The electrocardiogram recorded by telemetry during a parachute jump, compared to a trace during stress tests - A preliminary study of 29 cases
A79-46600

ELECTROENCEPHALOGRAPHY
Portable device for detection of petit mal epilepsy
A79-46226

ELECTROLYTE METABOLISM
Circadian rhythm of electrolyte uresis in healthy persons
A79-46681

ELECTROLYTES
Hyperthermia and exercise --- plasma fluid and electrolyte effects on human thermoregulation
A79-44775

ENZYME ACTIVITY
Effect of adaptation to high-altitude hypoxia on cardiac adrenoreactivity and the state of the adenylyclase and phosphodiesterase systems in the myocardium
A79-46500

EPILEPSY
Portable device for detection of petit mal epilepsy
A79-46226

EXOBIOLOGY
BIOSPEX: Biological space experiments, a compendium of life sciences experiments carried on US spacecraft
[NASA-TM-58217] N79-29784

EXTRATERRESTRIAL LIFE
Solar-driven chemical energy source for a Martian biota
A79-46464

Some comments on interpretations of Viking biological experiments
A79-46465

EYE (ANATOMY)
Intraocular pressure reduction and regulation system
[NASA-TM-79187] N79-28881

EYE MOVEMENTS
Eye torsion and visual tilt are mediated by different binocular processes
A79-46651

EYE PROTECTION
Effects of high-LET neon /Ne-20/ particle radiation on the brain, eyes and other head structures of the pocket mouse - A histological study
A79-44798

F

- FEEDBACK CONTROL**
 Pilot-optimal augmentation of the air-to-air tracking task [AIAA 79-1747] A79-45388
 A structural model of the adaptive human pilot [AIAA 79-1784] A79-45411
- FIRE CONTROL**
 Pilot-optimal augmentation of the air-to-air tracking task [AIAA 79-1747] A79-45388
- FIRE FIGHTING**
 Insulated firefighters' crash-crew rescue boots and components: Field and laboratory evaluation [AD-A068264] N79-29795
- FLIGHT SIMULATION**
 Sensory mechanism modeling [AD-A069439] N79-29796
- FLIGHT SIMULATORS**
 A lower body negative pressure box for +Gz simulation in the upright seated position [AD-A069326] N79-28868
- FLIGHT STRESS (BIOLOGY)**
 The vestibule and flying --- pilot disorientation A79-46598

G

- GALVANIC SKIN RESPONSE**
 Skin-resistance measuring device with higher resolution A79-45476
- GANGLIA**
 Enhancement of luminance flicker by color-opponent mechanisms A79-44582
- GAS TRANSPORT**
 A revised model of gas transport in human lungs A79-45768
- GENETIC CODE**
 Carbon suboxide and the genetic code --- in biochemical evolution A79-44865
- GLUCOSE**
 Insulin-like effect of bovine growth hormone in vivo as demonstrated by oxidation of C/14/-U-glucose in diabetic rats A79-44797
- GRAVIRECEPTORS**
 The vestibule and flying --- pilot disorientation A79-46598

H

- HABITS**
 Selective attention: The influences of subject sex and degree of prior habituation on performance of an attention task with distraction N79-28876
- HEAD (ANATOMY)**
 Effects of high-LET neon /Ne-20/ particle radiation on the brain, eyes and other head structures of the pocket mouse - A histological study A79-44798
- HEALTH PHYSICS**
 Pulmonary functional tolerance to ionizing radiation - An experimental study A79-46601
 Dose-rate conversion factors for external exposure to photon and electron radiation from radionuclides occurring in routine releases from nuclear fuel cycle facilities [NUREG/CR-0494] N79-28873
- HEART DISEASES**
 Cardiovascular diseases, volume 3. A bibliography with abstracts [NTIS/PS-79/0063/2] N79-28874
- HEART FUNCTION**
 Effect of adaptation to high-altitude hypoxia on cardiac adrenoreactivity and the state of the adenylyclase and phosphodiesterase systems in the myocardium A79-46500
 Isolation of a shock-induced circulating cardiodepressant substance A79-46967

HEMATOLOGY

- Some forms of adaptation to extreme influences in the blood system A79-46679

HEMORRHAGES

- Isolation of a shock-induced circulating cardiodepressant substance A79-46967

HIGH ALTITUDE ENVIRONMENTS

- Effect of adaptation to high-altitude hypoxia on cardiac adrenoreactivity and the state of the adenylyclase and phosphodiesterase systems in the myocardium A79-46500

HIGH RESOLUTION

- Skin-resistance measuring device with higher resolution A79-45476

HOMEOSTASIS

- The role of the neurohormone system of the hypothalamus in physiology and pathology --- Russian book A79-43835

HORMONE METABOLISMS

- Insulin-like effect of bovine growth hormone in vivo as demonstrated by oxidation of C/14/-U-glucose in diabetic rats A79-44797

HORMONES

- The role of the neurohormone system of the hypothalamus in physiology and pathology --- Russian book A79-43835

HUMAN BEINGS

- Central and reflex mechanisms of controlling movements --- Russian book A79-43950

HUMAN FACTORS ENGINEERING

- Operator performance and localized muscle fatigue in a simulated space vehicle control task [NASA-TM-58220] N79-28867
 Development of information theory concepts and equations for human mental processing [AD-A068606] N79-28877
 Cold water survival suits for aircrew [ARI/SYS-NOTE-56] N79-28882
 Crew workload assessment. Development of a measure of operator workload [AD-A068616] N79-28884
 Isometric strength testing in selecting workers for strenuous jobs N79-29790

- Human processing of information and the computerized mode of presentation: Ergonomic parameters [FOA-C-56018-H9] N79-29797

HUMAN PATHOLOGY

- The role of the neurohormone system of the hypothalamus in physiology and pathology --- Russian book A79-43835

HUMAN PERFORMANCE

- Test of the 10 bits/sec channel-capacity hypothesis for human tracking A79-45771
 A study of the available evidence on duration effects on comfort and task proficiency under vibration A79-46399

HUMAN REACTIONS

- A study of the available evidence on duration effects on comfort and task proficiency under vibration A79-46399

HUMAN TOLERANCES

- Temporary threshold shift from transportation noise A79-46286
 Thermal conduction effects in human skin. 1: Experimental data acquisition [AD-A068479] N79-28871
 Thermal conduction effects in human skin. 3: Influence of epidermal thickness and exposure time [AD-A068481] N79-28872

HYPERCAPNIA

- Epiphysis of rats under the combined action of hypoxia, hypercapnia and cooling A79-46680

HYPEROXIA

Adaptation to chronic hyperoxia in the rat - A study of pulmonary surfactant, tissue levels of superoxide dismutases and histology

A79-46603

HYPERTHERMIA

Hyperthermia and exercise --- plasma fluid and electrolyte effects on human thermoregulation

A79-44775

HYPNOSIS

Stress management: A comparison of educational, aerobic and autosuggestive approaches

N79-28875

HYPOTHALAMUS

The role of the neurohormone system of the hypothalamus in physiology and pathology --- Russian book

A79-43835

HYPOXIA

Effect of adaptation to high-altitude hypoxia on cardiac adrenoreactivity and the state of the adenylcyclase and phosphodiesterase systems in the myocardium

A79-46500

Epiphysis of rats under the combined action of hypoxia, hypercapnia and cooling

A79-46680

I**ILLUSIONS**

Sensory illusions of vestibular origin

A79-46596

The physiologist's view of sensory illusions

A79-46597

IN-FLIGHT MONITORING

The electrocardiogram recorded by telemetry during a parachute jump, compared to a trace during stress tests - A preliminary study of 29 cases

A79-46600

INFORMATION THEORY

Development of information theory concepts and equations for human mental processing [AD-A068606]

N79-28877

INSULIN

Insulin-like effect of bovine growth hormone in vivo as demonstrated by oxidation of C/¹⁴-U-glucose in diabetic rats

A79-44797

INTRAOCULAR PRESSURE

Intraocular pressure reduction and regulation system [NASA-TM-79187]

N79-28881

IONIZING RADIATION

Pulmonary functional tolerance to ionizing radiation - An experimental study

A79-46601

ISCHEMIA

The evolutionary pattern of exercise-induced ST segment depression

A79-44166

J**JET ENGINE FUELS**

Toxicity of high density jet fuel components [AD-A068596]

N79-28870

KNEE (ANATOMY)

Computer design synthesis of a below knee-Syme prosthesis

A79-44300

L**LABOR**

Isometric strength testing in selecting workers for strenuous jobs

N79-29790

LABYRINTHECTOMY

Changes in optokinetic, postoptokinetic, and reverse postoptokinetic nystagmus after bilateral labyrinthectomy

A79-46499

LEUCINE

Isolation of a shock-induced circulating cardiodepressant substance

A79-46967

LIFE SCIENCES

BIOSPEX: Biological space experiments, a compendium of life sciences experiments carried on US spacecraft [NASA-TM-58217]

N79-29784

LIFE SUPPORT SYSTEMS

Electrochemically regenerable carbon dioxide absorber [NASA-CR-152099]

N79-29794

LUMINANCE

Enhancement of luminance flicker by color-opponent mechanisms

A79-44582

LUNGS

A revised model of gas transport in human lungs

A79-45768

Pulmonary functional tolerance to ionizing radiation - An experimental study

A79-46601

Adaptation to chronic hyperoxia in the rat - A study of pulmonary surfactant, tissue levels of superoxide dismutases and histology

A79-46603

M**MACHINE ORIENTED LANGUAGES**

Attempt to describe a class of man-machine dialogue systems based on a natural language

A79-44057

MAN MACHINE SYSTEMS

Attempt to describe a class of man-machine dialogue systems based on a natural language

A79-44057

A structural model of the adaptive human pilot [AIAA 79-1784]

A79-45411

Combined discrete network-continuous control modeling of man-machine systems

N79-28879

Human processing of information and the computerized mode of presentation: Ergonomic parameters [POA-C-56018-H9]

N79-29797

MANPOWER

Isometric strength testing in selecting workers for strenuous jobs

N79-29790

MARINE BIOLOGY

Results of benthic studies at Calvert Cliffs [PB-294261/3]

N79-29788

MARS (PLANET)

Solar-driven chemical energy source for a Martian biota

A79-46464

Some comments on interpretations of Viking biological experiments

A79-46465

MATHEMATICAL MODELS

A structural model of the adaptive human pilot [AIAA 79-1784]

A79-45411

Mathematical model of the respiration rhythm generation process

A79-46268

A stochastic model of muscle fatigue in frequent strenuous work cycles

N79-29789

MEDICAL ELECTRONICS

Skin-resistance measuring device with higher resolution

A79-45476

MEDICAL EQUIPMENT

General activities related to medical research [TNO-MPI-PR-6]

N79-29793

MEDICAL SCIENCE

Skylab medical data evaluation program (SNEDEP) [NASA-CR-160279]

N79-28869

General activities related to medical research [TNO-MPI-PR-6]

N79-29793

MEMORY

Relationship between the reproduction tactics and the major indices of speech retention-reproduction processes

A79-46276

MENTAL PERFORMANCE

Relationship between the reproduction tactics and the major indices of speech retention-reproduction processes

A79-46276

MODELS

- Development of information theory concepts and equations for human mental processing [AD-A068606] N79-28877
- MODELS**
- Combined discrete network-continuous control modeling of man-machine systems N79-28879
- MUSCULAR FATIGUE**
- A stochastic model of muscle fatigue in frequent strenuous work cycles N79-29789
- MUSCULAR STRENGTH**
- Isometric strength testing in selecting workers for strenuous jobs N79-29790
- MUTATIONS**
- On investigating the statistical properties of the populous path algorithm by computer simulation - Counterconclusions to those of Tateno and Nei --- for mutational change in protein evolution A79-45640
- MYOCARDIUM**
- Effect of adaptation to high-altitude hypoxia on cardiac adrenoreactivity and the state of the adenylcyclase and phosphodiesterase systems in the myocardium A79-46500

N

- NATURAL LANGUAGE (COMPUTERS)**
- Attempt to describe a class of man-machine dialogue systems based on a natural language A79-44057
- NEON ISOTOPES**
- Effects of high-LET neon /Ne-20/ particle radiation on the brain, eyes and other head structures of the pocket mouse - A histological study A79-44798
- NETWORK ANALYSIS**
- Combined discrete network-continuous control modeling of man-machine systems N79-28879
- NEURONS**
- Mathematical model of the respiration rhythm generation process A79-46268
- NEUROPHYSIOLOGY**
- The role of the neurohormone system of the hypothalamus in physiology and pathology --- Russian book A79-43835
- Central and reflex mechanisms of controlling movements --- Russian book A79-43950
- NOISE MEASUREMENT**
- Temporary threshold shift from transportation noise A79-46286
- NOISE POLLUTION**
- Temporary threshold shift from transportation noise A79-46286
- The influence of intermittent aircraft noise on sleep. I A79-46599
- NUCLEAR POWER PLANTS**
- Results of benthic studies at Calvert Cliffs [PB-294261/3] N79-29788
- NUCLEOTIDES**
- Goodman et al.'s method for augmenting the number of nucleotide substitutions A79-45639
- Augmentation algorithm - A reply to Holmquist --- for nucleotide substitutions A79-45644
- NYSTAGMUS**
- Changes in optokinetic, postoptokinetic, and reverse postoptokinetic nystagmus after bilateral labyrinthectomy A79-46499
- OPERATOR PERFORMANCE**
- Selective attention: The influences of subject sex and degree of prior habituation on performance of an attention task with distraction N79-28876

O

SUBJECT INDEX

- Combined discrete network-continuous control modeling of man-machine systems N79-28879
- OPHTHALMOLOGY**
- Sensory illusions - The ophthalmologist's point of view A79-46595
- OPTICAL ACTIVITY**
- Mirror symmetry breaking in biochemical evolution A79-46462
- OPTICAL ILLUSION**
- Sensory illusions - The ophthalmologist's point of view A79-46595
- OPTIMAL CONTROL**
- Combined discrete network-continuous control modeling of man-machine systems N79-28879
- OPTIMIZATION**
- Pilot-optimal augmentation of the air-to-air tracking task [AIAA 79-1747] A79-45388

P

- PARACHUTE DESCENT**
- The electrocardiogram recorded by telemetry during a parachute jump, compared to a trace during stress tests - A preliminary study of 29 cases A79-46600
- PASSENGERS**
- A study of the available evidence on duration effects on comfort and task proficiency under vibration A79-46399
- PEPTIDES**
- Biologically active short-chain peptides [FOA-C-40063-C1] N79-29785
- PHOTOSYNTHESIS**
- A proposal concerning the origin of life on the planet earth A79-45641
- PHYSICAL EXERCISE**
- The evolutionary pattern of exercise-induced ST segment depression A79-44166
- Hyperthermia and exercise --- plasma fluid and electrolyte effects on human thermoregulation A79-44775
- Stress management: A comparison of educational, aerobic and autosuggestive approaches N79-28875
- PHYSICAL WORK**
- A stochastic model of muscle fatigue in frequent strenuous work cycles N79-29789
- PHYSIOLOGICAL EFFECTS**
- Retinal site of transient tritanopia A79-46623
- Biologically active short-chain peptides [FOA-C-40063-C1] N79-29785
- PHYSIOLOGICAL FACTORS**
- The physiologist's view of sensory illusions A79-46597
- PHYSIOLOGICAL RESPONSES**
- Enhancement of luminance flicker by color-opponent mechanisms A79-44582
- Hyperthermia and exercise --- plasma fluid and electrolyte effects on human thermoregulation A79-44775
- PHYSIOLOGICAL TESTS**
- Some forms of adaptation to extreme influences in the blood system A79-46679
- Epiphysis of rats under the combined action of hypoxia, hypercapnia and cooling A79-46680
- PILOT PERFORMANCE**
- Pilot-optimal augmentation of the air-to-air tracking task [AIAA 79-1747] A79-45388
- Sensory illusions - The ophthalmologist's point of view A79-46595
- Sensory illusions of vestibular origin A79-46596
- The physiologist's view of sensory illusions A79-46597

The vestibule and flying --- pilot disorientation
A79-46598

Stress factors on pilot performance. Citations
from the International Aerospace Abstracts data
base
[NTIS/PS-79/0506/0] N79-28878

Crew workload assessment. Development of a
measure of operator workload
[AD-A068616] N79-28884

PINEAL GLAND
Epiphysis of rats under the combined action of
hypoxia, hypercapnia and cooling
A79-46680

PITUITARY HORMONES
Insulin-like effect of bovine growth hormone in
vivo as demonstrated by oxidation of
C/14/-U-glucose in diabetic rats
A79-44797

POLYMERS
Carbon suboxide and the genetic code --- in
biochemical evolution
A79-44865

Polymers produced by heating an amino acid mixture
in sea water enriched with transition elements
A79-46461

PORTABLE EQUIPMENT
Portable device for detection of petit mal epilepsy
A79-46226

POSTFLIGHT ANALYSIS
Skylab medical data evaluation program (SMEDEP)
[NASA-CR-160279] N79-28869

PRIMITIVE EARTH ATMOSPHERE
Carbon suboxide and the genetic code --- in
biochemical evolution
A79-44865

A proposal concerning the origin of life on the
planet earth
A79-45641

An ultraviolet light induced bacteriophage in
Beneckea gazogenes --- organism growth on
precambrian earth
A79-46463

PROBLEM SOLVING
Selective attention: The influences of subject
sex and degree of prior habituation on
performance of an attention task with distraction
N79-28876

PROSTHETIC DEVICES
Computer design synthesis of a below knee-Syme
prosthesis
A79-44300

PROTECTIVE CLOTHING
Cold water survival suits for aircrew
[ARL/SYS-NOTE-56] N79-28882

Insulated firefighters' crash-crew rescue boots
and components: Field and laboratory evaluation
[AD-A068264] N79-29795

PROTEINS
On investigating the statistical properties of the
populous path algorithm by computer simulation -
Counterconclusions to those of Tateno and Nei
--- for mutational change in protein evolution
A79-45640

Inadequacy of prebiotic synthesis as origin of
proteinous amino acids
A79-45643

PSYCHOLOGICAL EFFECTS
The influence of intermittent aircraft noise on
sleep. I
A79-46599

PSYCHOLOGICAL FACTORS
Human processing of information and the
computerized mode of presentation: Ergonomic
parameters
[FOA-C-56018-H9] N79-29797

PSYCHOLOGICAL TESTS
Relationship between the reproduction tactics and
the major indices of speech
retention-reproduction processes
A79-46276

PULMONARY FUNCTIONS
A revised model of gas transport in human lungs
A79-45768

Pulmonary functional tolerance to ionizing
radiation - An experimental study
A79-46601

Adaptation to chronic hyperoxia in the rat - A
study of pulmonary surfactant, tissue levels of
superoxide dismutases and histology
A79-46603

PURSUIT TRACKING
Pilot-optimal augmentation of the air-to-air
tracking task
[AIAA 79-1747] A79-45388

R

RADIATION DAMAGE
Effects of high-LET neon /Ne-20/ particle
radiation on the brain, eyes and other head
structures of the pocket mouse - A histological
study
A79-44798

RADIATION DOSAGE
Dose-rate conversion factors for external exposure
to photon and electron radiation from
radionuclides occurring in routine releases from
nuclear fuel cycle facilities
[NUREG/CR-0494] N79-28873

Cell biology basis for the life of an organism in
the radiation field
[ANL-TRANS-1152] N79-29786

RADIATION EFFECTS
Cell biology basis for the life of an organism in
the radiation field
[ANL-TRANS-1152] N79-29786

RADIATION HAZARDS
Pulmonary functional tolerance to ionizing
radiation - An experimental study
A79-46601

Dose-rate conversion factors for external exposure
to photon and electron radiation from
radionuclides occurring in routine releases from
nuclear fuel cycle facilities
[NUREG/CR-0494] N79-28873

RADIOBIOLOGY
Effects of high-LET neon /Ne-20/ particle
radiation on the brain, eyes and other head
structures of the pocket mouse - A histological
study
A79-44798

RADIOLOGY
Computed axial tomography (CAT)
[ISS-R-78/4] N79-29791

REFLEXES
Central and reflex mechanisms of controlling
movements --- Russian book
A79-43950

RENAL FUNCTION
Circadian rhythm of electrolyte uresis in healthy
persons
A79-46681

REPRODUCTION (BIOLOGY)
Quantitative analysis of mating behavior in aging
male Drosophila Melanogaster
A79-44799

RESEARCH AND DEVELOPMENT
General activities related to medical research
[TNO-MFI-PR-6] N79-29793

RESPIRATORY RATE
Mathematical model of the respiration rhythm
generation process
A79-46268

RETINAL ADAPTATION
Retinal site of transient tritanopia
A79-46623

ROBOTS
Stabilization of the horizontal motion of a
bipedal walking robot
A79-44081

S

SEA WATER
Polymers produced by heating an amino acid mixture
in sea water enriched with transition elements
A79-46461

SENSORY PERCEPTION
Sensory illusions - The ophthalmologist's point of
view
A79-46595

Sensory illusions of vestibular origin
A79-46596

The physiologist's view of sensory illusions
A79-46597

SEX FACTOR

Sensory mechanism modeling
[AD-A069439] N79-29796

SEX FACTOR
Selective attention: The influences of subject sex and degree of prior habituation on performance of an attention task with distraction
N79-28876

SHOCK (PHYSIOLOGY)
Isolation of a shock-induced circulating cardiodepressant substance
A79-46967

SITTING POSITION
A lower body negative pressure box for +Gz simulation in the upright seated position
[AD-A069326] N79-28868

SKIN (ANATOMY)
Thermal conduction effects in human skin. 1:
Experimental data acquisition
[AD-A068479] N79-28871
Thermal conduction effects in human skin. 3:
Influence of epidermal thickness and exposure time
[AD-A068481] N79-28872

SKYLAB PROGRAM
Skylab medical data evaluation program (SMEDEP)
[NASA-CR-160279] N79-28869

SLEEP
The influence of intermittent aircraft noise on sleep. I
A79-46599

SOLAR RADIATION
Solar-driven chemical energy source for a Martian biota
A79-46464

SPACEBORNE EXPERIMENTS
Some comments on interpretations of Viking biological experiments
A79-46465

BIOSPEX: Biological space experiments, a compendium of life sciences experiments carried on US spacecraft
[NASA-TM-58217] N79-29784

SPACECRAFT ENVIRONMENTS
Technology advancement of an oxygen generation subsystem
[NASA-CR-152257] N79-28883

SPEECH
Relationship between the reproduction tactics and the major indices of speech retention-reproduction processes
A79-46276

STEREOCHEMISTRY
Mirror symmetry breaking in biochemical evolution
A79-46462

STIMULATION
Selective attention: The influences of subject sex and degree of prior habituation on performance of an attention task with distraction
N79-28876

STOCHASTIC PROCESSES
A stochastic model of muscle fatigue in frequent strenuous work cycles
N79-29789

STORAGE STABILITY
Maximizing storage stability of foods to be used for resupply in a controlled ecological life supply system: Evaluation of research
[NASA-CR-158846] N79-28880

STRESS (PHYSIOLOGY)
Stress management: A comparison of educational, aerobic and autosuggestive approaches
N79-28875

Stress factors on pilot performance. Citations from the International Aerospace Abstracts data base
[NTIS/PS-79/0506/0] N79-28878

STRESS (PSYCHOLOGY)
Stress management: A comparison of educational, aerobic and autosuggestive approaches
N79-28875

Stress factors on pilot performance. Citations from the International Aerospace Abstracts data base
[NTIS/PS-79/0506/0] N79-28878

STRESS ANALYSIS
Computer design synthesis of a below knee-Syme prosthesis
A79-44300

SUBJECT INDEX

SURFACTANTS

Adaptation to chronic hyperoxia in the rat - A study of pulmonary surfactant, tissue levels of superoxide dismutases and histology
A79-46603

SURVIVAL EQUIPMENT

Cold water survival suits for aircrew
[ARL/SYS-NOTE-56] N79-28882

SYMPATHETIC NERVOUS SYSTEM

The role of the neurohormone system of the Hypothalamus in physiology and pathology --- Russian book
A79-43835

T

TASKS

A study of the available evidence on duration effects on comfort and task proficiency under vibration
A79-46399

THERMAL CONDUCTIVITY

Thermal conduction effects in human skin. 1:
Experimental data acquisition
[AD-A068479] N79-28871
Thermal conduction effects in human skin. 3:
Influence of epidermal thickness and exposure time
[AD-A068481] N79-28872

THERMAL POLLUTION

Results of benthic studies at Calvert Cliffs
[PB-294261/3] N79-29788

THERMOREGULATION

Hyperthermia and exercise --- plasma fluid and electrolyte effects on human thermoregulation
A79-44775

THRESHOLDS (PERCEPTION)

Temporary threshold shift from transportation noise
A79-46286

TIME DEPENDENCE

A study of the available evidence on duration effects on comfort and task proficiency under vibration
A79-46399

TOMOGRAPHY

Computed axial tomography (CAT)
[ISS-R-78/4] N79-29791

TOXICITY

Toxicity of high density jet fuel components
[AD-A068596] N79-28870

TRACKING (POSITION)

Test of the 10 bits/sec channel-capacity hypothesis for human tracking
A79-45771

TRANSIENT RESPONSE

Retinal site of transient tritanopia
A79-46623

TREADMILLS

The evolutionary pattern of exercise-induced ST segment depression
A79-44166

TUMORS

Toxicity of high density jet fuel components
[AD-A068596] N79-28870

U

ULTRAVIOLET RADIATION

An ultraviolet light induced bacteriophage in Beneckea gazogenes --- organism growth on precambrian earth
A79-46463

URINALYSIS

Circadian rhythm of electrolyte uresis in healthy persons
A79-46681

V

VECTORCARDIOGRAPHY

The application of vectorcardiography to aerospace medicine
A79-46602

VESTIBULES

Sensory illusions of vestibular origin
A79-46596
The vestibule and flying --- pilot disorientation
A79-46598

VIBRATION EFFECTS

A study of the available evidence on duration effects on comfort and task proficiency under vibration

A79-46399

VIKING MARS PROGRAM

Some comments on interpretations of Viking biological experiments

A79-46465

VISUAL PERCEPTION

Changes in optokinetic, postoptokinetic, and reverse postoptokinetic nystagmus after bilateral labyrinthectomy

A79-46499

Sensory illusions - The ophthalmologist's point of view

A79-46595

Retinal site of transient tritanopia

A79-46623

Eye torsion and visual tilt are mediated by different binocular processes

A79-46651

W

WALKING MACHINES

Stabilization of the horizontal motion of a bipedal walking robot

A79-44081

WEIGHT REDUCTION

Computer design synthesis of a below knee-Syme prosthesis

A79-44300

WORDS (LANGUAGE)

Attempt to describe a class of man-machine dialogue systems based on a natural language

A79-44057

WORKLOADS (PSYCHOPHYSIOLOGY)

Crew workload assessment. Development of a measure of operator workload
[AD-A068616]

N79-28884

X

X RAY ANALYSIS

Computed axial tomography (CAT)
[ISS-R-78/4]

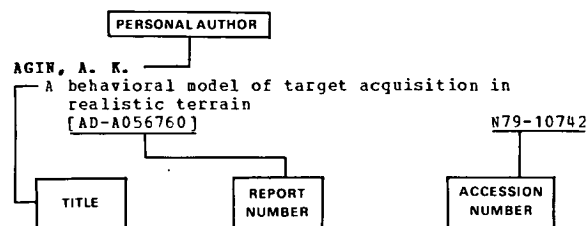
N79-29791

PERSONAL AUTHOR INDEX

AEROSPACE MEDICINE AND BIOLOGY / A Continuing Bibliography (Suppl. 199)

NOVEMBER 1979

Typical Personal Author Index Listing



The title of the document is used to provide the user with a brief description of the subject matter. The NASA or AIAA accession number is included in each entry to assist the user in locating the abstract in the abstract section of this supplement. If applicable, a report number is also included as an aid in identifying the document.

A

- ABBATUCCI, J.-S.**
Pulmonary functional tolerance to ionizing radiation - An experimental study
A79-46601
- AKSENOV, S. I.**
Some comments on interpretations of Viking biological experiments
A79-46465
- ALVAR, R. S.**
Computer design synthesis of a below knee-Syme prosthesis
A79-44300
- ANDERSON, H.**
BIOSPEX: Biological space experiments, a compendium of life sciences experiments carried on US spacecraft
[NASA-TN-58217]
N79-29784
- AWDEH, M. R.**
The evolutionary pattern of exercise-induced ST segment depression
A79-44166

B

- BAEHR, E. P.**
Intraocular pressure reduction and regulation system
[NASA-TN-79187]
N79-28881
- BAEV, V. I.**
Epiphysis of rats under the combined action of hypoxia, hypercapnia and cooling
A79-46680
- BAILEY, M.**
Insulated firefighters' crash-crew rescue boots and components: Field and laboratory evaluation
[AD-A068264]
N79-29795
- BARET, A.**
Adaptation to chronic hyperoxia in the rat - A study of pulmonary surfactant, tissue levels of superoxide dismutases and histology
A79-46603
- BECK, E. A.**
Selective attention: The influences of subject sex and degree of prior habituation on performance of an attention task with distraction
N79-28876
- BENTON, E. V.**
Effects of high-LET neon /Ne-20/ particle radiation on the brain, eyes and other head structures of the pocket mouse - A histological study
A79-44798

- BERTASH, V. I.**
Epiphysis of rats under the combined action of hypoxia, hypercapnia and cooling
A79-46680
- BINWARD, B.**
Quantitative analysis of mating behavior in aging male *Drosophila melanogaster*
A79-44799
- BLANC, P.**
Sensory illusions of vestibular origin
A79-46596
- BORAH, J.**
Sensory mechanism modeling
[AD-A069439]
N79-29796
- BOULIER, A.**
Pulmonary functional tolerance to ionizing radiation - An experimental study
A79-46601
- BRINKHUS, H. B.**
Skin-resistance measuring device with higher resolution
A79-45476
- BROMSKILL, P. H.**
Inadequacy of prebiotic synthesis as origin of proteinous amino acids
A79-45643
- BROUSSOLLE, B.**
Adaptation to chronic hyperoxia in the rat - A study of pulmonary surfactant, tissue levels of superoxide dismutases and histology
A79-46603
- BURKE, K. A.**
Technology advancement of an oxygen generation subsystem
[NASA-CR-152257]
N79-28883
- BURBET, H.**
Adaptation to chronic hyperoxia in the rat - A study of pulmonary surfactant, tissue levels of superoxide dismutases and histology
A79-46603
- BURNETT, J. E.**
Intraocular pressure reduction and regulation system
[NASA-TN-79187]
N79-28881

C

- CARGO, D.**
Results of benthic studies at Calvert Cliffs
[PB-294261/3]
N79-29788
- CASSOU, B.**
Effects of high-LET neon /Ne-20/ particle radiation on the brain, eyes and other head structures of the pocket mouse - A histological study
A79-44798
- CHAHINE, R. A.**
The evolutionary pattern of exercise-induced ST segment depression
A79-44166
- CHEVALERAUD, J.-P.**
Sensory illusions - The ophthalmologist's point of view
A79-46595
- CHIANTA, H. A.**
Thermal conduction effects in human skin. 1: Experimental data acquisition
[AD-A068479]
N79-28871
- Thermal conduction effects in human skin. 3: Influence of epidermal thickness and exposure time
[AD-A068481]
N79-28872
- CLARK, B. C.**
Solar-driven chemical energy source for a Martian biota
A79-46464

CLARKE, M. J.

A study of the available evidence on duration effects on comfort and task proficiency under vibration

A79-46399

COLIN, J.

The physiologist's view of sensory illusions

A79-46597

CURRY, R. P.

Sensory mechanism modeling
[AD-A069439]

N79-29796

CZELUSIAK, J.

On investigating the statistical properties of the populous path algorithm by computer simulation - Counterconclusions to those of Tateno and Nei

A79-45640

D

DEUTSCH, S.

BIOSPEX: Biological space experiments, a compendium of life sciences experiments carried on US spacecraft
[NASA-TN-58217]

N79-29784

DIDIER, A.

The electrocardiogram recorded by telemetry during a parachute jump, compared to a trace during stress tests - A preliminary study of 29 cases

A79-46600

DINABURG, A. D.

The role of the neurohormone system of the hypothalamus in physiology and pathology

A79-43835

E

ECONOMOS, A. C.

Quantitative analysis of mating behavior in aging male *Drosophila Melanogaster*

A79-44799

EGAMI, F.

Polymers produced by heating an amino acid mixture in sea water enriched with transition elements

A79-46461

EISENHAN, J.

Isolation of a shock-induced circulating cardiodepressant substance

A79-46967

ELANGOVAN, P. T.

Computer design synthesis of a below knee-Syme prosthesis

A79-44300

F

FABRE, J.

Pulmonary functional tolerance to ionizing radiation - An experimental study

A79-46601

FELDER, S. P.

Intraocular pressure reduction and regulation system
[NASA-TN-79187]

N79-28881

FELDMAN, A. G.

Central and reflex mechanisms of controlling movements

A79-43950

FELLER, D. D.

Insulin-like effect of bovine growth hormone in vivo as demonstrated by oxidation of C/14-U-glucose in diabetic rats

A79-44797

FLIEDNER, T. M.

Cell biology basis for the life of an organism in the radiation field
[ANL-TRANS-1152]

N79-29786

FOLIGUET, B.

Adaptation to chronic hyperoxia in the rat - A study of pulmonary surfactant, tissue levels of superoxide dismutases and histology

A79-46603

FUTERMAN, W. A.

Circadian rhythm of electrolyte uresis in healthy persons

A79-46681

G

GENTILE, F. P.

Computed axial tomography (CAT)
[ISS-R-78/4]

N79-29791

GHISTA, D. W.

Computer design synthesis of a below knee-Syme prosthesis

A79-44300

GOLDFARB, R. D.

Isolation of a shock-induced circulating cardiodepressant substance

A79-46967

GOLUBEVA, L. IU.

Effect of adaptation to high-altitude hypoxia on cardiac adrenoreactivity and the state of the adenylcyclase and phosphodiesterase systems in the myocardium

A79-46500

GONCHAROVA, E. I.

Some forms of adaptation to extreme influences in the blood system

A79-46679

GOODMAN, H.

On investigating the statistical properties of the populous path algorithm by computer simulation - Counterconclusions to those of Tateno and Nei

A79-45640

GOTTENBOS, J. J.

Aspects of dietary prevention of arteriosclerosis

N79-29792

GOURAS, P.

Enhancement of luminance flicker by color-opponent mechanisms

A79-44582

GREENLEAF, J. E.

Hyperthermia and exercise

A79-44775

H

HARRISON, E. A.

Cardiovascular diseases, volume 3. A bibliography with abstracts
[NTIS/PS-79/0063/2]

N79-28874

HAUN, C. C.

Toxicity of high density jet fuel components
[AD-A068596]

N79-28870

HAUTTEMENT, J.-L.

Pulmonary functional tolerance to ionizing radiation - An experimental study

A79-46601

HAYMAKER, W.

Effects of high-LET neon /Ne-20/ particle radiation on the brain, eyes and other head structures of the pocket mouse - A histological study

A79-44798

HEIDELBAUGH, H. D.

Maximizing storage stability of foods to be used for resupply in a controlled ecological life supply system: Evaluation of research
[NASA-CR-158846]

N79-28880

HELD, R.

Eye torsion and visual tilt are mediated by different binocular processes

A79-46651

HENKE, R. P.

Effects of high-LET neon /Ne-20/ particle radiation on the brain, eyes and other head structures of the pocket mouse - A histological study

A79-44798

HEPPNER, D. B.

Electrochemically regenerable carbon dioxide absorber
[NASA-CR-152099]

N79-29794

HESS, R. A.

A structural model of the adaptive human pilot
[AIAA 79-1784]

A79-45411

HIEGEL, H.

Results of benthic studies at Calvert Cliffs
[PB-294261/3]

N79-29788

HILTENBRAND, C.

The electrocardiogram recorded by telemetry during a parachute jump, compared to a trace during stress tests - A preliminary study of 29 cases

A79-46600

- HOFFLER, G. W.
Skylab medical data evaluation program (SMEDEP)
[NASA-CR-160279] N79-28869
- HOLLAND, A. P.
Results of benthic studies at Calvert Cliffs
[PB-294261/3] N79-29788
- HOLMGREN, E.
Human processing of information and the
computerized mode of presentation: Ergonomic
parameters
[FOA-C-56018-H9] N79-29797
- HOLMQUIST, R.
Molecular phylogenetic trees - On the validity of
the Goodman-Moore augmentation algorithm
A79-45645
- HOUGE, J. C.
Portable device for detection of petit mal epilepsy
A79-46226
- HUNTOON, C. L.
Skylab medical data evaluation program (SMEDEP)
[NASA-CR-160279] N79-28869

- ILLE, H.
The electrocardiogram recorded by telemetry during
a parachute jump, compared to a trace during
stress tests - A preliminary study of 29 cases
A79-46600

J

- JOHNSON, J. E., JR.
Effects of high-LET neon /Ne-20/ particle
radiation on the brain, eyes and other head
structures of the pocket mouse - A histological
study
A79-44798
- JOUFFRAY, L.
The electrocardiogram recorded by telemetry during
a parachute jump, compared to a trace during
stress tests - A preliminary study of 29 cases
A79-46600

K

- KABUTO, M.
Temporary threshold shift from transportation noise
A79-46286
- KAMHISKAIA, G. A.
Some forms of adaptation to extreme influences in
the blood system
A79-46679
- KARCHEVSKI, P.
Effect of adaptation to high-altitude hypoxia on
cardiac adrenoreactivity and the state of the
adenylcyclase and phosphodiesterase systems in
the myocardium
A79-46500
- KARREL, M.
Maximizing storage stability of foods to be used
for resupply in a controlled ecological life
supply system: Evaluation of research
[NASA-CR-158846] N79-28880
- KAUMBEYER, K.
Results of benthic studies at Calvert Cliffs
[PB-294261/3] N79-29788
- KELLY, M. A.
Effects of high-LET neon /Ne-20/ particle
radiation on the brain, eyes and other head
structures of the pocket mouse - A histological
study
A79-44798
- KESSLER, S.
Quantitative analysis of mating behavior in aging
male *Drosophila melanogaster*
A79-44799
- KEYSERLING, W. M.
Isometric strength testing in selecting workers
for strenuous jobs
N79-29790
- KINZEY, S. L.
Skylab medical data evaluation program (SMEDEP)
[NASA-CR-160279] N79-28869
- KOBOZEV, G. V.
Some forms of adaptation to extreme influences in
the blood system
A79-46679

- KOCHER, D. C.
Dose-rate conversion factors for external exposure
to photon and electron radiation from
radionuclides occurring in routine releases from
nuclear fuel cycle facilities
[NUREG/CR-0494] N79-28873
- KORIUKIN, V. E.
Changes in optokinetic, postoptokinetic, and
reverse postoptokinetic nystagmus after
bilateral labyrinthectomy
A79-46499

- KRAFT, L. E.
Effects of high-LET neon /Ne-20/ particle
radiation on the brain, eyes and other head
structures of the pocket mouse - A histological
study
A79-44798

- KRAUZE, E. G.
Effect of adaptation to high-altitude hypoxia on
cardiac adrenoreactivity and the state of the
adenylcyclase and phosphodiesterase systems in
the myocardium
A79-46500

- KRINKEVICH, E. I.
Circadian rhythm of electrolyte uresis in healthy
persons
A79-46681

- KUZNETSOV, P. I.
Mathematical model of the respiration rhythm
generation process
A79-46268

- KVALSETH, T. O.
Test of the 10 bits/sec channel-capacity
hypothesis for human tracking
A79-45771

L

- LARIN, V. B.
Stabilization of the horizontal motion of a
bipedal walking robot
A79-44081

- LATEGOLA, M. T.
A lower body negative pressure box for +Gz
simulation in the upright seated position
[AD-A069326] N79-28868

- LAUTA, A. D.
The role of the neurohormone system of the
hypothalamus in physiology and pathology
A79-43835

- LEE, M. K.
Technology advancement of an oxygen generation
subsystem
[NASA-CR-152257] N79-28883

- LEE, M. W.
A stochastic model of muscle fatigue in frequent
strenuous work cycles
N79-29789

- LEGUAY, G.
The application of vectorcardiography to aerospace
medicine
A79-46602

- LEWIS, J. L., JR.
Operator performance and localized muscle fatigue
in a simulated space vehicle control task
[NASA-TN-58220] N79-28867

- LOPESDASILVA, P. L.
General activities related to medical research
[TNO-MFI-PR-6] N79-29793

- LUCHI, R. J.
The evolutionary pattern of exercise-induced ST
segment depression
A79-44166

M

- MACEWEN, J. D.
Toxicity of high density jet fuel components
[AD-A068596] N79-28870

- MAKARCHENKO, A. F.
The role of the neurohormone system of the
hypothalamus in physiology and pathology
A79-43835

- MARCHAL, L.
Adaptation to chronic hyperoxia in the rat - A
study of pulmonary surfactant, tissue levels of
superoxide dismutases and histology
A79-46603

- MARGULIS, L.**
An ultraviolet light induced bacteriophage in
Beneckea gazogenes A79-46463
- MARSHALL, R. D.**
Electrochemically regenerable carbon dioxide
absorber [NASA-CR-152099] N79-29794
- MARTINEZ, J. A.**
Development of information theory concepts and
equations for human mental processing [AD-A068606] N79-28877
- MAZON, S.**
Attempt to describe a class of man-machine
dialogue systems based on a natural language A79-44057
- MCGANNON, W. J.**
Intraocular pressure reduction and regulation system
[NASA-TM-79187] N79-28881
- MEERSON, F. Z.**
Effect of adaptation to high-altitude hypoxia on
cardiac adrenoreactivity and the state of the
adenylcyclase and phosphodiesterase systems in
the myocardium A79-46500
- MICHEL, P.**
Adaptation to chronic hyperoxia in the rat - A
study of pulmonary surfactant, tissue levels of
superoxide dismutases and histology A79-46603
- MIQUEL, J.**
Quantitative analysis of mating behavior in aging
male Drosophila Melanogaster A79-44799
- MNAYER, M.**
The evolutionary pattern of exercise-induced ST
segment depression A79-44166
- MOORE, G. W.**
On investigating the statistical properties of the
populous path algorithm by computer simulation -
Counterconclusions to those of Tateno and Nei A79-45640
- MOROZOV, L.**
Mirror symmetry breaking in biochemical evolution A79-46462
- MOUNTFORD, N. K.**
Results of benthic studies at Calvert Cliffs
[PB-294261/3] N79-29788
- MOURIK, J.**
Binding of biologically active agents to plasma
proteins [CL-1977-22] N79-29787
- N**
- NEI, M.**
Goodman et al.'s method for augmenting the number
of nucleotide substitutions A79-45639
Augmentation algorithm - A reply to Holmquist A79-45644
- NEKRASOVA, V. M.**
Mathematical model of the respiration rhythm
generation process A79-46268
- NEVEROV, V. P.**
Changes in optokinetic, postoptokinetic, and
reverse postoptokinetic nystagmus after
bilateral labyrinthectomy A79-46499
- NEVILLE, E. D.**
Insulin-like effect of bovine growth hormone in
vivo as demonstrated by oxidation of
C/14/-U-glucose in diabetic rats A79-44797
- O**
- OKIHANA, H.**
Polymers produced by heating an amino acid mixture
in sea water enriched with transition elements A79-46461

P

- PERREROUD, J.-P.**
The electrocardiogram recorded by telemetry during
a parachute jump, compared to a trace during
stress tests - A preliminary study of 29 cases A79-46600
- PERSIDSKII, IU. V.**
Circadian rhythm of electrolyte uresis in healthy
persons A79-46681
- PESQUIES, P.-C.**
The electrocardiogram recorded by telemetry during
a parachute jump, compared to a trace during
stress tests - A preliminary study of 29 cases A79-46600
- PHILPOTT, D. E.**
Effects of high-LET neon /Ne-20/ particle
radiation on the brain, eyes and other head
structures of the pocket mouse - A histological
study A79-44798
- PIERGALLINI, J. R.**
Thermal conduction effects in human skin. 1:
Experimental data acquisition [AD-A068479] N79-28871
Thermal conduction effects in human skin. 3:
Influence of epidermal thickness and exposure time
[AD-A068481] N79-28872
- PSHENNIKOVA, M. G.**
Effect of adaptation to high-altitude hypoxia on
cardiac adrenoreactivity and the state of the
adenylcyclase and phosphodiesterase systems in
the myocardium A79-46500
- R**
- RAPPLER, H.**
Cell biology basis for the life of an organism in
the radiation field [ANL-TRANS-1152] N79-29786
- RAIZNER, A. E.**
The evolutionary pattern of exercise-induced ST
segment depression A79-44166
- RAMBLER, M.**
An ultraviolet light induced bacteriophage in
Beneckea gazogenes A79-46463
- ROSIER, S.-P.**
The electrocardiogram recorded by telemetry during
a parachute jump, compared to a trace during
stress tests - A preliminary study of 29 cases A79-46600
- RUMMEL, J. A.**
Skylab medical data evaluation program (SHEDEP)
[NASA-CR-160279] N79-28869
BIOSPEX: Biological space experiments, a
compendium of life sciences experiments carried
on US spacecraft [NASA-TM-58217] N79-29784
- S**
- SABETTA, F.**
Computed axial tomography (CAT) [ISS-R-78/4] N79-29791
- SAPONOV, V. A.**
Mathematical model of the respiration rhythm
generation process A79-46268
- SAGUY, I.**
Maximizing storage stability of foods to be used
for resupply in a controlled ecological life
supply system: Evaluation of research [NASA-CR-158846] N79-28880
- SCHMIDT, D. K.**
Pilot-optimal augmentation of the air-to-air
tracking task [AIAA 79-1747] A79-45388
- SCHUBERT, P. H.**
Technology advancement of an oxygen generation
subsystem [NASA-CR-152257] N79-28883
Electrochemically regenerable carbon dioxide
absorber [NASA-CR-152099] N79-29794

SCRIMSHIRE, D. A.
A revised model of gas transport in human lungs
A79-45768

SEIFERT, D. J. R.
Combined discrete network-continuous control
modeling of man-machine systems
N79-28879

SEIGNEURIC, A.
The application of vectorcardiography to aerospace
medicine
A79-46602

SHINIZU, M.
Carbon suboxide and the genetic code
A79-44865

SMITH, R. G.
Portable device for detection of petit mal epilepsy
A79-46226

STEINBACH, K. H.
Cell biology basis for the life of an organism in
the radiation field
[ANL-TRANS-1152]
N79-29786

STOLL, A. H.
Thermal conduction effects in human skin. 1:
Experimental data acquisition
[AD-A068479]
N79-28871
Thermal conduction effects in human skin. 3:
Influence of epidermal thickness and exposure time
[AD-A068481]
N79-28872

STRUNZA, H. V.
The influence of intermittent aircraft noise on
sleep. I
A79-46599

SUZUKI, S.
Temporary threshold shift from transportation noise
A79-46286

SYLVESTER, S. H.
Stress management: A comparison of educational,
aerobic and autosuggestive approaches
N79-28875

T

TADEUSIEWICZ, R.
Attempt to describe a class of man-machine
dialogue systems based on a natural language
A79-44057

TATENO, Y.
Goodman et al.'s method for augmenting the number
of nucleotide substitutions
A79-45639
Augmentation algorithm - A reply to Holmquist
A79-45644

TENHOOR, P.
Aspects of dietary prevention of arteriosclerosis
N79-29792

TRENT, C. C.
A lower body negative pressure box for +Gz
simulation in the upright seated position
[AD-A069326]
N79-28868

TROI, V.
Computed axial tomography (CAT)
[ISS-R-78/4]
N79-29791

TROITSKAIA, N. A.
Some forms of adaptation to extreme influences in
the blood system
A79-46679

U

UDDGARD, A.
Biologically active short-chain peptides
[FOA-C-40063-C1]
N79-29785

V

VALETON, J. H.
Retinal site of transient tritanopia
A79-46623

VAN MORREN, D.
Retinal site of transient tritanopia
A79-46623

VANHEIJNSBERGEN, B.
General activities related to medical research
[TNO-MPI-PR-6]
N79-29793

VERGROESEN, A. J.
Aspects of dietary prevention of arteriosclerosis
N79-29792

VERHOT, E. H.
Toxicity of high density jet fuel components
[AD-A068596]
N79-28870

VILLOTA, R.
Maximizing storage stability of foods to be used
for resupply in a controlled ecological life
supply system: Evaluation of research
[NASA-CR-158846]
N79-28880

VINOGRADOVA, L. N.
Relationship between the reproduction tactics and
the major indices of speech
retention-reproduction processes
A79-46276

VOGEL, P. S.
Effects of high-LET neon /Ne-20/ particle
radiation on the brain, eyes and other head
structures of the pocket mouse - A histological
study
A79-44798

W

WALTER, P. V.
Skin-resistance measuring device with higher
resolution
A79-45476

WANNER, J.-C.
The vestibule and flying
A79-46598

WEBER, P.
Isolation of a shock-induced circulating
cardiodepressant substance
A79-46967

WEBSTER, J. G.
Portable device for detection of petit mal epilepsy
A79-46226

WHITE, G. R.
Cold water survival suits for aircrew
[ARL/SYS-NOTE-56]
N79-28882

WOESE, C. R.
A proposal concerning the origin of life on the
planet earth
A79-45641

WOLF, J. D.
Crew workload assessment. Development of a
measure of operator workload
[AD-A068616]
N79-28884

WOLPE, J. H.
Eye torsion and visual tilt are mediated by
different binocular processes
A79-46651

WOLLENBERGER, A.
Effect of adaptation to high-altitude hypoxia on
cardiac adrenoreactivity and the state of the
adenylcyclase and phosphodiesterase systems in
the myocardium
A79-46500

WONG, J. T.-P.
Inadequacy of prebiotic synthesis as origin of
proteinous amino acids
A79-45643

WOODS, R. R.
Electrochemically regenerable carbon dioxide
absorber
[NASA-CR-152099]
N79-29794

WYNVEEN, R. A.
Technology advancement of an oxygen generation
subsystem
[NASA-CR-152257]
N79-28883

Y

YOUNG, L. R.
Sensory mechanism modeling
[AD-A069439]
N79-29796

Z

ZEMAN, W.
Effects of high-LET neon /Ne-20/ particle
radiation on the brain, eyes and other head
structures of the pocket mouse - A histological
study
A79-44798

ZOLLARS, G. F.
Stress factors on pilot performance. Citations
from the International Aerospace Abstracts data
base
[NTIS/PS-79/0506/0]
N79-28878

ZOZULIAKOVA, S. V.

PERSONAL AUTHOR INDEX

ZOZULIAKOVA, S. V.

Epiphysis of rats under the combined action of
hypoxia, hypercapnia and cooling

A79-46680

ZRENNER, E.

Enhancement of luminance flicker by
color-opponent mechanisms

A79-44582

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