



Aerospace Medicine
and Biology
A Continuing
Bibliography
with Indexes

NASA SP-7011(256)
March 1984



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ACCESSION NUMBER RANGES

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

STAR (N-10000 Series) N84-12027 - N84-14108

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AEROSPACE MEDICINE AND BIOLOGY

**A CONTINUING BIBLIOGRAPHY
WITH INDEXES**

(Supplement 256)

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 February 1984 in

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

NASA SP-7011 and its supplements are available from the National Technical Information Service (NTIS). Questions on the availability of the predecessor publications, Aerospace Medicine and Biology (Volumes I - XI) should be directed to NTIS.

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INTRODUCTION

This Supplement to *Aerospace Medicine and Biology* lists 224 reports, articles and other documents announced during February 1984 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA)*. The first issue of the bibliography was published in July 1964.

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 by *STAR* categories 51 through 55, the Life Sciences division. The citations include the original accession numbers from the respective announcement journals. The *IAA* items will precede the *STAR* items within each category.

Six indexes -- subject, personal author, corporate source, contract, report number, and accession number -- are included.

An annual index will be prepared at the end of the calendar year covering all documents listed in the 1984 Supplements.

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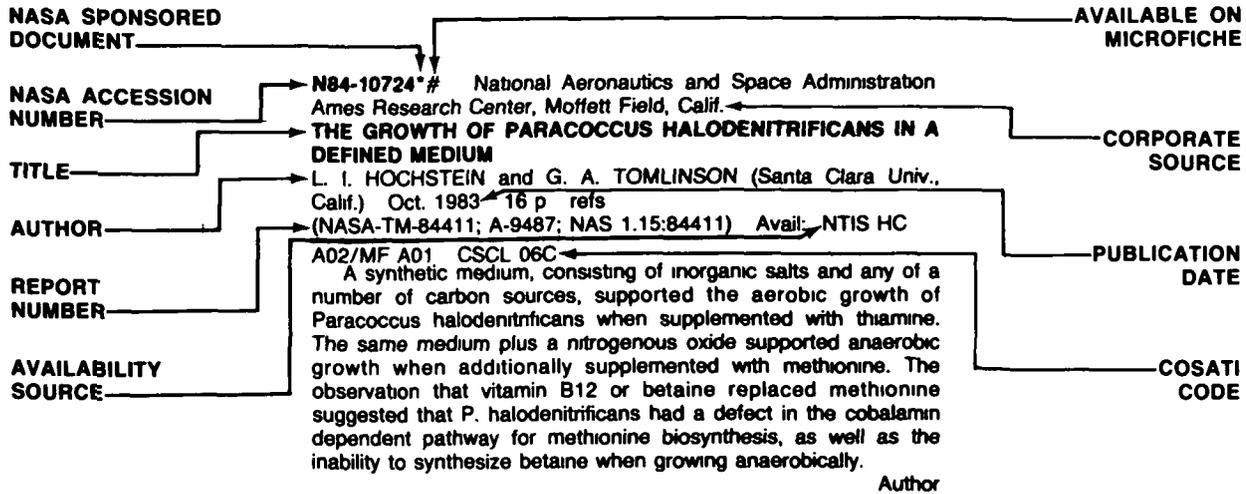
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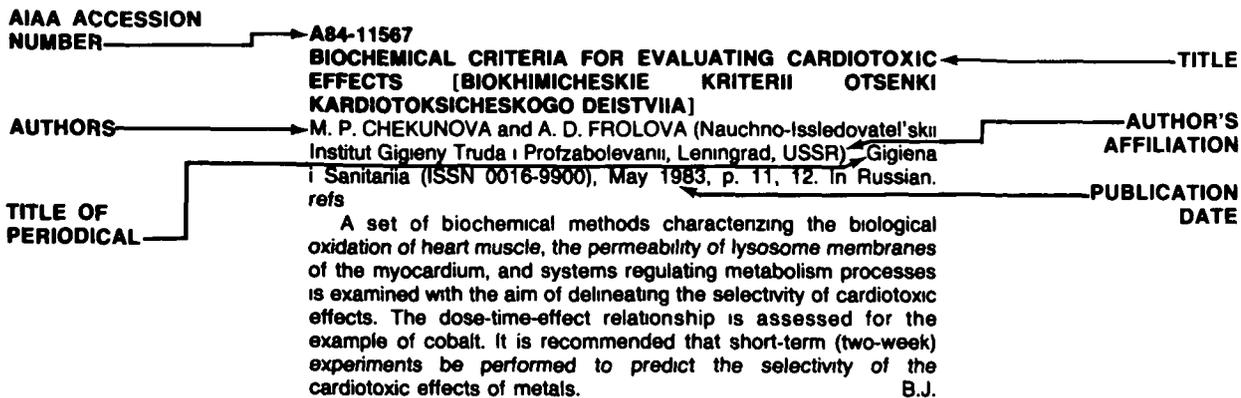
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AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 256)

MARCH 1984

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LIFE SCIENCES (GENERAL)

Includes genetics.

A84-13141

SIMPLE-OPPONENT RECEPTIVE FIELDS ARE ASYMMETRICAL - G-CONE CENTERS PREDOMINATE

C. R. INGLING, JR. and E. MARTINEZ-URIEGAS (Ohio State University, Columbus, OH) *Optical Society of America, Journal* (ISSN 0030-3941), vol. 73, Nov. 1983, p. 1527-1532 refs (Contract NIH-EY-03236)

For quantitative models of color vision, the R-cone contribution to the r-g channel is less than half of the R-cone contribution to the V(λ) channel. There is currently no explanation of how this different contribution of R cones to the two channels comes about. An asymmetrical receptive-field arrangement to explain the difference in weighting is proposed. Because cones in receptive-field surrounds are weighted less than cones in centers, placing R cones predominantly in surrounds and G cones in centers provides a simple differential weighting mechanism. Electrophysiological and psychophysical evidence substantiates such an asymmetry of simple-opponent fields. Author

A84-13413

PROTEIN INHIBITORS AS REGULATORS OF PROTEOLYSIS PROCESSES [BELKOVYE INHIBITORY KAK REGULATORY PROTSESSOV PROTEOLIZA]

V. V. MOSOLOV Moscow, *Izdatel'stvo Nauka*, 1983, 41 p. In Russian refs

A survey is made of data on a special group of proteins which act as inhibitors of proteolytic enzymes. Attention is given to the amino acid composition, primary structure, physicochemical properties, and specificity of these inhibitors. Particular emphasis is placed on the mechanism of the interaction between protein inhibitors and enzymes. Probable physiological functions of protease inhibitors in animal and plant organisms are also considered. B.J.

A84-13420

HUMAN MORPHOLOGY [MORFOLOGIJA CHELOVEKA]

B. A. NIKITIUK, ED. and V. P. CHTETSOV, ED. Moscow, *Izdatel'stvo Moskovskogo Universiteta*, 1983, 320 p. In Russian.

This is the first Soviet textbook to collect and systematize the data on the variations in human organs and systems of organs that have to do with age, sex, ethnic background (and region of the country), and profession. The organs considered include the skin, the skeleton, the brain, the spinal cord, and the blood. Extensive data are included on physical development, on constitutions, and on the composition of the body. Various applied aspects of morphological investigations are discussed. No individual items are abstracted in this volume. C.R.

A84-13476

STRUCTURAL AND FUNCTIONAL CHARACTERISTICS OF NEUTROPHILIC LEUKOCYTES AND THEIR ROLE IN INFLAMMATORY AND IMMUNE RESPONSE FORMATION [STRUKTURNO-FUNKSIONAL'NAIA KHARAKTERISTIKA NEITROFIL'NYKH LEIKOTSITOV I IKH ROL' V FORMIROVANII VOSPALITEL'NYKH I IMMUNNYKH PROTSESSOV]

V. S. PAUKOV and O. IA. KAUFMAN (I Moskovskii Meditsinskii Institut, Moscow, USSR) *Arkhiv Patologii* (ISSN 0004-1955), vol. 45, no. 5, 1983, p. 3-13 In Russian. refs

A84-13478

QUANTITATIVE MORPHOLOGY IN STUDIES OF THE REGULARITIES OF CHRONOPATHOLOGY [KOLICHESTVENNAIA MORFOLOGIJA V IZUCHENII ZAKONOMERNOSTEI KHRONOPATOLOGII]

G. G. AVTANDILOV (Tsentral'nyi Institut Uovershenstvovaniia Vrachei, Moscow, USSR) *Arkhiv Patologii* (ISSN 0004-1955), vol. 45, no. 5, 1983, p. 60-63 In Russian

The fundamental principles of quantitative morphology which make possible an objective investigation of chronopathology are reviewed. Consideration is given to the three principal types of chronopathology connected with changes in the development rate, dyschronization, and dyscyclicity of pathomorphological processes. Mathematical models of the principal types of chronopathology are described. B.J.

A84-13479

CURRENT CONCEPTS OF THE ROLE OF THE VEGETATIVE NERVOUS SYSTEM IN CARDIOVASCULAR PATHOLOGY [SOVREMENNYE PREDSTAVLENIIA O ROLI VEGETATIVNOI NERVNOI SISTEMY V SERDECHNO-SOSUDISTOI PATOLOGII]

V. N. SHVALEV and A. A. SOSUNOV (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) *Arkhiv Patologii* (ISSN 0004-1955), vol. 45, no. 5, 1983, p. 73-78. In Russian. refs

Data on the time course of changes in different heart tissues due to primary lesions of the nervous system are examined, with consideration given to disorders caused by the irritation of different parts of the nervous system, especially the vegetative part. Tissue changes occurring after partial or complete denervation of the organ are investigated. Also considered are secondary changes of the nervous apparatus of the heart. In particular it is shown that myocardial infarction or the development of rheumatic heart defect are followed by the reaction of the intracardial nerve plexus, sometimes resulting in their partial destruction which aggravates the course of the disease. B.J.

A84-13480

FUNCTIONAL MORPHOLOGY AND METABOLIC CHARACTERISTICS OF TISSUE BASOPHILS AND BASOPHILIC GRANULOCYTES OF THE BLOOD [FUNKSIONAL'NAIA MORFOLOGIJA I METABOLICHESKAIA KHARAKTERISTIKA TRANEVYKH BAZOFILOV I BAZOFIL'NYKH GRANULOTSITOV KROVI]

V. A. PROTSENKO and S. I. SHPAK (Krymskii Meditsinskii Institut, Simferopol, Ukrainian SSR) *Uspekhi Sovremennoi Biologii* (ISSN 0042-1324), vol. 95, May-June 1983, p. 408-420. In Russian. refs

A84-13481

STRUCTURAL-FUNCTIONAL ASPECTS OF THE CONTRACTILITY OF THE VASCULAR ENDOTHELIUM [STRUKTURNO-FUNKTSIONAL'NYE ASPEKTY SOKRATIMOSTI SOSUDISTOGO ENDOTELIIA]

IA. L. KARAGANOV, A. A. MIRONOV, and V. A. MIRONOV (II Moskovskii Gosudarstvennyi Meditsinskii Institut, Moscow; Ivanovskii Gosudarstvennyi Meditsinskii Institut, Ivanovo, USSR) *Uspekhi Sovremennoi Biologii* (ISSN 0042-1324), vol. 95, May-June 1983, p. 421-436. In Russian. refs

A84-13482

FACTORS DETERMINING THE FUNCTIONAL HETEROGENEITY OF VASOMOTOR EFFECTS [FAKTORY, OPREDELIAIUSHCHIE FUNKTSIONAL'NUIU RAZNORODNOST' VAZOMOTORYKH EFFEKTOV]

V. P. KULAGINA (Akademiia Meditsinskikh Nauk SSR, Moscow, USSR) and M. G. UDELNOV (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR) *Uspekhi Sovremennoi Biologii* (ISSN 0042-1324), vol. 95, May-June 1983, p. 437-452. In Russian. refs

An analysis is made of conditions facilitating the change in the functional sign of reactions of isolated vascular segments to humoral effects. It is suggested that the specific character of adrenergic-receptor behavior may be determined by vasomotor reactions that are heterogeneous in terms of functional directionality depending on the condition and reactive properties of vessel walls as conditioned by the character of exchange and the effect of external factors. This point of view is substantiated by experimental data obtained using graded electrical stimulation of vessel walls.

B. J.

A84-13483

TRANSPLANTING OF SECTIONS AND CELLS OF NERVE TISSUE INTO THE BRAIN AND THE PROBLEM OF FUNCTION RECOVERY [TRANSPLANTATSIIA UCHASTKOV I KLETOR NERVNOI TKANI V GOLOVNOI MOZG I PROBLEMA VOSSTANOVLEENIIA FUNKTSII]

L. V. POLEZHAEV (Akademiia Nauk SSSR, Institut Obshchei Genetiki, Moscow, USSR) *Uspekhi Sovremennoi Biologii* (ISSN 0042-1324), vol. 95, May-June 1983, p. 453-469. In Russian. refs

A84-13484

OXYGEN AS AN INHIBITOR OF THE NITRITE-REDUCTASE ACTIVITY OF HEMOGLOBIN [KISLOROD KAK INGIBITOR NITRITREDUKTAZNOI AKTIVNOSTI GEMOGLOBINA]

V. P. REUTOV, IA. I. AZHIPA, and L. P. KAIUSHIN (Akademiia Nauk SSSR, Institut Vysshei Nervnoi Deiatel'nosti and Institut Khimicheskoi Fiziki, Moscow, USSR) *Akademiia Nauk SSSR, Izvestiia, Seria Biologicheskaiia* (ISSN 0002-3329), May-June 1983, p. 408-418. In Russian. refs

A84-13485

INVESTIGATION OF ORGAN HEMODYNAMICS IN CONDITIONS OF CONTROLLED PERFUSION [ISSLEDOVANIE ORGANNOI GEMODINAMIKI V USLOVIAKH UPRAVLIAEMOI PERFUZII]

V. P. NEFEDOV, I. V. IARYGINA, G. A. DORRER, R. A. GAREEV, and T. D. KIM (Akademiia Nauk SSSR, Institut Fiziki, Krasnoyarsk, USSR; Akademiia Nauk Kazakhskoi SSR, Institut Fiziologii, Alma-Ata, Kazakh SSR) *Akademiia Nauk SSSR, Izvestiia, Seria Biologicheskaiia* (ISSN 0002-3329), May-June 1983, p. 440-450. In Russian. refs

The hemodynamic parameters of an isolated part of an organism (the hind third of a dog) were investigated in the course of four-hour normothermal perfusion with preliminary one-hour hypothermal perfusion at a temperature of 14 C and an arterial pressure of 40 mm Hg. Data are presented in arterial and venous series, where the normo- and hypothermal regimes are combined with a stepwise pressure change within part of the range of the physiological norm. A mathematical model is developed which expresses the quantitative relationships between pressure change, blood flow, and peripheral vascular resistance.

B. J.

A84-13486

A COMPONENT MODEL OF HUMAN LYMPHOCYTE BLAST TRANSFORMATION STIMULATED BY PHYTOHEMAGGLUTININ [KOMPONENTNAIA MODEL' BLASTTRANSFORMATSII LIMFOTSITOV CHELOVEKA, STIMULIROVANNYKH FITOGEMAGGLUTININOM]

V. P. VOITENKO, IU. V. PAKIN, and A. A. CHERNIAVSKAIA (Akademiia Meditsinskikh Nauk SSSR, Kiev, Ukrainian SSR) *Tsitologii i Genetika* (ISSN 0041-4883), vol. 17, May-June 1983, p. 19-23. In Russian. refs

A84-13487

EFFECT OF THE INTRA-TRACHEAL INJECTION OF GAMMA-GLOBULIN ON MITOTIC ACTIVITY AND THE PROLIFERATIVE POOL OF THE LYMPHOID CELLS OF THE RESPIRATORY ORGANS [VLIANIE INTRATRAKHEAL'NOGO VVEDENIIA GAMMA-GLOBULINA NA MITOTICHESKUIU AKTIVNOST' I PROLIFERATIVNYI PUL LIMFOIDNYKH KLETOK ORGANOV DYKHANIIA]

V. K. SYRTSOV and IU. A. KRIVOKRISENKO (Zaporozhskii Meditsinskii Institut, Zaporozhe, Ukrainian SSR) *Tsitologii i Genetika* (ISSN 0041-4883), vol. 17, May-June 1983, p. 23-26. In Russian. refs

A84-13488

THE EFFECT OF THYMOSIN ON THE ULTRASTRUCTURE OF RAT BONE MARROW [DEISTVIE TIMOZINA NA UL'TRASTRUKTURU KOSTNOGO MOZGA KRYS]

L. A. ZOTIKOV, IU. A. GRINEVICH, and T. P. SEGEDA (Kievskii Nauchno-Issledovatel'skii Institut Rentgenologii, Radiologii i Onkologii, Kiev, Ukrainian SSR) *Tsitologii i Genetika* (ISSN 0041-4883), vol. 17, May-June 1983, p. 26-32. In Russian. refs

A84-13741

THE EFFECT OF WEIGHTLESSNESS ON CELL-MORPHOLOGY CHANGES DURING MICROSPOROGENESIS IN TRADESCANTIA PALUDOSA IN EXPERIMENTS ON VOSTOK-3, 4, 5, 6; VOSKHOD-1; AND COSMOS-110, 368 [VLIANIE NEVESOMOSTI NA IZMENENIE MORFOLOGII KLETOK PRI MIKROSPOROGENEZE U TRADESCANTIA PALUDOSA V OPYTAKH NA KORABLIKH-SPUTNIKAKH 'VOSTOK-3, 4, 5, 6', 'VOSKHOD-1', 'KOSMOS-110, 368']

N. L. DELONE, V. V. ANTIPOV, and B. I. DAVYDOV *Kosmicheskie Issledovaniia* (ISSN 0023-4206), vol. 21, Sept.-Oct. 1983, p. 785-791. In Russian. refs

A84-13821

OPTICAL RECORDING OF ACTION POTENTIALS FROM VERTEBRATE NERVE TERMINALS USING POTENTIOMETRIC PROBES PROVIDES EVIDENCE FOR SODIUM AND CALCIUM COMPONENTS

B. M. SALZBERG, A. L. OBAID, D. M. SENSEMAN, and H. GAINER (Pennsylvania, University, Philadelphia, PA; National Institutes of Health Laboratory of Neurochemistry and Neuroimmunology, Bethesda, MD; Marine Biological Laboratory, Woods Hole, MA) *Nature* (ISSN 0028-0836), vol. 306, Nov 3, 1983, p. 36-40. refs (Contract PHS-NS-16824; PHS-DE-05271)

A84-13825* Indiana Univ., Bloomington SULPHUR ISOTOPIC COMPOSITIONS OF DEEP-SEA HYDROTHERMAL VENT ANIMALS

B. FRY, H. GEST, and J. M. HAYES (Indiana University, Bloomington, IN) *Nature* (ISSN 0028-0836), vol. 306, Nov 3, 1983, p. 51, 52. refs (Contract NSF OCE-80-24895; NSF PCM-79-10747; NGR-15-003-118)

The S-34/S-32 ratios of tissues from vestimentiferan worms, brachiuran crabs, and giant clams living around deep hydrothermal vents are reported. Clean tissues were dried, ground, suspended in 0.1 M LiCl, shaken twice at 37 C to remove seawater sulfates, dried at 60 C, combusted in O₂ in a Parr bomb. Sulfur was recovered as BaSO₄, and the isotopic abundances in SO₂ generated by thermal decomposition of 5-30-mg samples were

determined using an isotope-ratio mass spectrometer. The results are expressed as delta S-34 and compared with values measured in seawater sulfates and in normal marine fauna. The values ranged from -4.7 to 4.7 per thousand, comparable to vent sulfide minerals (1.3-4.1 per thousand) and distinct from seawater sulfates (20.1 per thousand) and normal marine fauna (about 13-20 per thousand). These results indicate that vent sulfur rather than seawater sulfur is utilized by these animals, a process probably mediated by chemoautotrophic bacteria which can use inorganic sulfur compounds as energy sources. T.K.

A84-13906#**THE SCIENTIFIC UTILISATION OF BIORACK**

D. MESLAND (ESA, Special Projects Div, Noordwijk, Netherlands) ESA Bulletin (ISSN 0376-4265), no. 36, Nov. 1983, p. 48-55.

The characteristics and behavior of cells in a microgravity field will be examined with equipment on the Biorack experimental rack on the Spacelab D-1 flight. It is known that cells exhibit directional activity, which may have developed in response to a gravitational field. However, it is not known if the gravity information is processed in real time, in a feedback loop, or is built into the cellular system through previous experience with gravity. The Biorack will hold two incubators, a glove box, and a freezer/cooler unit. Controlled temperature conditions, together with centrifugal control of the gravitational force, will be available with the Biorack, which will have a duplicate module at the launch site for control group experimentation. Minute morphological changes will be detected through chemical fixation methods for examinations post-flight. Planned studies include cell proliferation, function, interaction, and differentiation experiments, and embryogenesis experiments.

M.S.K.

A84-13914**BRAIN PEPTIDES - WHAT, WHERE, AND WHY?**

D. T. KRIEGER (Mount Sinai Medical Center, New York, NY) Science (ISSN 0036-8075), vol. 222, Dec 2, 1983, p. 975-985. Research supported by the Lita Annenberg Hazen Charitable Trust. refs

(Contract NIH-NS-02893)

Within the past decade, a large number of peptides have been described within the vertebrate central nervous system. Some of these peptides were previously known to be present in nonneural vertebrate tissues, as well as in lower species, in which they may serve as primitive elements of intercellular communication prior to the development of neuronal or endocrine systems. In vertebrates, these peptides are thought to have neurotransmitter or neuromodulatory roles and appear to be involved in the regulation of a number of homeostatic systems, although the mechanisms of their actions are still unclear. Author

A84-14600**RESPONSES OF PRIMATE RETINAL GANGLION CELLS TO MOVING SPECTRAL CONTRAST**

P. GOURAS and H. EGGERS (Columbia University, New York, NY) Vision Research (ISSN 0042-6989), vol. 23, no. 10, 1983, p. 1175-1182. Research supported by the National Retinitis Pigmentosa Foundation and Foundation of St. Giles the Cripple. refs

(Contract NIH-EY-02591)

Recordings were made of the responses of single neurons in macaque and rhesus retinae to a brightness and contrast controlled moving border. The stimuli were presented on a screen in front of the eyes of the anesthetized monkeys. Each cell's receptive field was mapped on a tangent screen. Trials were run with stationary, flashing monochromatic lights obtained with filters and with moving white/yellow and red/green borders of different brightnesses. Cell action potentials were recorded. The responses of 55 retinal ganglion cells were tracked. The white/yellow borders at minimum brightness contrast were not detected by the red/green opponent and phasic nonopponent cells, while the red/green cells did respond at a threshold level of brightness contrast as the border crossed their receptive field. Only the red/green opponent

cells and the nonopponent phasic on-center cells responded to the red/green contrast at the maximum and minimum brightness contrast. It is suggested that the blue/yellow opponent system has a less effective role in spatial resolution than does the red/green opponent system, and that the phasic ganglion cells are receptive to a rod and red/green input, but not a blue/yellow input, which has a neural pathway that does not influence rods or other cones. M.S.K.

A84-14790**METABOLIC CHANGES IN BLOOD UNDER TRAUMATIC SHOCK [METABOLICHESKIE IZMENENIIA V KROVI PRI TRAVMATICHESKOM SHOKE]**

V. I. SHEPOTINOVSKII and Z. I. MIKASHINOVICH (Rostovskii Meditsinskii Institut, Rostov-on-Don, USSR) Patologicheskaiia Fiziologiia i Eksperimental'naia Terapiia (ISSN 0031-2991), Sept.-Oct. 1983, p. 5-9. In Russian. refs

An experiment on dogs with traumatic shock shows that phosphorylase activity in whole venous blood drops while the activity of glucose-6-phosphate isomerase increases. The longer shock-hypotension lasts, the more marked are the enzymatic shifts, resulting in a statistically significant reduction of the glycolytic coefficient. Severe shock is accompanied by an increase in the amount of bound water in the blood; in mild shock, the free-water content increases while the content of bound water decreases. It is also shown that, in shock-resistant animals, hexokinase and glucose-6-phosphate dehydrogenase activity in leukocytes decreases in the erectile phase, the glucose content increases, and the lactate level drops. B.J.

A84-14791**FATTY-ACID COMPOSITION OF BLOOD-PLASMA LIPIDS UNDER TRAUMATIC SHOCK [SOSTAV ZHIRNYKH KISLOT OBSHCHIKH LIPIDOV PLAZMY KROVI PRI TRAVMATICHESKOM SHOKE]**

V. E. NIKOLAEV (Rostovskii Meditsinskii Institut, Rostov-on-Don, USSR) Patologicheskaiia Fiziologiia i Eksperimental'naia Terapiia (ISSN 0031-2991), Sept.-Oct. 1983, p. 9-12. In Russian. refs

A84-14792**THE EFFECT OF EPITHALAMINE ON THE COURSE OF TRAUMATIC SHOCK IN RATS [VLIANIE EPITALAMINA NA TECHENIE TRAVMATICHESKOGO SHOKA U KRYS]**

V. D. SLEPUSHKIN, V. KH. KHAVINSON, and V. G. MOROZOV (Akademiia Meditsinskikh Nauk SSSR, Tomsk, USSR) Patologicheskaiia Fiziologiia i Eksperimental'naia Terapiia (ISSN 0031-2991), Sept.-Oct. 1983, p. 12-15. In Russian. refs

It was shown that the administration of epithalamine improved the water-salt and acid-alkaline balance in rats subjected to shock caused by soft-tissue crushing. The mortality of the rats was reduced by half and the life span was increased. It was also shown that sodium hydroxybutyrate produced a mild positive effect on the parameters investigated. It is concluded that epithalamine shows promise as a measure for the prevention and treatment of traumatic shock. B.J.

A84-14793**INVESTIGATION OF THE DYNAMICS OF THE DIURNAL RHYTHM OF PAIN SENSITIVITY IN RATS AND HUMANS [IZUCHENIE DINAMIKI DNEVNOGO RITMA BOLEVOI CHUVSTVITEL'NOSTI U KRYS I CHELOVEKA]**

E. O. BRAGIN and R. A. DURINIAN (Tsentral'nyi Nauchno-Issledovatel'skii Institut Refleksoterapii, Moscow, USSR) Patologicheskaiia Fiziologiia i Eksperimental'naia Terapiia (ISSN 0031-2991), Sept.-Oct. 1983, p. 22-25. In Russian. refs

Pain sensitivity in rats, as measured by the hot-plate method, after exposure to stress is shown to be significantly lower in the evening than in the morning. No significant differences in the morning and evening values after exposure to stress were revealed in measurements of the latent periods of the tail flick reaction. In humans, pain sensitivity was shown to be significantly lower in the morning than in the evening. A biochemical investigation shows that the decrease in pain sensitivity in rats in the evening is

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accompanied by a statistically significant increase in the noradrenaline level in the brain, while the serotonin concentration remains unchanged. B.J.

A84-14794

CHANGES IN THE SERUM-COMPLEMENT ACTIVITY DURING THE EARLY PERIODS OF EXPERIMENTAL MYOCARDIAL INFARCTION IN DOGS [IZMENENIE AKTIVNOSTI SYVOROTOCHNOGO KOMPLEMENTA V RANNIE SROKI EKSPERIMENTAL'NOGO INFARKTA MIOKARDA U SOBAK]

I. A. GUKASIAN and A. V. MASIUKEVICH (Vsesoiuznyi Nauchno-Issledovatel'skii Institut Biosinteza Bilkovykh Veshchestv, Moscow, USSR) *Patologicheskaiia Fiziologiia i Eksperimental'naia Terapiia* (ISSN 0031-2991), Sept.-Oct. 1983, p. 37-40. In Russian. refs

A84-14795

THE ROLE OF CYCLIC NUCLEOTIDES IN THE PATHOGENESIS OF ACUTE HYPOXIA [ROL' TSIKLICHESKIKH NUKLEOTIDOV V PATOGENEZE OSTROI GIPOKSII]

L. B. BURAVKOVA, E. S. MAILIAN, and E. A. KOVALENKO (Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR) *Patologicheskaiia Fiziologiia i Eksperimental'naia Terapiia* (ISSN 0031-2991), Sept.-Oct. 1983, p. 40-43. In Russian. refs

Investigations were made of the cAMP and cGMP levels in the cerebral hemispheres and blood plasma of rats raised for 30 minutes to an 'altitude' of 10,000 m in a hypobaric chamber as well as in the blood plasma of a human given a 11-percent O₂ mixture to breathe for 20 minutes. Results showed that, in the initial period of acute oxygen deficiency, the cAMP increased first in the tissues and then in the blood. Subsequently, the level of this substance in the cells began to decrease, while the cGMP level either remained unchanged or increased. Possible mechanisms underlying these changes are discussed as well as their connection with bioenergetic processes in the tissues during acute hypoxia. B.J.

A84-14796

THE ROLE OF HYPOPHYSIS IN THE ADAPTATION OF THE MICROCIRCULATORY SYSTEM TO SINGLE AND REPEATED STRESS [ROL' GIPOFIZA V ADAPTATSII MIKROTSIRKULIATORNOI SISTEMY K ODNOKRATNOMU I POVTORNOMU STRESSU]

M. P. GORIZONTOVA (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) and I. U. B. DESHEVOI (Ministerstvo Zdravookhraneniia, Institut Biofiziki, Moscow, USSR) *Patologicheskaiia Fiziologiia i Eksperimental'naia Terapiia* (ISSN 0031-2991), Sept.-Oct. 1983, p. 43-46. In Russian. refs

Experiments performed on 30 male Wistar rats were used to assess the role of hypophysis in the adaptation of the microcirculatory system to single and repeated stress. It is shown that neither single nor repeated immobilization stress causes the development of adaptational changes in the microcirculatory system of the mesentery of hypophysectomized rats. B.J.

A84-14797

THE EFFECT OF HYPOKINESIA ON INDICATORS OF THE ANTIOXIDANT SYSTEM AND FREE-RADICAL OXIDATION IN RATS [VLIANIE GIPOKINEZII NA POKAZATELI ANTIKSIDANTNOI SISTEMY I SVOBODNORADIKAL'NOGO OKISLENIIA U KRYS]

V. V. BRECHKO (Poltavskii Meditsinskii Stomatologicheskii Institut, Poltava, Ukrainian SSR) *Patologicheskaiia Fiziologiia i Eksperimental'naia Terapiia* (ISSN 0031-2991), Sept.-Oct. 1983, p. 56-59. In Russian. refs

A84-14870

TWO FRACTIONS OF CALCIUM CHANNELS IN THE FROG MYOCARDIUM [O NALICHII DVIKH FRAKTSII KAL'TSIEVYKH KANALOV V MIOKARDE LIAGUSHKI]

V. I. GENDVILENE, R. A. MACHIANSKENE, and E. V. NARUSHIAVICHIIUS (Kaunasskii Meditsinskii Institut, Kaunas, Lithuanian SSR) *Akademiia Nauk SSSR, Doklady* (ISSN 0002-3264), vol. 272, no. 5, 1983, p. 1247-1249. In Russian. refs

A84-14880

DISTURBANCE OF THE COMPENSATION OF THE CONSEQUENCES OF DELABYRINTHATION UNDER THE EFFECT OF A HYPERBARIC NITROGEN-OXYGEN MIXTURE [NARUSHENIE KOMPENSATSII POSLEDSTVII DELABIRINTATSII PRI VOZDEISTVII GIPERBARICHESKOI AZOTNO-KISLORODNOI SMESI]

V. P. ZAGRIADSKII, G. I. GORGILADZE, and A. N. VETOSH (Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow; Akademiia Nauk SSSR, Institut Evolutsionnoi Fiziologii i Biokhimi, Leningrad, USSR) *Akademiia Nauk SSSR, Doklady* (ISSN 0002-3264), vol. 272, no. 6, 1983, p. 1506-1509. In Russian. refs

The effect of a hyperbaric nitrogen-oxygen mixture on guinea pigs that were subjected to unilateral delabyrinthation was investigated with reference to the effect of various hyperbaric factors on the underwater activity of humans. It was shown that an elevated nitrogen pressure caused a marked disturbance of the compensation condition in the animals. In addition, the biological effect of elevated nitrogen pressure on the central nervous system was shown to be complex and nonuniform in character. B.J.

A84-14901

INVESTIGATION OF MOLECULAR MECHANISMS OF THE RADIATION-INDUCED DEATH OF LYMPHOID CELLS - RADIO-PROTECTIVE EFFECT OF CYSTEAMINE ON THYMOCYTE SUBPOPULATIONS, DIFFERING IN RADIO SENSITIVITY [ISSLEDOVANIE MOLEKULIARNYKH MEKHANIZMOV RADIATIONNOI GIBELI LIMFOIDNYKH KLETOK - RADIOZASHCHITNOE DEISTVIE TSISTEAMINA NA SUBPOPULIATSII TIMOTSITOV, RAZLICHAIUSHCHIESIA PO RADIOCHUVSTVITEL'NOSTI]

V. A. SOLDATENKOV, N. I. SOROKINA, I. V. FILIPPOVICH, and E. F. ROMANTSEV (Ministerstvo Zdravookhraneniia SSSR, Institut Biofiziki, Moscow, USSR) *Radiobiologiia* (ISSN 0033-8192), vol. 23, Sept.-Oct. 1983, p. 585-589. In Russian. refs

A84-14902

CORRELATION BETWEEN THE RADIO SENSITIVITY OF THE ANIMAL ORGANISM AND THE CHARACTERISTICS OF THE REASSOCIATION KINETICS OF ITS DNA [O KORRELIATSII MEZHDU RADIOCHUVSTVITEL'NOST'IU ZHIVOTNOGO ORGANIZMA I OSOBNOSTIAMI KINETIKI REASSOTSIIATSII EGO DNK]

L. A. KALASHNIKOVA, G. A. KRITSKII, and I. O. KONONOV (Akademiia Nauk SSSR, Institut Biokhimi, Moscow, USSR) *Radiobiologiia* (ISSN 0033-8192), vol. 23, Sept.-Oct. 1983, p. 595-598. In Russian. refs

A84-14903

MOLECULAR MECHANISMS OF THE RADIO-PROTECTIVE EFFECT OF BENZOTHIADIAZOLE DERIVATIVES [MOLEKULIARNYE MEKHANIZMY RADIOZASHCHITNOGO DEISTVIIA PROIZVODNYKH BENZOTIADIAZOLOV]

V. G. VLADIMIROV, V. K. MUKHOMOROV, I. U. E. STRELNIKOV, N. S. TSEPOVA, and A. V. KOKUSHKINA (Voenno-Meditsinskaiia Akademiia, Leningrad, USSR) *Radiobiologiia* (ISSN 0033-8192), vol. 23, Sept.-Oct. 1983, p. 616-619. In Russian. refs

The relationship between the radio-protective efficiency of substituted benzothiadiazoles and their electronic characteristics is analyzed on the basis of gamma-ray-irradiation experiments performed on white mice. It is shown that the protective effect of

these substances correlates with their ability to participate in electron transfer. It is determined that this protective effect comes into play through the formation of metal complexes in which benzothiadiazole molecules are ligands. The protective effect is shown to increase with the increasing complex-formation energy and the diffusion motility of radio-protector molecules B.J.

A84-14904
CERTAIN REGULARITIES OF THE CHANGE OF THE RELATIVE NUMBER OF HEMOPOIETIC STEM CELLS UNDER LONG-TERM IRRADIATION AT DIFFERENT DOSE RATES [NEKOTORYE ZAKONOMERNOSTI IZMENENIIA OTNOSITEL'NOGO CHISLA STVOLOVYKH KROVOTVORNYYKH KLETOK PRI PROTIAZHennom OBLUCHENII S RAZLICHNOI MOSHCHNOST'IU DOZY]

A. V. SHAFIRKIN (Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR) Radiobiologiya (ISSN 0033-8192), vol. 23, Sept.-Oct. 1983, p. 630-636. In Russian. refs

A84-14905
THE ATP CONTENT OF MITOCHONDRIA AND RADIATION-INDUCED DISTURBANCE OF THE ENERGY METABOLISM [UROVEN' VNUTRIMITOKHONDRIAL'NOGO ATF I RADIATSIONNOE NARUSHENIE ENERGETICHESKOGO OBMENA]

V. IA. KALACHEVA and T. E. PAVLOVSKAIA (Akademiia Nauk SSSR, Institut Biokhimi, Moscow, USSR) Radiobiologiya (ISSN 0033-8192), vol. 23, Sept.-Oct. 1983, p. 662-664. In Russian. refs

The radio-protective efficiency of endogenous ATP was investigated in pea (*Pisum sativum*) mitochondria. It is shown that mitochondria with a high ATP content endured less damage and had higher respiratory control and ADP/O ratio. Experiments on mitochondria with different postirradiation concentrations of ATP show the radio-protective effect to be associated with the repair process. B.J.

A84-14906
CHANGES IN THE PH OF CHINESE-HAMSTER CELLS IRRADIATED AT DIFFERENT DOSES [IZMENENIE PH KLETOK KITAISKOGO KHOMIACHKA POSLE OBLUCHENIIA V RAZNYKH DOZAKH]

A. M. VEKSLER, O. V. DEGTIAREVA, and L. N. KUBLIK (Akademiia Nauk SSSR, Institut Biologicheskoi Fiziki, Pushchino, USSR) Radiobiologiya (ISSN 0033-8192), vol. 23, Sept.-Oct. 1983, p. 664-667. In Russian. refs

A84-14907
THE EFFECT OF MICROWAVES ON THE POSTSYNAPTIC-MEMBRANE MODEL [DEISTVIE SVERKHVYSOKOCHASTOTNYKH ELEKTROMAGNITNYKH VOLN NA MODEL' POSTSYNAPTICHESKOI MEMBRANY]

I. G. AKOEV, O. V. KOLOMYTKIN, and V. I. KUZNETSOV (Akademiia Nauk SSSR, Institut Biologicheskoi Fiziki, Pushchino, USSR) Radiobiologiya (ISSN 0033-8192), vol. 23, Sept.-Oct. 1983, p. 670-672. In Russian. refs

An experiment was conducted to study the effect of microwaves on the electroconductivity of ionic channels formed in a postsynaptic-membrane model at a specific absorbed power of 200 + or - 50 W/kg. It is shown that the microwave field produces an increase in the conductivity of ionic channels formed by the synaptic membrane fragments which bind glutamate in a bilayer lipid membrane. Attention is given to the possibility that the data can be explained by the selective heating of the whole membrane or a small region of the cell solution adjacent to the membrane. B.J.

A84-14908
CHANGES IN THE CIRCADIAN RHYTHM OF THE HYPOTHALAMUS-HYPOPHYSIS-ADRENAL SYSTEM A LONG TIME AFTER IRRADIATION [OB IZMENENII SUTOCHNOGO RITMA GIPOTALAMO-GIPOFIZ-ADRENALOVOI SISTEMY V OTDALENNYE SROKI POSLE OBLUCHENIIA]

E. A. PROKUDINA (Ministerstvo Zdravookhraneniia SSSR, Tsentral'nyi Nauchno-Issledovatel'skii Rentgeno-Radiologicheskii Institut, Leningrad, USSR) Radiobiologiya (ISSN 0033-8192), vol. 23, Sept.-Oct. 1983, p. 689-691. In Russian. refs

A84-14909
RADIO SENSITIVITY OF THE ORGANISM DURING THE IRRADIATION OF ANIMALS IN AN ALTERED GASEOUS ENVIRONMENT - THE EFFECT OF REPEATED SHORT-TERM BREATHING OF PURE OXYGEN ON THE RADIO SENSITIVITY OF ANIMALS [RADIOCHUVSTVITEL'NOST' ORGANIZMA PRI OBLUCHENII ZHIVOTNYKH V IZMENENNOI GAZOVOI SREDE - VLIANIE POVTORNOGO KRATKOVREMENNAGO DYKHANIIA CHISTYM KISLORODOM NA RADIOCHUVSTVITEL'NOST' ZHIVOTNYKH]

M. V. VASIN and L. V. KOROLEVA Radiobiologiya (ISSN 0033-8192), vol. 23, Sept.-Oct. 1983, p. 692, 693. In Russian.

A84-14910
CHANGES IN MOUSE SKIN AT EARLY AND LATE TIMES AFTER EXPOSURE TO X-RAYS AND ACCELERATED HELIUM IONS [IZMENENIE KOZHII MYSHEI V RANNIE I POZDNIYE SROKI POSLE VOZDEISTVIA RENTGENOVSKOGO IZLUCHENIIA I USKORENNYKH IONOV GELIIA]

N. IA. SAVCHENKO (Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR) Radiobiologiya (ISSN 0033-8192), vol. 23, Sept.-Oct. 1983, p. 694, 695. In Russian.

A84-14911
THE RESPONSE OF PIGS TO TOTAL-BODY GAMMA-IRRADIATION [REAKTSIIA POROSIAT NA TOTAL'NOE GAMMA-OBLUCHENIE]

L. B. KOZNOVA, L. K. TIKHOMIROVA, V. V. ZNAMENSKII, O. A. DOBRYNINA, A. V. TEREKHOV, V. I. SUSLIKOV, and V. S. GRAMMATIKATI (Ministerstvo Zdravookhraneniia SSSR, Institut Biofiziki, Moscow, USSR) Radiobiologiya (ISSN 0033-8192), vol. 23, Sept.-Oct. 1983, p. 696-699. In Russian. refs

Clinical manifestations of radiation sickness in pigs exposed to gamma irradiation within a wide range of doses are examined. LD50/30 was approximately 2.82 Gy after short-term total-body irradiation; the nonuniformity coefficient was 1.2. B.J.

A84-14974
THE VVEDENSKII PARADOX IN CONTEMPORARY PHYSIOLOGY [PARADOKS VVEDENSKOGO V SOVREMENNOI FIZIOLOGII]

D. P. MATIUSHKIN (Leningradskii Gosudarstvennyi Universitet, Leningrad, USSR) Priroda (ISSN 0032-874X), Oct. 1983, p. 28-33. In Russian

Many inhibitory nervous mechanisms are now known in detail. There exist, however, also forms of inhibition in the nervous system which are not yet well understood. An example of an inhibition which was not understood until recently represents the inhibition of nerve reaction in response to an increase in the intensity of the stimulus. This type of inhibition has been discovered by Vvedenskii at the beginning of the century. Ordinarily an intensification of stimuli will intensify the response of the nerve. However, under the particular conditions of the experiment conducted by Vvedenskii, the intensification of the stimuli resulted in a weakening of the nervous response. These conditions involved a treatment of the nerve with cocaine or other agents. Attention is given to studies which have only now provided an explanation of the mechanism involved in the considered exhibition phenomenon. G.R.

A84-14993

A STUDY OF THE CHOLINERGIC MECHANISMS OF ADAPTIVE CARDIAC RESPONSES IN DIVING MAMMALS [ISSLEDOVANIE KHOLINERGICHESKIKH MEKHAZIMOV PRISPOBITEL'NYKH REAKTSII SERDTSA NYRIAUSHCHIKH MLEKOPITAUSHCHIKH]

V. P. GALANTSEV, S. G. KOVALENKO, and S. M. POPOV (Leningradskii Gosudarstvennyi Universitet, Leningrad, USSR) Zhurnal Evolutsionnoi Biokhimi i Fiziologii (ISSN 0044-4529), vol. 19, May-June 1983, p. 251-255. In Russian refs

A84-14994

THE EFFECT OF HYPOTHALAMUS ON THE DIURNAL PATTERN OF THE HEART RHYTHM IN THE FROG RANA TEMPORARIA [VLIANIE GIPOTALAMUSA NA SUTOCHNIU DINAMIKA SERDECHNOGO RITMA LIAGUSHKI RANA TEMPORARIA]

I. G. KARMANOVA, A. I. BELICH, and N. V. SHILLING (Akademiia Nauk SSSR, Institut Evolutsionnoi Fiziologii i Biokhimi, Leningrad, USSR) Zhurnal Evolutsionnoi Biokhimi i Fiziologii (ISSN 0044-4529), vol. 19, May-June 1983, p. 282-288. In Russian. refs

A84-14995

A MEMORY MODEL BASED ON THE PLASTICITY OF INHIBITORY NEURONS [MODEL' PAMIATI NA OSNOVE PLASTICHNOSTI TORMOZNYKH NEIRONOV]

A. A. FROLOV and G. I. SHULGINA (Akademiia Nauk SSSR, Institut Vysshei Nervnoi Deiatel'nosti i Neurofiziologii, Moscow, USSR) Biofizika (ISSN 0006-3029), vol. 28, May-June 1983, p. 475-480. In Russian. refs

Attention is given to a stochastic memory model based on the net of excitatory and inhibitory neurons, the learning ability of the model being due to the decrease of the reactivity of the inhibitory elements. The memory capacity of such a neuron net is assessed in relation to its structure parameters. It is shown that, in a certain region of parameter variation, the information capacity of this net considerably exceeds that of a memory based on the plasticity of excitatory neurons. B.J.

A84-14996

PRESSURE DISTRIBUTION IN THE CRANIAL CAVITY [O RASPREDELENIИ DAVLENIИ V POLOSTI CHEREPA]

E. I. PALTSEV (Akademiia Nauk SSSR, Institut Problem Peredachi Informatsii, Moscow, USSR) Biofizika (ISSN 0006-3029), vol. 28, May-June 1983, p. 489-493. In Russian. refs

Determinations were made of the absolute values of interstitial fluid pressure in surface layers of the human brain and of the pressure of the cerebrospinal fluid 'bathing' the brain. The results indicate a difference in these pressures. A spherical-model analysis shows that intratissue structural (biomechanical) connections as well as connections between the brain, its membranes and the cranium, play an important role in weakening the transmission of cerebrospinal fluid pressure to the cortex and surface layers of the brain. B.J.

A84-14997

THE STATE OF CELLULAR FACTORS OF IMMUNITY IN THE ADAPTATION BY ANIMALS TO ALPINE REGIONS AND THE DYNAMICS OF RADIATION SICKNESS [SOSTOIANIE KLETOCHNYKH FAKTOROV IMMUNITETA V PROTSESSE ADAPTATSII ZHIVITNYKH K VYSOKOGOR'IU I DINAMIKE LUCHEVOI BOLEZNI]

B. MOLDOTASHEV, F. S. MUSTAFINA, and M. A. NAGAEVA (Kirgizskii Gosudarstvennyi Meditsinskii Institut, Frunze, Kirgiz SSR) Zdravookhranenie Kirgizii, May-June 1983, p. 13-17. In Russian

A84-14999

PHYSIOLOGICAL AND CLINICAL EFFECTS OF LOCAL NEGATIVE PRESSURE [FIZIOLOGICHESKIE I KLINICHESKIE EFFEKTY LOKAL'NOGO OTRITSATEL'NOGO DAVLENIИ]

I. G. VLASOVA, I. L. KISLITSYN (Universitet Druzhby Narodov, Moscow, USSR), and A. V. KOROBKOV Uspekhi Fiziologicheskikh Nauk (ISSN 0301-1798), vol. 14, July-Sept. 1983, p. 66-91. In Russian refs

A survey is given of studies concerning the application of local decompression to overcome fatigue, to restore physical work capacity in athletes, and to train aircraft pilots for orthostatic stability and astronauts for adaptation to hypoxia. Data are presented which suggest that local negative pressure (LNG) has a stimulating effect on the plastic and energy exchange and functional condition of developing-brain cells. In a discussion of the mechanisms underlying the LNG effect, it is suggested that LNG increases pressure in blood vessels in the decompression zone, increases the number of functioning capillaries, intensifies blood flow, and activates mechanisms of transmembrane exchange in the blood-tissue system. B.J.

A84-15000

THE ROLE OF BINDING PROTEINS IN SUBSTANCE-ABSORPTION PROCESSES [ROL' SVIAZIVAIUSHCHIKH BELKOV V PROTSESSAKH VSASYVANIИ VESHCHESTV]

V. K. BAUMAN (Akademiia Nauk Latvinskoi SSR, Institut Biologii, Salaspils, Latvian SSR) Uspekhi Fiziologicheskikh Nauk (ISSN 0301-1798), vol. 14, July-Sept. 1983, p. 92-113. In Russian. refs

Published data on binding proteins which participate in processes of intestinal absorption are examined. Individual binding proteins are characterized, and their role in various stages of intestinal absorption is discussed: intestinal transport; binding with the mucosa surface, transport through membranes and cells of the intestinal epithelium, and the circulation of absorbed substances in the blood. Attention is given to data on the cellular localization of binding proteins in the mucosa, mechanisms underlying their effect in the intestinal-transport process, and the physiological regulation of their biosynthesis. B.J.

A84-15013

NEURONAL RESPONSES OF THE CAT FASTIGIAL NUCLEUS TO ACOUSTIC SIGNALS [REAKTSII NEIRONOV FASTIGIAL'NOGO IADRA KOSHKI NA ZVUKOVYE SIGNALY]

N. N. BEKHTEREV and I. N. KUDRIAVTSEVA (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol. 69, Sept. 1983, p. 1143-1149. In Russian. refs

A84-15014

INVESTIGATION OF THE EFFECT OF TEMPERATURE ON THE CHRONOTROPISM OF THE MYOCARDIUM IN WARM-BLOODED ANIMALS [ISSLEDOVANIE VLIANIИ TEMPERATURY NA KHONOTROPIIU MIOKARDA TEPLOKROVNYKH]

V. IA. IZAKOV, B. L. BYKOV, and S. M. RUTKEVICH (Ministerstvo Zdravookhraneniia RSFSR, Nauchno-Issledovatel'skii Institut Gigeny Truda i Professional'nykh Zabolevani, Sverdlovsk, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol. 69, Sept. 1983, p. 1188-1195. In Russian. refs

The effect of temperature (35, 25, and 20 C) on the interval-force characteristics of rabbit ventricular myocardium was investigated in the case of a random Gaussian sequence of stimulation intervals. The chronotropism is described using Volterra series and cross-correlation functions. It is shown that, at high temperature, calcium appears to enter the myoplasm from the extracellular pool, to be absorbed by the sarcoplasmic reticulum and released to activate contraction in succeeding cycles. At low temperature, part of the calcium entering from the extracellular pool directly activates contractions in the same cycle. B.J.

A84-15015

THE REACTION OF THE SELF-STIMULATION OF THE HYPOTHALAMUS IN CATS IN A NITROGEN-OXYGEN ENVIRONMENT AT ELEVATED PRESSURE [REAKTSIIA SAMORAZDRAZHENIIA GIPOTALAMUSA U KOSHEK V AZOTNO-KISLORODNOI SREDE POD POVYSHENNYM DAVLENIEM]

G. K. AKHMETOVA, E. L. POLIAKOV, and G. V. TROSHIKHIN (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol. 69, Sept. 1983, p. 1224-1226. In Russian. refs

A84-15016

SEASONAL VARIATIONS OF THE CONCENTRATIONS OF ACETYLCHOLINE AND NORADRENALINE AND THE SENSITIVITY TO THESE SUBSTANCES IN THE SMOOTH MUSCLES OF THE RAT INTESTINE [SEZONNYE IZMENENIIA SODERZHANIIA ATSETILKHOLINA I NORADRENALINA I CHUVSTVITEL'NOST' K ETIM VESHCHESTVAM GLADKOI MUSKULATURY TONKOI KISHKI KRYSI]

T. G. PUTINTSEVA, T. M. TURPAEV, and G. P. SELIVANOVA (Akademiia Nauk SSSR, Institut Biologii Razvitiia, Moscow, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol. 69, Sept. 1983, p. 1227-1230. In Russian. refs

A84-15018

RESPONSE OF SUPRAOPTIC AND PARAVENTRICULAR NUCLEI OF THE HYPOTHALAMUS TO COOLING IN RATS IN CONDITIONS OF AN ALTERED GASEOUS ENVIRONMENT [REAKTSIIA SUPRAOPTICHESKIKH I PARAVENTRIKULIARNYKH IADER GIPOTALAMUSA NA OKHLAZHDENIE KRYS V USLOVIIAKH IZMENENNOI GAZOVOI SREDE]

E. S. SERGEEVA and S. S. MOGUTOV (Leningradskii Pediatricheskii Meditsinskii Institut, Leningrad, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol. 69, Sept. 1983, p. 1238-1243. In Russian. refs

A84-15019

AGE-RELATED VARIATIONS OF RELATIVE AMOUNTS OF ADRENALINE AND NORADRENALINE IN RAT TISSUES [VOZRASTNYE IZMENENIIA SOOTNOSHENIIA ADRENALINA I NORADRENALINA V TKANIYAKH KRYS]

M. P. PROZOROVSKAIA (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol. 69, Sept. 1983, p. 1244-1247. In Russian. refs

A84-15020

A METHOD FOR INVESTIGATING INTERCELLULAR INTERACTION IN THE MYOCARDIUM [METOD ISSLEDOVANIIA MEZHKLETOCHNOGO VZAIMODEISTVIA V MIOKARDE]

V. S. MARKHASIN, A. V. ZINOV, and S. M. RUTKEVICH (Sverdlovskii Mezhhoblastnoi Kardiokhirurgicheskii Tsentr, Sverdlovsk, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol. 69, Sept. 1983, p. 1252-1255. In Russian.

A technique for investigating intercellular interaction in the myocardium is described which eliminates the diffusion and mechanical problems of previous devices and permits a detailed study of the local application of physiologically active substances. The design is based on the elimination of mechanical interaction between the end sections of the specimen and the complete elimination of the mixing of solutions bathing these sections. A block diagram of the device is presented, and attention is given to preliminary experiments using this device to study the propagation of the local effects of adrenaline on rabbit myocardium specimens. B.J.

A84-15043

ON CERTAIN MOLECULAR MECHANISMS RESPONSIBLE FOR CHANGES IN THE SENSITIVITY OF RAT KIDNEYS TO ALDOSTERONE IN THE CASE OF NEUROGENIC DYSTROPHIES OF THIS ORGAN [O NEKOTORYKH MOLEKULIARNYKH MEKHANIZMAKH IZMENENIIA CHUVSTVITEL'NOSTI POCHEK KRYS K AL'DOSTERONU PRI NEIROGENNYKH DISTROFIIAKH ETOGO ORGANA]

I. A. AKIMOV, I. A. AZHIPA, and A. A. RODIONOV (Akademiia Nauk SSSR, Institut Vysshei Nervnoi Deiatel'nosti i Neurofiziologii, Moscow, USSR) Zhurnal Obshchei Biologii (ISSN 0044-4596), vol. 44, May-June 1983, p. 353-360. In Russian. refs

A84-15044

POSSIBLE PRINCIPLE OF THE REGULATION OF THE DAMAGE AND DEFENSE REACTION OF THE CELL [O VOZMOZHNOI PRINTSIPE REGULIATSII POVREZHDENIIA I ZASHCHITNOI REAKTSII KLETKI]

E. I. MELEKHOV (VNIKhleskhoz, Ivanteevka, USSR) Zhurnal Obshchei Biologii (ISSN 0044-4596), vol. 44, May-June 1983, p. 386-397. In Russian. refs

A simple model and examples are used to illustrate the principle that, under stress conditions, metabolism provides energy and metabolites for cell damage, whose rate is regulated by the intensity of the metabolic processes. A number of nonspecific changes in the cell may be considered as a single reaction of the defensive inhibition of metabolism (DIM). In response to stress, the DIM reaction reduces the activity of many metabolic processes, inhibits the damage rate, and reduces the degree of damage, providing energy for compensatory and restorative processes. B.J.

A84-15046

MECHANISMS OF THE FUNCTIONAL ADAPTATION OF THE HEART TO HIGH-ALTITUDE CONDITIONS (A WORKING HYPOTHESIS) [MEKHANIZMY FUNKTSIONAL'NOI ADAPTATSII SERDTSA K VYSOKOGOR'IU /RABOCHAIA GIPOTEZA/]

A. KH. KARASAEVA (Akademiia Nauk Kirgizskoi SSR, Institut Fiziologii i Eksperimental'noi Patologii Vysokogor'ia, Frunze, Kirgiz SSR) Akademiia Nauk Kirgizskoi SSR, Izvestiia (ISSN 0002-3221), May-June 1983, p. 46-49. In Russian. refs

According to the proposed hypothesis, the functional adaptation of the heart to high-altitude conditions proceeds along an ascending line: from minimum to maximum fulfillment of the function. Adaptation to high-altitude conditions depending on adaptation times is accompanied first by a change in the function of the right ventricle and then by a change in the function of the left ventricle. It is concluded that a possible mechanism providing for the functional adaptation of the heart to a complex of high-altitude factors is the self-regulatory rhythmoinotropic mechanism. B.J.

A84-15162* National Aeronautics and Space Administration, Washington, D. C.

FUTURE THRUSTS IN LIFE SCIENCES EXPERIMENTATION IN SPACE

L. F. DIETLEIN, P. C. RAMBAUT, and A. E. NICOGLOSSIAN (NASA, Washington, DC) Aviation, Space, and Environmental Medicine (ISSN 0095-0562), vol. 54, Dec. 1983, p. S6-S8.

Biomedical research objectives for future Shuttle and/or Space Station missions are discussed, with a focus on experiments exploring the physiological effects of microgravity. Experience up to the present is found to indicate that molecular-level processes are not much affected by the space environment, so that future experiments should concentrate on larger-scale phenomena. Areas considered include cardiovascular, respiratory, skeletal, and muscular physiology; metabolism; neurophysiology; and behavior. Radiation effects are seen as well as understood on the basis of ground-based data, with the possible exception of HZE-particle radiation. The need for carefully constructed ground research to prepare for space experiments is stressed. T.K.

A84-15163

INVESTIGATIONS ON BIOSATELLITES OF THE COSMOS SERIES

E. A. ILIN (Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR) Aviation, Space, and Environmental Medicine (ISSN 0095-0562), vol. 54, Dec. 1983, p. S9-S15. refs

The results of biological experiments conducted on specialized Soviet satellite missions from 1970 through 1979 are summarized. The primary areas of investigation included the effects of weightlessness and/or artificial gravity (1G) on the growth, development, and function of different organisms and tissues and on the radiosensitivity of rats. The experimental design is explained, stressing the importance of ground controls in satellite mockups and immediate postflight evaluation. The structural and functional changes which occur in rats during weightlessness are discussed and shown to be both reversible upon return to earth gravity and avoidable by centrifuge-induced artificial gravity, the negative effects observed in the artificial-gravity experiments are attributed to the small radius of the centrifuges used. No significant effects of weightlessness on radiosensitivity, intracellular processes, or overall embryogenesis were found, but (as expected) plant-cell shape and the embryonic growth of plant roots were affected.

T K

A84-15475* Maryland Univ., Baltimore.

CONTRACTILE PROPERTIES OF RAT FAST-TWITCH SKELETAL MUSCLE DURING REINNERVATION - EFFECTS OF TESTOSTERONE AND CASTRATION

S. P. YEAGLE, R. F. MAYER, and S. R. MAX (Maryland, University, Baltimore, MD) Experimental Neurology (ISSN 0014-4886), vol. 82, 1983, p. 344-357. Research supported by the Neuromuscular Research Fund and U.S. Veterans Administration. refs (Contract NIH-NS-15760; NAG2-100)

The peroneal nerve of subject rats were crushed 1 cm from the muscle in order to examine the isometric contractile properties of skeletal muscle in the recovery sequence during reinnervation of normal, castrated, and testosterone-treated rats. The particular muscle studied was the extensor digitorum longus, with functional reinnervation first observed 8-9 days after nerve crush. No evidence was found that either castration or testosterone injections altered the process of reinnervation after the nerve crush, with the conclusion being valid at the 0.05 p level. The most reliable index of reinnervation was found to be the twitch:tetanus ratio, a factor of use in future studies of the reinnervation of skeletal muscle.

M.S K

N84-12703# Naval Aerospace Medical Research Lab., Pensacola, Fla.

ERUPTION OF PERMANENT DENTITION IN RHESUS MONKEYS EXPOSED TO ELF (EXTREMELY LOW FREQUENCY) FIELDS Interim Report

T. D. DAVID, G. A. HARRIS, and J. A. BLEY, JR. Apr. 1983 26 p

(Contract NAMRL PROJ M0096PN) (AD-A132065, NAMRL-1295) Avail NTIS HCA03/MFA01 CSCL 06R

In a study initiated to determine the biological effects of extremely low frequency ELF electric and magnetic fields associated with a submarine communications system ELF-exposed male rhesus monkeys gained weight at a slightly faster rate than control males. In order to obtain sufficient data on the physiological effects of electromagnetic fields, a second ELF study was initiated. Whereas the first study was initiated with wild-caught young adult animals, the second study utilized colony-bred animals beginning at 30 days of age. The emphasis of the second study was to substantiate previous findings and determine the underlying mechanisms involved. As in the first study, 30 primates (male and female) were exposed to the ELF electric and magnetic fields, and 30 control animals received the same care and treatment, but were not exposed. This report deals with the development of the permanent teeth relative to ELF exposure and sex. A consistent trend noted was that the teeth of female animals erupted at a

slightly earlier age than males. However, no significant differences due to ELF exposure or sex were detected. Author (GRA)

N84-12704# Naval Aerospace Medical Research Lab., Pensacola, Fla.

EFFECTS OF PULSED MICROWAVES AT 1.28 AND 5.62 GHZ ON RHESUS MONKEYS (MACACA MULATTA) PERFORMING AN EXERCISE TASK AT THREE LEVELS OF WORK Final Report

J. KNEPTON, J. DELORGE, and T. GRINER 10 Mar. 1983 35 p

(Contract NAMRL PROJ. F58524) (AD-A132057; NAMRL-1293) Avail: NTIS HCA03/MFA01 CSCL 06R

The present experiment studies both behavioral and physiological consequences of exposing exercising rhesus monkeys to microwave radiation. At 1.28 Ghz four of the monkeys were exposed to power densities of 25, 41, and 89 mW/sq cm. At the highest power density exercising animals consistently had a lower response rate, a higher heart rate, and a greater increase in colonic temperature. At lower power densities the effects were generally less evident and were idiosyncratic. At 5.62 Ghz five monkeys were exposed to power densities of 25, 41, and 89 mW/sq cm. Differences from controls were found only at 43 mW/sq cm: (1) colonic temperature averaged +0.8 C higher (N=2), (2) response rate decreased (N=5) when the heaviest work load occurred during the terminal third of the session, and (3) heart rate (N=2) was higher. These experiments demonstrate the microwaves will produce cardiovascular effects in addition to those produced by exercise alone and that body temperature induced by microwave energy does not seem to be further accelerated by exercise. The results also illustrate that monkeys working a physically arduous task are more likely to stop working when exposed to microwave than when working a less arduous task. GRA

N84-12705# Naval Aerospace Medical Research Lab., Pensacola, Fla.

A RESTRAINT CHAIR WITH ROWING-LIKE MOVEMENT FOR EXPOSING EXERCISING NONHUMAN PRIMATES TO MICROWAVE IRRADIATION

J. KNEPTON, C. EZELL, and J. DELORGE 20 Apr. 1983 21 p (Contract NAMRL PROJ. F58524)

(AD-A132047; NAMRL-1298) Avail: NTIS HCA02/MFA01 CSCL 06R

Design and construction of a Styrofoam exercise restraint chair is described for use with rhesus monkeys exposed to microwaves. Monkeys usually learn the rowing-like motion of the device within five 1-hour conditioning sessions. Radiation intensity measure of the chair and an example animal experiment demonstrated the chair's suitability for bioelectromagnetic studies. Results of a series of base-line behavioral sessions demonstrated concomitant exercise work load effects on colonic temperature, heart rate, correct response rate, and post-reinforcement pause time. With additional instrumentation, detection of minute disturbances of integrated psychological and physiological mechanisms by unusual environmental factors may be possible. GRA

N84-12706# Naval Aerospace Medical Research Lab., Pensacola, Fla.

EFFECT OF PULSED 5.62 GHZ MICROWAVES ON SQUIRREL MONKEYS (SAIMIRI SCIUREUS) PERFORMING A REPEATED ACQUISITION TASK Final Report

J. KNEPTON and J. DELORGE 28 Jan 1983 21 p

(Contract NAMRL PROJ F51524) (AD-A132045; NAMRL-1291) Avail: NTIS HCA02/MFA01 CSCL 06R

Navy personnel assigned to perform duties in the vicinity of microwave irradiating devices are subject to possible hazards if the irradiation is of adequate intensity and frequency. Data are of critical need to establish safety standards for human exposure to microwaves. In an effort to provide such information squirrel monkeys were trained on a task that required learning and were subsequently irradiated with microwaves while they performed the

task. Four male squirrel monkeys trained to perform a repeated learning task demonstrated performance decay while being exposed to pulsed 5.62 GHz microwave radiation in the far-field situation at power densities of 38 and 46 mW/sq cm, but there was only slight learning impairment. There was little, if any, effect on learning or performance at 17 and 32 mW/sq cm. The performance effect became evident when the monkey's colonic temperature increased 1 C or more above the small increases that occurred during sham exposure. There was no evidence of either thermal or behavioral adaptation, nor were there indications of lasting microwave effects. Specific absorption rate (SAR) values, obtained from saline and tissue-simulating models, coupled with the performance decay finding at 38 and 46 mW/sq cm indicate that special attention should be given to exposures of the head and extremities when establishing safety standards for human exposure
GRA

N84-12707# School of Aerospace Medicine, Brooks AFB, Tex.
COMBINED EFFECTS OF IONIZING RADIATION AND ANTICHOLINESTERASE EXPOSURE ON RODENT MOTOR PERFORMANCE Final Report, Oct. 1982 - Jan. 1983
T. G. WHEELER and R. E. CORDTS Jul 1983 16 p
(Contract AF PROJ. 7757)
(AD-A131847, SAM-TR-83-30) Avail NTIS HCA02/MFA01
CSCL 06R

Ionizing radiation and anticholinesterase exposure produce a performance decrement. The objective of this study was to determine if combined exposure would produce a greater deficit than either insult present alone. Five behavioral measures were taken on four experimental test groups. The test groups consisted of: (1) sham controls, (2) radiation exposure only (7 Gy), (3) physostigmine exposure only (0.1 mg/kg), and (4) radiation-plus physostigmine exposure. The behavioral measures were: (1) ability to maintain balance on a rotating rod, and (2) four measures of general motor activity in an activity monitor--crossing rearings, groomings, and boli excreted. Animals were evaluated on the behavioral test battery three times postirradiation (45 min, 4 days, and 8 days). The radiation-only test group had a 30% performance deficit at 45 min postirradiation which decreased to a 60% deficit by Day 8. The physostigmine test group had a 40% deficit for each of the periods. The combined treatment groups showed a 60% performance deficit on each of the tests periods. All measures of performance indicated that the combined exposure to ionizing radiation and physostigmine was much greater than either insult alone. The extent of the performance deficit was task dependent and appears to be a nonlinear function. The underlying mechanisms are not yet known.
GRA

N84-12708# Army Research Inst. of Environmental Medicine, Natick, Mass.
NALOXONE DOES NOT AFFECT VENTILATORY RESPONSES TO HYPOXIA AND HYPERCAPNIA IN RATS
R. A. STEINBROOK, H. A. FELDMAN, V. FENCL, V. A. FORTE, JR., and R. A. GABEL 11 Aug 1983 10 p
(Contract DA PROJ. 3M1-61102-BS-10)
(AD-A131836, USARIEM-M-42/83) Avail: NTIS HCA02/MFA01
CSCL 06O

Ventilatory responses (tidal volume, respiratory frequency, and minute ventilation) to steady-state hypoxia and steady-state hypercapnia were measured plethysmographically in awake unrestrained adult rats, before and after subcutaneous injection of placebo (saline) or naloxone in doses up to 5.0 mg/kg. Naloxone did not alter the ventilatory responses to hypoxia or hypercapnia
GRA

N84-12709# Argonne National Lab., Ill.
MEASUREMENTS, IN VIVO, OF PARAMETERS OF THE DOPAMINE SYSTEM

A. M. FRIEDMAN, O. T. DEJESUS, R. DINERSTEIN, and J. REVENAUGH 1983 30 p refs Presented at the Natl. Inst of Health Workshop, Bethesda, Md., 22 Jun 1983 Prepared in cooperation with Chicago Univ., Ill.
(Contract W-31-109-ENG-38)
(DE83-017964, CONF-8306122-1) Avail: NTIS HC A03/MF A01

Methods of measuring important parameters of the dopamine system in the living animal by use of PET techniques are discussed. Especially the density and binding affinity of postsynaptic neuroreceptors, the activity of neurons. In vivo, this is generally related to the turnover of neurotransmitter and can also be related to the uptake of precursor compounds by the neurons. If the transmitter and neuroleptic compound compete for the same binding sites these two effects are interwoven and are not easily isolated. It appears that the movement of neuroleptic drugs from the brain is slow enough to allow equilibrium to be maintained between ligand and receptor, especially after some time for the initial washout and translocation in the brain. To test the consequences of equilibrium binding and the possible use of the model for measurement of receptor densities by emission tomography Clark's equilibrium model of ligand binding was modified. The solutions of the equations and some comparisons of the predictions of the model with data, as well as its application to tomographic measurements are described.
DOE

N84-12710# Wisconsin Univ., Madison.
PHYTOCHROME FROM GREEN PLANTS: ASSAY, PURIFICATION, AND CHARACTERIZATION
P. H. QUAIL 1983 28 p refs
(Contract DE-AC02-81ER-10903)
(DE83-017447; DOE/ER-10903/4) Avail: NTIS HC A03/MF A01

Phytochrome from the chlorophyllous cells of light grown higher plants and green algae was isolated and characterized. Spectral and immunochemical analysis of phytochrome from green oat tissue indicates the presence of two distinct species of the molecule: a minority species that is recognized by antibodies directed against phytochrome from etiolated tissue and that has an apparent molecular mass of 124 kilodaltons (kD), the same as that of the native molecule from etiolated tissue; and a majority species that is not recognized by anti-etiolated tissue phytochrome Iq and has a Pr absorbance maximum some 14 nm shorter than its etiolated tissue counterpart. It is established that these different molecular species preexist in the green cell and are not the results of posthomogenization modifications. Monoclonal antibodies specific for antigenic sites distributed throughout the length of the etiolated tissue phytochrome polypeptide were identified. Axenic cultures of the alga *Mesotaenium* are established and phytochrome isolated from these cells is analyzed
DOE

N84-12711# Environmental Protection Agency, Research Triangle Park, N.C. Inhalation Toxicology Div
PULMONARY DOSIMETRY OF NITROGEN DIOXIDE IN ANIMALS AND MAN
E. J. MILLER, J. A. GRAHAM, J. H. OVERTON (Northrop Services Inc.), and E. T. MYERS (Northrop Services Inc.) 1983 15 p refs
(PB83-243394; EPA-600/D-83-091) Avail: NTIS HC A02/MF A01 CSCL 06T

Using a general mathematical model formulation for the transport of gases in the lungs, the regional pulmonary deposition of nitrogen dioxide (NO₂) in man, rabbits, guinea pigs, and rats was studied. The model formulation utilizes lung morphometric data and includes parameters reflecting physiochemical properties of NO₂, ventilatory patterns, and chemical reactions of NO₂ with components of the protective layer linings of the lungs. Sensitivity of model predicted doses to changes in some of the above parameters are discussed as well as qualitative comparisons between animals and man in the shape of the dose curves.
Author (GRA)

N84-13754 New Mexico Univ., Albuquerque.
THE EFFECTS OF HYPERBARIC ELEMENTAL GASES ON THE RATE COEFFICIENT OF K(+) INFLUX IN MAMMALIAN SYNAPTOSOMES Ph.D. Thesis

E. I. SEIBEL-ROSS 1982 265 p
 Avail: Univ. Microfilms Order No. DA8314001

Normal functions of the mammalian CNS are modified by exposure to both high pressure and hyperbaric pressures of narcotic elemental gases, creating a high pressure nervous syndrome and elemental gas narcosis, respectively. The hypothesis that these phenomena are caused by modification of synaptic membrane-mediated changes in ionic transport within the CNS is examined. To test this hypothesis, *in vitro* preparations of presynaptic nerve ending are employed. A separative procedure is developed here with rapidly and reproducibly separates synaptosomes from their suspending buffer by microcentrifugation enabling a preparation to be collected whose integrity of structure and function is retained. Because this separative method efficiently removes extraneous butter from synaptosomal samples, a kinetic analysis of K-42 influx across the presynaptic membrane can be applied to this model. Dissert Abstr.

N84-13755 Brigham Young Univ., Provo, Utah.
ADAPTATIONS TO A HIGH FAT DIET WHICH INCREASE EXERCISE ENDURANCE IN MALE RATS Ph.D. Thesis

W. C. MILLER 1983 62 p
 Avail: Univ. Microfilms Order No. DA8313055

Eighty-seven, male Sprague-Dawley rats were randomly assigned to one of two experimental groups. Group 1 consumed a diet high in fat and low in carbohydrate (LCD) while Group 2 ate a normal diet. After either 1 or 5 weeks on the diets, rats from each group were sacrificed either before or after an exhausting run on a rodent treadmill. The LCD animals ran longer before exhaustion at both week 1 and week 5. Adaptations to the LCD included lower muscle and liver glycogen content, decreased rate of carbohydrate utilization during exercise, decreased lactate production, and elevated blood ketone levels. In addition, the LCD caused increased muscular activities of 3-hydroxyacyl CoA dehydrogenase and citrate synthase. Rats exposed to a high fat diet are capable of prolonged intense exercise in spite of limited glycogen stores. This improved capacity for exercise appears to be due, in part, to a decreased rate of carbohydrate metabolism and an increased ability to oxidize fat. Dissert Abstr.

N84-13756* National Aeronautics and Space Administration
 Marshall Space Flight Center, Huntsville, Ala
COIL PLANET CENTRIFUGATION AS A MEANS FOR SMALL PARTICLE SEPARATION

F. T. HERRMANN Nov. 1983 18 p refs
 (NASA-TM-82561; NAS 1 15:82561) Avail: NTIS HC A02/MF A01 CSCL 06B

The coil planet centrifuge uses a centrifugal force field to provide separation of particles based on differences in sedimentation rates by flow through a rotating coiled tube. Three main separations are considered: (1) single phase fresh sheep and human erythrocytes, (2) single phase fixed heep and human erythrocytes, and (3) electrophoretically enhanced single phase fresh sheep and human erythrocytes Author

N84-13757# Scripps Institution of Oceanography, San Diego, Calif.

YIELDS PHOTOSYNTHETIC EFFICIENCIES, AND PROXIMATE CHEMICAL COMPOSITION OF DENSE CULTURES OF MARINE MICROALGAE, A SUBCONTRACT REPORT

W. H. THOMAS, D. L. R. SEIBERT, M. ALDEN, P. ELDRIDGE, and A. NEORI Jul. 1983 63 p refs Prepared for Midwest Research Inst., Golden, Colo.

(Contract DE-AC02-77CH-00178, EG-77-C-01-4042)
 (DE83-011992; SERI/STR-231-1896) Avail: NTIS HC A04/MF A01

The yields, photosynthetic efficiencies, and proximate composition of several microalgae were compared in dense cultures grown at light intensities up to 70% sunlight. Yields ranged from

3.4 to 21.7 g dry weight/(m²) day. The highest yield was obtained with *Phaeodactylum*; the lowest in *Botryococcus* cultures. The same species had the highest and lowest efficiencies of utilization of photosynthetically active radiation. In nitrogen-sufficient cells of all but one species, most of the dry weight consisted of protein. Lipid content of all species was 20 to 29%, and carbohydrate content 11 to 23%. Lipid content increased somewhat in N-deficient *Phaeodactylum* and *Isochrysis* cells, but decreased in deficient *Monallanthus* cells. Because the overall dry weight yield was reduced by deficiency, lipid yields did not increase. However, since the carbohydrate content increased to about 65% in N-deficient *Dunaliella* and *Tetraselmis* cells, the carbohydrate yield increased. In *Phaeodactylum* the optimum light intensity was about 40% of full sunlight. Most experiments with this algae included a CUSO₄ filter to decrease infrared irradiance. DOE

N84-13758# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.

ANALYSIS AND MODELING OF PHOTOSYNTHETIC BACTERIAL HYDROGEN PRODUCTION PLANTS

A. HERLEVICH May 1983 11 p refs Presented at the Photo/Biol. Hydrogen Ann. Rev. Meeting, Golden, Colo., 20 May 1983

(Contract DE-AC02-77CH-00178; EG-77-C-01-4042)
 (DE84-000003, SERI/TP-235-1987; CONF-8305137-1) Avail: NTIS HC A02/MF A01

The design of the bacterial reactor can be studied parametrically with the aid of a computer model. This approach is more cost-effective than actually designing and building several reactor configurations. Various geometries can be modeled and their thermal and biological performance determined. The activity should be followed by actual outdoor construction and testing. The thermal performance of the reactor was modeled first, followed by the biological performance. Both have been implemented in a computer program called SOLBUG. SOLBUG accepts hourly solar insolation, wind, and ambient temperature data and calculates the reactor temperature response and hydrogen production. Our materials analysis consisted of incorporating into the earlier study new performance and cost data made available for candidate materials. The overall effect on system performance and cost was determined for two materials (Tedlar and Kynar). Parameters of interest were hydrogen permeability rates, solar transmittance, material lifetime, and cost. System economics using these materials were compared with previously obtained system cost estimates. DOE

N84-13759# Oak Ridge National Lab., Tenn. Health and Safety Research Div

NUCLEAR-MEDICINE Quarterly Progress Report

F. F. KNAPP, JR., K. R. AMBROSE, T. A. BUTLER, M. M. GOODMAN, and P. C. SRIVASTAVA Oct. 1983 21 p refs
 (Contract W-7405-ENG-26)

(DE84-000346, ORNL/TM-8827) Avail: NTIS HC A02/MF A01

Several recently developed (123) I-labeled fatty acids are described. Well defined planar images were obtained in a dog study utilizing (E) - 18-(123)I-17-octadecenoic acid, a new alkenoic fatty acid containing the radiiodide stabilized as a vinyl iodide. The first single photon tomographic images were obtained with 15-(123)I-iodophenyl-3-(R,S)-methylpentadecanoic acid. This agent was readily obtained from a new kit involving the H(123)I decomposition of the pipendinyl triazene derivative of 15-(p-aminophenyl)-3-(R,S)-methyl-pentadecanoic acid. This agent and several radiiodinated fatty acids in the *in vitro* beating rat heart cell system is described. The recent evaluation of radiiodinated phosphonium cations is extended to the preparation and testing of (E)-(-1-(125)I-1-penten-5-yl)triphenylarsonium iodide. Several radiolabeled fatty acids including 15-(p-(131)I-iodophenyl)-1-3-(R,S)-methylpentadecanoic acid and 15-(131)I-iodophenyl-6-tellurapentadecanoic acid were made to investigate the properties of these new agents. DOE

N84-13760# Brookhaven National Lab., Upton, N. Y.
KINETIC AND SPECTROSCOPIC STUDIES OF CYTOCHROME B-563 IN ISOLATED CYTOCHROME B/F COMPLEX AND IN THYLAKOID MEMBRANES

G HIND, R. D. CLARK, and J. P. HOUGHINS 1983 9 p refs
 Presented at the 6th Intern. Congr on Photosynthesis, Brussels, 1-6 Aug. 1983

(Contract DE-AC02-76CH-00016)

(DE83-017982; BNL-33553; CONF-8308110-4) Avail: NTIS HC A02/MF A01

Extensive studies show that a cytochrome (cyt) b/f complex isolated from photosynthetic membranes of spinach or Anabaena catalyzes electron transport from plastoquinol (PQH₂) to plastocyanin or algal cyt c-552. The complex from spinach thylakoids generates a membrane potential when reconstituted into liposomes, and although the electrogenic mechanism remains unknown, a key role for cyt b-563 is widely accepted. Electrogenesis by a Q-cycle mechanism requires a plastoquinone (PQ) reductase to be associated with the stromal side of the thylakoid b/f complex though this activity has yet to be demonstrated. It seemed possible that more gentle isolation of the complex might yield a form containing additional polypeptides, perhaps including a PQ reductase or a component involved in returning electrons from reduced ferredoxin to the complex in cyclic electron flow. Optimization of the isolation of cyt b/f complex for Hybrid 424 spinach from a growth room was also required. DOE

N84-13761# Michigan State Univ., Hickory Corners.
DISSOLVED ORGANIC MATTER AND LAKE METABOLISM: BIOCHEMISTRY AND CONTROLS OF NUTRIENT FLUX DYNAMICS IN LAKES Technical Progress Report, 1 Aug. 1982 - 31 Aug. 1983

R G. WETZEL 1983 55 p refs

(Contract DE-AC02-76EV-01599, EY-76-S-02-1599)

(DE83-016789; DOE/EV-01599/235-PT-1; COO-1599-235-PT-1)

Avail: NTIS HC A04/MF A01

The interrelated couplings between nutrient loadings from littoral and sediment sources to the open water, and how these fluxes are regulated by the population dynamics of growth, metabolism, senescence, and decomposition of attached littoral and wetland plants (submersed and emergent microphytes, epiphytic and epipellic microflora) and the phytoplankton (algae and bacteria) were analyzed. All of the subprograms are coupled to each other and address the general question of quantifying the regulatory capacities of attached macrophytes and microflora for nutrient loadings and recycling, and how these controls affect phytoplanktonic productivity, competition, and succession. The research progressed in three major areas: wetland nutrient fluxes, littoral controls of internal nutrient loadings from sediment sources, and pelagial nutrient turnover and cycling rates. DOE

N84-13762# Pacific Northwest Lab., Richland, Wash.
USE OF FAUNA AS BIOMONITORS

D. W. CARLILE and R. E. FITZNER Aug. 1983 7 p refs
 Presented at the Renewable Resource Inventories for Monitoring Changes and Trends Conf., Corvallis, Oreg., 15-19 Aug. 1983

(Contract DE-AC06-76RL-01830)

(DE83-016082; PNL-SA-10954, CONF-830872-2) Avail: NTIS HC A02/MF A01

Five criteria by which to evaluate the suitability of faunal species as biomonitors are proffered. The criteria which should be considered include: species response to environmental condition, distribution of species, cost of biomonitoring, precision of measurements and ease of maintaining a monitoring system. As an example, the criteria are used in assessing the utility of using nesting Great Blue Herons as biomonitors of fate and effects of environmental contaminants. Emphasis is placed on a method of determining optimal sampling based on cost and precision of measurements of environmental condition. Heron excreta, collected from nine colonies throughout the arid, Mid-Columbia region of Washington, was analyzed to determine levels of specific pollutants. Analyses of variance components were conducted and estimates of within and among-colony variance in levels of selected pollutants

are provided. From such variance estimates, numbers of colonies and samples within colonies needed to obtain precise estimates of pollutant levels are determined. The costs of each aspect of sampling are accounted for and are incorporated into a cost function to estimate the cost of sampling. Costs associated specifically with colonies and those attributed to samples within colonies are related to estimates of among and within-colony variation in pollutant levels. This enables determination of the most cost-effective allocation of sampling effort. This method of associating precision and cost is also applied to counts of fledglings for assessment of effects. DOE

N84-13763# Pacific Northwest Lab., Richland, Wash.
LIFE HISTORIES AND MONITORING STRATEGIES: SOME LESSONS FROM FIELD EXPERIENCE

W. T. HINDS Aug. 1983 20 p Presented at the Intern. Conf. on Renewable Resource Inventories to Monitor Change and Trend, Corvallis, Oreg., 15-19 Aug. 1983

(Contract DE-AC06-76RL-01830)

(DE83-016164, PNL-SA-11013, CONF-830872-3) Avail: NTIS HC A02/MF A01

Appropriately selected ecological measurements can provide economical and accurate data for long-term measurements. Two considerations are initially important: specific methods reflecting activities in the life history of target biota, and specification of the statistical population for which inferences can be made. We have found that working with common species and focusing on aggregated or colonial aspects of life histories is nearly essential for cost-effective data. Examples from forests and food webs in Washington suggest that long-term studies will benefit from passive methods. Specification or definition of the population of interest is necessary to determine where the measurements must be made. Unfortunately, ambiguities in identifying replicates are common. Some method of locating a population of equally suitable sites from which replicates can be selected properly is needed. A procedure for selecting a suite of equally suitable sites using cluster and discriminant analyses is suggested, and illustrated to demonstrate the problems and potentials involved. DOE

N84-13764# Oak Ridge National Lab., Tenn.
CHEMICAL AND PHYSICAL CHARACTERIZATION OF THE ACTIVATION OF RIBULOSEBIPHOSPHATE CARBOXYLASE/OXYGENASE

M. I. DONNELLY, V. RAMAKRISHNAN, and F. C. HARTMAN 1983 5 p refs
 Presented at the 6th Intern. Congr. on Photosynthesis, Brussels, 1 Aug. 1983

(Contract W-7405-ENG-26)

(DE83-017226, CONF-8308110-5) Avail: NTIS HC A02/MF A01
 Molecular structure of ribulosebiphosphate carboxylase/oxygenase isolated from *Rhodospirillum rubrum* was compared with the enzyme isolated from *Alcaligenes eutrophus*. Peptides derived from the active center of the bacterial enzyme were highly homologous with those isolated from spinach. Molecular shapes of the carboxylases were estimated using neutron scattering data. These studies suggested that the enzyme as isolated from *R. rubrum* is a solid prolate ellipsoid or cylinder, while the spinach enzyme resembles a hollow sphere. DOE

N84-13765# Texas Univ., Austin, Lb. of Radiation Biology.
EARLY MECHANISMS IN RADIATION-INDUCED BIOLOGICAL DAMAGE

E. L. POWERS 1983 9 p Presented at the 7th Intern. Conf. of Radiation Res., Amsterdam, 3-8 Jul. 1983

(Contract DE-AS05-76EV-03408, NIH-GM-13557; NIH-RR-00886)

(DE84-001511, CONF-830710-10) Avail: NTIS HC A02/MF A01

An introduction to the mechanisms of radiation action in biological systems is presented. Several questions about the nature of the radiation damage process are discussed, including recognition of the oxygen effects, dose response relationships, and the importance of the hydroxyl radical. DOE

51 LIFE SCIENCES (GENERAL)

N84-13766# California Univ., Santa Cruz Dept. of Biology. RESPIRATION OF ROOTS RESPONSE TO LOW O₂ STRESS Final Report

H. BEEVERS 1983 4 p
(Contract DE-AT03-76ER-70185; DE-AM03-76SF-00034)
(DE83-017495, DOE/ER-71085/T2) Avail: NTIS HC A02/MF
A01

Progress is reported in the following research areas effects of O₂ concentration on rice seedlings; alcohol dehydrogenase and an inactivator from rice seedlings; and properties and intracellular location of alcohol dehydrogenase from rice seedlings. DOE

52

AEROSPACE MEDICINE

Includes physiological factors; biological effects of radiation; and weightlessness

A84-13142 SPATIAL AND TEMPORAL DISCRIMINATION ELLIPSOIDS IN COLOR SPACE

C. NOORLANDER and J. J. KOENDERINK (Utrecht, Rijksuniversiteit, Utrecht, Netherlands) Optical Society of America, Journal (ISSN 0030-3941), vol. 73, Nov. 1983, p. 1533-1543. refs

Three-dimensional discrimination ellipsoids are presented for a number of representative points in color space. These ellipsoids have been obtained not with the conventional split field but with flickering grating patterns. Thus the present study extends the well-known results of Brown and MacAdam (1949) to cases in which the image is structured in space and time. As expected, we find that the discrimination ellipsoids depend on the spatiotemporal structure of the stimulus. Analytical descriptions are presented based on the Vos-Walraven (1972) line element augmented with spatiotemporal frequency-dependent coefficients that fit the present results reasonably well. For coarse gratings (1 cycle per degree) or slowly modulated fields (1 Hz) the present results prove to be compatible with the results of Brown and MacAdam obtained with a bipartite 2-deg field. Author

A84-13143 IMPROVEMENTS IN VISUAL PERFORMANCE FOLLOWING A PULSED FIELD OF LIGHT - A TEST OF THE EQUIVALENT-BACKGROUND PRINCIPLE

R. W. BOWEN (Loyola University, Chicago, IL) and D. C. HOOD (Columbia University, New York, NY) Optical Society of America, Journal (ISSN 0030-3941), vol. 73, Nov. 1983, p. 1551-1556. refs

(Contract NSF BNS-78-17779; NSF BNS-81-11366; NIH-EY-02115)

The offset of a pulsed conditioning field of light has recently been shown to produce enhancements of temporal resolution and brightness discrimination. These enhancements are similar to those that are due to imposing a high level of light adaptation on the visual system. Here the possibility of a true equivalence of adaptive state between some level of steady light adaptation and the offset of a conditioning field is analyzed. The enhancements of visual function at field offset were replicated by using a suprathreshold two-pulse discrimination task and a task requiring detection of an incremental probe stimulus superimposed upon a suprathreshold pulse. These effects are shown to be qualitatively but not quantitatively similar to those produced by an equivalent background selected on the basis of its ability to raise threshold to the same degree as field offset. It is concluded that the equivalent-back-ground principle cannot be supported for the given measures of foveal visual function. Author

A84-13144 PHASE SHIFT IN RED AND GREEN COUNTERPHASE FLICKER AT HIGH FREQUENCIES

W. B. CUSHMAN and J. Z. LEVINSON (Maryland, University, College Park, MD) Optical Society of America, Journal (ISSN 0030-3941), vol. 73, Nov. 1983, p. 1557-1561 refs

When balanced red and green lights are alternated more than 20 times per second, the perceived flicker can be reduced by advancing the green flicker about 10 deg of the red-green cycle. The required advance for least flicker is greatest at retinal illuminances around 1000 td and frequencies between 30 and 35 Hz. A model that predicts tuning at this frequency exists, but the tuning curve that is predicted is broader than that observed. A modified model is left for future publication. Meanwhile, other empirical properties of the advance required by green over red are described. In addition to the intensity dependence of this phase shift, its dependence on intensity balance between red and green is described. Also, the intensity balance turns out to depend on the frequency being used, in contrast to the independence expected by Ives. Author

A84-13446 THE SIGNIFICANCE OF LEFT-VENTRICULAR INSUFFICIENCY IN THE INCREASED PHYSICAL ACTIVITY OF PATIENTS WITH MYOCARDIAL INFARCTION [ZNACHENIE LEVOZHELUDOCHKOVOI NEDOSTATOCHNOSTI V POVYSHENII FIZICHESKOI AKTIVNOSTI BOL'NYKH INFARKTOM MIOKARDA]

I. N. BLUZHAS, K.-L. BLOZNIANE, and D. P. RASTIANENE (Kaunasskii Meditsinskii Institut, Kaunas, Lithuanian SSR) Voprosy Kurortologii, Fizioterapii i Lechebnoi Fizicheskoi Kul'tury (ISSN 0042-8787), May-June 1983, p. 17-20. In Russian refs

A84-13447 NEW METHODOLOGICAL APPROACHES TO THE USE OF MEASURED WALKING AND RUNNING IN THE REHABILITATION OF PATIENTS WITH MYOCARDIAL INFARCTION

D. M. ARONOV, L. F. NIKOLAEVA, L. V. ZHUKOVA, V. K. LAZUTKINA, O. F. KOVALEVA, and A. I. GRIUNTAL (Akademiya Meditsinskikh Nauk SSSR, Moscow, USSR) Voprosy Kurortologii, Fizioterapii i Lechebnoi Fizicheskoi Kul'tury (ISSN 0042-8787), May-June 1983, p. 20-23. In Russian. refs

A84-13448 EFFECT OF PHYSICAL EXERCISE OF VARIOUS INTENSITIES ON MYOCARDIAL CONTRACTILITY IN OBESE PATIENTS [VLIYANIE FIZICHESKOI NAGRUZKI RAZLICHNOI MOSHCHNOSTI NA SOKRATITEL'NIU SPOSOBNOST' MIOKARDA U BOL'NYKH OZHIRENIEM]

N. A. BELAIA and V. A. ANTIPENKOV (Tsentral'nyi Nauchno-Issledovatel'skii Institut Kurortologii i Fizioterapii, Moscow, USSR) Voprosy Kurortologii, Fizioterapii i Lechebnoi Fizicheskoi Kul'tury (ISSN 0042-8787), May-June 1983, p. 26-28. In Russian. refs

A84-13449 THE FUNCTIONAL CONDITION OF THE CARDIORESPIRATORY SYSTEM IN PATIENTS WITH RHEUMATISM UPON THE EXPANSION OF MOTOR ACTIVITY [FUNKSIONAL'NOE SOSTOYANIE KARDIORESPIRATORNOI SISTEMY U BOL'NYKH REVMATIZMOM PRI RASSHIRENII DVIGATEL'NOI AKTIVNOSTI]

V. N. SARCHUK (Tsentral'nyi Nauchno-Issledovatel'skii Institut Kurortologii i Fizioterapii, Evpatoria, USSR) Voprosy Kurortologii, Fizioterapii i Lechebnoi Fizicheskoi Kul'tury (ISSN 0042-8787), May-June 1983, p. 57, 58. In Russian. refs

A84-13475

**ARTERIAL HYPERTENSION AS A MARKER OF
HYPERGLYCEMIA IN THE GLUCOSE TOLERANCE TEST
[ARTERIAL'NAIA GIPERTONIIA KAK MARKIRUIUSHCHII
PRIZNAK GIPERGLIKEMII V TESTE TOLERANTNOSTI K
GLIUKOZE]**

A. G. MAZOVETSKII, G. S. ZHUKOVSKII, F. T. ALESKEROV, E. V. BAUMAN, V. I. VOLSKII, IU. I. SUNTSOV, G. M. ZINENKO, A. V. DREVAL, V. V. KONSTANTINOV, and V. A. BULIN (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Problemy Endokrinologii, vol. 29, May-June 1983, p. 32-35 In Russian

A84-13477

**MORPHOLOGY OF BLOOD CAPILLARIES AND SHIN MUSCLES
IN THE CASE OF OBLITERATING ATHEROSCLEROSIS
[MORFOLOGIIA KROVENOSNYKH KAPILLIAROV I MYSHTS
GOLENI PRI OBLITERIRUIUSHCHEM ATEROSKLEROZE]**

V. I. AKHMATOV and O. P. KURGUZOV (I Moskovskii Meditsinskii Institut, Moscow, USSR) Arkhiv Patologii (ISSN 0004-1955), vol. 45, no. 5, 1983, p. 32-39. In Russian. refs

A84-14597

**POSITIVE AND NEGATIVE AFTERIMAGES FROM BRIEF
TARGET GRATINGS**

G. M. LONG and S. C. KLING (Villanova University, Villanova, PA) Vision Research (ISSN 0042-6989), vol. 23, no. 10, 1983, p. 959-963 refs

Threshold luminance levels for the production of negative afterimages from brief target gratings were determined as a function of background luminance and grating frequency. The obtained thresholds were extremely low - typically below the values that would maintain constant space-average luminance between target and background. The implications of these results for other studies that may have inadvertently produced negative afterimages with their stimulus conditions were noted. As a demonstration, visual persistence from these gratings were determined under conditions that carefully excluded negative afterimages, and clear differences from previously published work were obtained. Author

A84-14598

**SPATIOTEMPORAL CONTRAST SENSITIVITY AND VISUAL
FIELD LOCUS**

M. J. WRIGHT and A. JOHNSTON (Brunel University, Uxbridge, Middx., England) Vision Research (ISSN 0042-6989), vol. 23, no. 10, 1983, p. 983-989. Research supported by the Medical Research Council. refs

Contrast sensitivity, measured as a function of retinal eccentricity for stimuli differing in temporal and spatial frequency (0.25-9c/deg, 0-16 Hz, 0-12 deg eccentricity), was maximum at the fovea and declined linearly with eccentricity. The slope of the decrease depended upon spatial but not temporal frequency. Contrast sensitivity for drifting gratings was approximately twice that for sinusoidal counter-phase gratings at all eccentricities. For central viewing log contrast sensitivity increased with grating length. The shape of this function was systematically related to spatial frequency but independent of temporal frequency, indicating that the visual field is homogeneous in sensitivity for change in contrast over time. The implications of these findings for mechanisms of threshold vision in fovea and periphery are discussed. Author

A84-14599

**SMOOTH PURSUIT EYE MOVEMENTS UNDER OPEN-LOOP
AND CLOSED-LOOP CONDITIONS**

H. J. WYATT and J. POLA (New York, State University, New York, NY) Vision Research (ISSN 0042-6989), vol. 23, no. 10, 1983, p. 1121-1131. Research supported by the State University of New York Research Foundation. refs
(Contract NIH-EY-02878)

Smooth pursuit eye movement responses to sinusoidal target motion in the open-loop condition (target motion stabilized on the retina) and the closed-loop condition (target motion fixed in space) are measured. In addition, predictions are made of the closed-loop response for each subject from the open-loop data, using the

relationship for a linear system. Predictions made in this way were very accurate, for both gain and phase lag, even though responses of a given subject usually differed idiosyncratically from those of another. The accuracy of prediction was observed over a broad frequency range (0.5-3 Hz) and a moderate range of target amplitudes (2-6 deg, peak-to-peak). Author

A84-14986

**CHARACTERISTICS OF THE FUNCTIONING OF THE
'BIOLOGICAL CLOCK' OF THE LEFT AND RIGHT CEREBRAL
HEMISPHERES IN SCHOOLCHILDREN [OSOBENNOSTI
FUNKTSIONIROVANIIA 'BIOLOGICHESKIKH CHASOV'
LEVOGO I PRAVOGO POLUSHARII GOLOVNOGO MOZGA U
SHKOL'NIKOV]**

V. F. KONOVALOV and ZH. I. BURKOVETSKAIA (Akademiia Nauk SSSR, Institut Biologicheskoi Fiziki, Pushchino, USSR) Voprosy Psikhologii (ISSN 0042-8841), May-June 1983, p. 106-112. In Russian. refs

A84-14990

**THE USE OF A SOVIET-MADE ULTRASONIC
PHACOFRAGMENTATOR IN EYE SURGERY. I [PRIMENENIE
OTECHESTVENNOGO UL'TRAZVUKOVOGO
FAKOFRAGMENTATORA V GLAZNOI KHIRURGII. I]**

L. V. KOSSOVSKII and I. L. KOSSOVSKAIA (Gor'kovskii Meditsinskii Institut, Gorki, USSR) Vestnik Oftal'mologii (ISSN 0042-465X), May-June 1983, p. 25-29. In Russian. refs

A84-14991

**THE USE OF A SOVIET-MADE ULTRASONIC
PHACOFRAGMENTATOR IN EYE SURGERY. II [PRIMENENIE
OTECHESTVENNOGO UL'TRAZVUKOVOGO
FAKOFRAGMENTATORA V GLAZNOI KHIRURGII. II]**

L. V. KOSSOVSKII, G. E. STOLIARENKO, and I. L. KOSSOVSKAIA (Gor'kovskii Meditsinskii Institut, Gorki, USSR) Vestnik Oftal'mologii (ISSN 0042-465X), May-June 1983, p. 29-33. In Russian. refs

A84-14992

**INDIVIDUAL EVALUATION OF VISUAL FATIGUE
[INDIVIDUAL'NAIA OTSENKA ZRITEL'NOGO UTOMLENIIA]**

A. A. SHPAK (Tsentral'nyi Nauchno-Issledovatel'skii Institut Ekspertizy Trudospособnosti i Organizatsii Truda Invalidov, Moscow, USSR) Vestnik Oftal'mologii (ISSN 0042-465X), May-June 1983, p. 65-67. In Russian. refs

A method for the individual qualitative evaluation of visual (and other types of) fatigue is proposed. Various manifestations of a patient's fatigue are expressed as a total-fatigue index calculated from a special formula; and the resulting values are evaluated on the basis of a statistical analysis of the fatigue indices in a group of healthy subjects, thus establishing the range of fatigue indices with respect to a corresponding load. The effectiveness of the method was confirmed by an investigation of 105 patients with primary glaucoma and 54 healthy subjects. B.J.

A84-14998

**THE SYMPTOMATOLOGY AND PATHOGENESIS OF THE
HYPODYNAMIC CARDIOVASCULAR SYNDROME IN SURGICAL
TUBERCULOSIS [SIMPTOMATIKA I PATOGENEZ
GIPODINAMICHESKOGO KARDIO-VASKULIARNOGO
SINDROMA PRI KOSTNO-SUSTAVNOM TUBERKULEZE]**

V. P. ZAKUTAEVA (Kirgizskii Nauchno-Issledovatel'skii Institut Tuberkuleza, Frunze, Kirgiz SSR) Zdravookhranenie Kirgizii, May-June 1983, p. 45-48. In Russian

A84-15017

REFLECTION OF THE SIGNIFICANCE OF AUDITORY STIMULI IN EVOKED POTENTIALS IN THE CASE OF THE PROGRAMMING OF MOVEMENTS IN HUMANS [OTRAZHENIE ZNACHIMOSTI AKUSTICHESKIKH STIMULOV V VYZVANNYKH POTENTIALAKH PRI PROGRAMMIROVANII DVIZHENII U CHELOVEKA]

A. N. DINGA, V. A. DOROSHENKO, and G. A. KULIKOV (Leningradskii Gosudarstvennyi Universitet, Leningrad, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol. 69, Sept. 1983, p. 1236-1238. In Russian. refs

A84-15026

ATTACKS OF VARIANT ANGINA PECTORIS INDUCED BY PHYSICAL EXERCISE [PRISTUPY VARIANTNOI STENOKARDII PRI FIZICHESKOI NAGRUZKE]

O. P. SHEVCHENKO, B. A. SIDORENKO, V. P. MAZAEV, L. M. BATYRBEKOVA, V. A. NAZARENKO, O. A. KOMAR, and N. M. AKHMEDZHANOV (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Kardiologiya (ISSN 0022-9040), vol. 23, June 1983, p. 41-44. In Russian. refs

An investigation was made of 10 coronary patients showing no signs of controlled myocardial infarction and responding with transient ST rise to bicycle-ergometer exercise. Also recorded was ST rise from the same leads during a spontaneous attack and cold testing. Mild coronary arterial lesions were revealed by coronarography. No ST rise was recorded when bicycle-ergometer exercise was repeated in the case of obsidan or cornfar treatment. B.J.

A84-15027

ANATOMICAL-ECHOCARDIOGRAPHIC CORRELATIONS OF HEART STRUCTURES - ADDITIONAL DIAGNOSTIC CROSS SECTIONS [ANATOMO-EKHOKARDIOGRAFICHESKIE SOPOSTAVLENIIA STRUKTUR SERD TSA - DOPOLNITEL'NYE DIAGNOSTICHESKIE SECHENIIA]

L. M. KUZNETSOVA, V. V. BOBKOV, and O. M. PUGACHEV (Akademiia Meditsinskikh Nauk SSSR; Moskovskii Kardiologicheskii Dispanser, Moscow, USSR) Kardiologiya (ISSN 0022-9040), vol. 23, June 1983, p. 99-102. In Russian. refs

An analysis is made of the feasibility of two-dimensional echocardiography using a number of additional cross sections, i.e., right chambers sectioned longitudinally, the four-chamber epigastric view, and the longitudinal cross sections of the aortal arc. Comparisons with anatomical cross sections of the heart in the specified planes were used to identify heart structures. Sections from 34 hearts and results of 46 echocardiographic studies in normal subjects served as the basis of the investigation. Attention is given to methodological procedures for acquiring such echocardiograms. B.J.

A84-15028

EFFICIENCY OF THE FRANK-STARLING MECHANISM UNDER PHYSICAL LOAD [EFFEKTIVNOST' MEKHANIZMA FRANKA-STARLINGA PRI FIZICHESKOI NAGRUZKE]

V. L. KARPAN, Z. B. BELOTSEKOVSKII, B. G. LIUBINA, and IA. KH. TIIDUS (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Kardiologiya (ISSN 0022-9040), vol. 23, June 1983, p. 106-109. In Russian. refs

The Frank-Starling mechanism (FSM) was studied in 88 athletes exposed to physical load and was shown to operate under physical load in athletes with ventricular cavities of normal or moderately increased size. The FSM is not normally triggered under physical load in athletes with physiological ventricular dilatation as a result of endurance training (over 160 ml in ultimate diastolic volume). Increased cardiac output is provided by greater basal blood volume reserve. The FSM provides an optimal increase in peak stroke volume with ultimate diastolic volumes of 115-159 ml. The efficiency of the heterometric mechanism activated by physical load in subjects with small ultimate diastolic volumes is shown to be insufficient, as additive reserve volume cannot be increased essentially. B.J.

A84-15029

ORGANOMETRIC ANALYSIS OF HEART CHANGES ASSOCIATED WITH SYSTEMATIC PHYSICAL EXERCISE [ORGANOMETRICHESKII ANALIZ IZMENENII SERD TSA PRI SISTEMATICHESKIKH FIZICHESKIKH NAGRUZKAKH]

B. I. DUBCHAK, M. S. GNATIUK, and L. A. GNATIUK (Ternopol'skii Meditsinskii Institut, Ternopol, Ukrainian SSR) Kardiologiya (ISSN 0022-9040), vol. 23, June 1983, p. 109-111. In Russian. refs

Hearts from 23 athletes who had died of traumas were studied on the basis of measurements of external and internal macrochanges, planimetry and gravimetry, histostereometry, and morphostatistical analysis. Hypertrophic heart was found in all cases, while ratios between the quantitative parameters of individual heart muscle departments as well as nuclear-cytoplasmatic and stromal-parenchymatous relations and myocardial blood supply were within the normal range. It is shown that only a certain portion of myocardial muscle cells, responsible for intensified operation, became hypertrophic in response to systematic physical exercise. B.J.

A84-15030

DETERMINATION OF THE HABITUAL MOTOR ACTIVITY BY MEANS OF A Pedometer WITH THE OBJECTIVE OF PREVENTING THE ISCHEMIC HEART DISEASE [OPREDELENIE PRIVYCHNOI DVIGATEL'NOI AKTIVNOSTI V TSELIKHX PERVICHNOI PROFILAKTIKI ISHEMICHESKOI BOLEZNI SERD TSA S POMOSHCH'IU SHAGOMERA]

I. D. KOZLOV and E. I. ZBOROVSKII (Belorusskii Nauchno-Issledovatel'skii Institut Kardiologii, Minsk, Belorussian SSR) Kardiologiya (ISSN 0022-9040), vol. 23, June 1983, p. 114, 115. In Russian. refs

A84-15031

COMPARISON OF RESULTS OF BICYCLE-ERGOMETER TESTS WITH CONTINUOUSLY AND DISCONTINUOUSLY INCREASING LOADS [SOPOSTAVLENIE REZUL'TATOV VELOERGOMETRICHESKOI NEPRERYVNO I PRERYVISTO VOZRASTAIUSHCHEI PROBY]

G. A. GLEZER and D. G. VINOGRADOV (Ministerstvo Meditsinskoi Promyshlennosti SSSR, Nauchno-Issledovatel'skii Institut po Biologicheskim Ispytaniyam Khimicheskikh Soedinenii, Moscow, USSR) Kardiologiya (ISSN 0022-9040), vol. 23, June 1983, p. 116, 117. In Russian.

The bicycle-ergometer test with a continuously increasing load was compared to the same test with a discontinuously increasing load in terms of the markedness of hemodynamic shifts and the physical work capacity. Tests were conducted on 29 persons 15-35 years of age, divided into four groups: 8 healthy males; 9 males with neurocirculatory dystonia of hypertension type; 6 females with neurocirculatory dystonia of the hypertension type; and 6 females with I and IIA stage hypertension. Results show that the cardiovascular system functions with less stress in the case of discontinuously increasing load, which is manifested in a smaller increase in heart rate in the final stages of loading in all the groups studied. This is associated with an increase in the mean value of physical work capacity. B.J.

A84-15032

PHYSIOLOGICAL MECHANISMS OF THE ADAPTATION OF THE CARDIOVASCULAR AND THERMOREGULATORY SYSTEMS DURING THE EFFECT OF HIGH AMBIENT TEMPERATURE ON STEEL WORKERS [FIZIOLOGICHESKIE MEKHANIZMY ADAPTATSII SERDECHNO-SOSUDISTOI I TERMOREGULIATSIONNOI SISTEM PRI VOZDEISTVII NA METALLURGOV VYSOKOI TEMPERATURY VOZDUKHA]

G. D. LIAKH (Institut Kraevoi Patologii, Alma-Ata, Kazakh SSR) Gigiena Truda i Professional'nye Zabolevaniia, June 1983, p. 5-10. In Russian. refs

A84-15035

HYGIENIC ASSESSMENT OF NOISE AND VIBRATION IN THE OIL INDUSTRY [GIGIENICHESKAIA OTSENKA SHUMA I VIBRATSII V NEFTIANOI PROMYSHLENNOSTI]

R. KH. ALIEVA (Institut Gigieny Truda i Profzabolevaniu, Sumgait, Azerbaidzhan SSR) Gigiena Truda i Professional'nye Zabolevaniia, June 1983, p. 21-24. In Russian. refs

A84-15036

THE INFLUENCE OF THE PRESTARTING CONDITION ON THE COORDINATION OF MOVEMENTS AND EQUILIBRIUM OF WRESTLERS [VLIANIE PREDSTARTOVOGO SOSTOIANIIA NA KOORDINATSIIU DVIZHENII I RAVNOVESIE BORTSOV]

V. G. STRELETS, V. S. EFREMOV, and A. S. KORNEEV (Gosudarstvennyi Institut Fizicheskoi Kul'tury, Leningrad, USSR) Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), June 1983, p. 10-13. In Russian. refs

A84-15037

RESERVES OF SPEED IN THE BIATHLON [O REZERVAKH DISTANTSIONNOI SKOROSTI V BIATLONE]

O. A. SOLDATOV (Vsesoiuznyi Nauchno-Issledovatel'skii Institut Fizicheskoi Kul'tury, Moscow, USSR) Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), June 1983, p. 16, 17. In Russian. refs

A technique for improving the result in biathlon competition is described. It has been observed that most biathlon performers reduce their speed significantly when approaching the firing line, which worsens the result. In the present study the proposition is set forth that it is possible to approach the firing line without a decrease in competitive speed and without a deterioration in shooting quality. This hypothesis was confirmed by an experiment, which showed that a high level of preparedness can result in accurate shooting right after intense work at 180 yd/min and greater. B.J.

A84-15038

THE STATE OF THE SYMPATHICO-ADRENAL SYSTEM IN ATHLETES DURING VARIOUS TYPES OF EXERCISES [SOSTOIANIE SIMPATO-ADRENALOVOI SISTEMY Y SPRIINTEROV PRI RAZLICHNYKH VIDAKH TRENIROVOCHNYKH NAGRUZOK]

G. N. KASSIL and V. V. MEKHRIKADZE (Vsesoiuznyi Nauchno-Issledovatel'skii Institut Fizicheskoi Kul'tury, Moscow, USSR) Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), June 1983, p. 18, 19. In Russian. refs

A84-15039

THE ACTIVITY OF THE SYMPATHICO-ADRENAL SYSTEM AS AN INDICATOR OF ADAPTATION IN ATHLETES SUBJECTED TO RIGOROUS PHYSICAL STRESSES AT HIGH AMBIENT TEMPERATURES [AKTIVNOST' SIMPATO-ADRENALOVOI SISTEMY KAK POKAZATEL' ADAPTATSII SPORTSMENOV K VYPOLNENIIU FIZICHESKOI NAGRUZKI MAKSIMAL'NOI MOSHCHNOSTI V USLOVIIAKH VYSOKOI TEMPERATURY VNESHNEI SREDY]

L. S. GULIEVA (Azerbaidzhanski Gosudarstvennyi Meditsinskii Institut, Baku, Azerbaidzhan SSR) Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), June 1983, p. 20-22. In Russian. refs

A84-15040

THE PHYSICAL FITNESS FOR WORK DURING THE EARLY STAGE OF CONVALESCENCE OF PERSONS WHO HAVE SUFFERED ACUTE RHEUMATISM [FIZICHESKAIA RABOTOSOBNOST' LITS, PERENESSHIKH OSTRYI REVMAZM, V RANNEM VOSSTANOVITEL'NOM PERIODE]

A. G. ASADOV (Voenno-Meditsinskii Zhurnal (ISSN 0026-9050), June 1983, p. 32-36. In Russian. refs

A84-15041

THE USE OF COMPUTER TOMOGRAPHY IN DIAGNOSING THE WOUNDS FROM BULLETS THAT PENETRATE THE SKULL AND BRAIN [DIAGNOSTIKA PRONIKAIUSHCHIKH OGNESTREL'NYKH RANENII CHEREPA I GOLOVNOGO MOZGA S POMOSHCH'IU KOMPIUTERNOI TOMOGRAFII]

S. ABDERAKHMAN (Voenno-Meditsinskii Zhurnal (ISSN 0026-9050), June 1983, p. 52, 53. In Russian.

A84-15042

THE ACTION OF NOISE PULSES ON HUMANS AND ASPECTS OF MEASURING THESE PULSES AND SETTING STANDARDS FOR THEM [VOZDEISTVIE NA ORGANIZM CHELOVEKA IMPUL'SNYKH SHUMOV, OSOBNOSTI IKH IZMERENIIA I NORMIROVANIIA]

L. B. OZERETSKOVSKII, M. I. ZOLOTASHKO, E. P. TYRNOV, and T. I. A. BORISOVSKAIA (Voenno-Meditsinskii Zhurnal (ISSN 0026-9050), June 1983, p. 75-78. In Russian. refs

The methods used in Britain, the U.S., and West Germany for measuring the parameters that characterize noise pulses are discussed. The noises are those to which soldiers are exposed, that is, noise from rifle fire, artillery fire, and exploding shells. The adequacy of these methods depends on how well the values of the parameters obtained correspond to the medical conditions; that is, if the values of the parameters are low and the injury caused by the noise is severe, the method is invalid. In addition, the methods used to assess hearing impairments caused by noise pulses are discussed. C.R.

A84-15047

COMPUTER-ASSISTED TOMOGRAPHY FOR THE DIAGNOSIS OF CEREBRAL INSULT [KOMPIUTERNAIA TOMOGRAFIIA V DIAGNOSTIKE MOZGOVOGO INSUL'TA]

H. A. F. SCHULZE, M. MICHALIK, J. PLANITZER, M. ERISH, and T. LEONGARD (Berlin, Humboldt-Universitaet, Berlin, East Germany) Zhurnal Nevropatologii i Psikhatrii im. S. S. Korsakova (ISSN 0044-4588), vol. 83, no. 5, 1983, p. 681-684. In Russian. refs

A84-15161

MAN IN SPACE - AN OVERVIEW

O. G. GAZENKO (Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR) Aviation, Space, and Environmental Medicine (ISSN 0095-0562), vol. 54, Dec 1983, p. S3-S5

The effects of the space environment on humans are reviewed in the light of 22 years of experience, and the implications for future space-colonized projects are considered. The primary factors discussed are cosmic radiation and weightlessness. While operations near the earth are shown to expose crew members to only minimal amounts of radiation, interplanetary voyages will involve exposure to relativistic androns which could affect vital brain centers. Weightlessness brings numerous complications related to changes in the afferent nervous system, the cardiovascular system, and the loading of the musculoskeletal system which could well induce evolutionary changes in space colonists ('El Greco-type' humans in solar-system colonies or new species of the Homo genus in Galactic colonies). The risk factors for current spacecraft crew members are shown to be comparable to those encountered by test pilots or professional boxers. T.K.

A84-15165

CENTRAL CIRCULATION OF A NORMAL MAN DURING 7-DAY HEAD-DOWN TILT AND DECOMPRESSION OF VARIOUS BODY PARTS

V. E. KATKOV, V. V. CHESTUKHIN, E. M. NIKOLAENKO, V. V. RUMIANTSEV, and S. V. GVOZDEV (Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR) Aviation, Space, and Environmental Medicine (ISSN 0095-0562), vol. 54, Dec. 1983, p. S24-S30. refs

The effects of Chibis-suit decompression of upper body, lower body, or lower legs on central venous pressure (CVP) and pulmonary-artery systolic pressure (PAP) during 15-deg head-down

tilt over a period of 7 d is investigated experimentally in eight healthy male subjects. Pressures were measured via catheters placed in the pulmonary and radial arteries; cardiac output, by the thermodilution method; plasma renin and aldosterone, by RIA; and acid-base equilibrium and blood oxygenation, by an automatic gas analyzer. Decompression tests were performed before tilting and after 7 h, 2 d, 4 d, and 7 d of tilting, with pressure decreasing to -60 mm Hg over 2-3 min and then increasing to a steady-state value of -30 mm Hg for 15 min. The results are presented in graphs and tables. Upper-body decompression had an effect 3-4 times as large as that of lower-body or leg depression in lowering PAP and CVP (by 20 and 67 percent, respectively). The tilting caused no significant changes in CVP but a significant (p less than 0.05) 27-percent increase in PAP at 7 h, followed by a decrease to slightly subnormal levels at 3 d. The mechanisms of the responses are explored, and the potential usefulness of the catheterization technique for space experiments is indicated.

T.K.

A84-15166**MEDICAL RESULTS OF SALYUT-6 MANNED SPACE FLIGHTS**

E. I. VOROBEV, O. G. GAZENKO, A. M. GENIN, and A. D. EGOROV (Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR) Aviation, Space, and Environmental Medicine (ISSN 0095-0562), vol. 54, Dec. 1983, p. 531-540. refs

The major goal of medical investigations in the USSR long-term (up to 6 months) manned space flights was to accumulate information on human responses to prolonged weightlessness. Before, during and after these flights, detailed clinical, physiological, immunological and anthropometric examinations were conducted. The examinations demonstrated that man may well adapt to long-term space flight, retaining good health and a high work capacity. The changes seen postflight were reversible and disappeared completely after a relatively short readaptation period. Postflight changes did not correlate with the flight duration. A reasonable work-rest cycle and various physiological countermeasures were used, the efficiency of which were substantiated by means of regular medical examinations. These methods helped the cosmonauts to maintain good health status and adequate performance inflight and facilitated their readaptation postflight. Medical investigations performed during the Salyut-6 flights indicate that the duration of manned space flight can be increased.

Author

A84-15167* National Aeronautics and Space Administration, Washington, D. C.

BIOMEDICAL RESULTS OF THE SPACE SHUTTLE ORBITAL FLIGHT TEST PROGRAM

S. L. POOL and A. NICOGLOSSIAN (NASA, Washington, DC) Aviation, Space, and Environmental Medicine (ISSN 0095-0562), vol. 54, Dec. 1983, p. 541-549 refs

On July 4, 1982, the Space Shuttle Columbia landed at Edwards Air Force Base, CA, thus successfully completing the fourth and last in a series of Orbital Flight Tests (OFT) of the Space Transportation System (STS). The primary goal of medical operations support for the OFT was to assure the health and well-being of flight personnel during all phases of the mission. To this end, crew health status was evaluated preflight, inflight, and postflight. Biomedical flight test requirements were completed in the following areas: physiological adaptation to microgravity, cabin acoustical noise, cabin atmospheric evaluation, radiation dosimetry, crew exercise equipment evaluation, and a cardiovascular deconditioning countermeasure assessment.

Author

A84-15168* National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, Tex.

MEDICAL RESULTS FROM STS 1-4 - ANALYSIS OF BODY FLUIDS

C. S. LEACH (NASA, Johnson Space Center, Biomedical Laboratories, Houston, TX) Aviation, Space, and Environmental Medicine (ISSN 0095-0562), vol. 54, Dec. 1983, p. 550-554. refs

Venous blood was drawn from the eight crewmembers of Space Shuttle flights STS-1 through STS-4 three times before lift-off and twice after landing, and the characteristics of biochemical blood components were evaluated. Twenty-four-hour urine pools were collected 30 d before flight and on landing day or day 4 after landing, and electrolytes, selected hormones and other components were measured. The results indicated that, although fluid and electrolyte loss occur during space flight, conservation of these substances is begun almost immediately upon cessation of weightlessness. Enzyme and hormone measurements indicated that landing may have caused some stress on crewmembers.

Author

A84-15169* National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, Tex.

HUMAN CELLULAR IMMUNE RESPONSIVENESS FOLLOWING SPACE FLIGHT

G. R. TAYLOR and J. R. DARDANO (NASA, Johnson Space Center, Houston, TX) Aviation, Space, and Environmental Medicine (ISSN 0095-0562), vol. 54, Dec. 1983, p. 555-559. refs
(Contract NAS9-15425)

Peripheral circulating lymphocytes were separated from astronaut blood samples three times before and two times after the first four US Space Shuttle flights. The ability of the in vitro T lymphocytes to respond to Phytohemagglutinin by blastogenesis was found to be reduced for each crewmember following spaceflight. In addition, the astronauts experienced a postflight increase in neutrophils and a decrease in eosinophils. These postflight changes in leukocytes are shown to increase with subjectively-evaluated increases in the incidence of inflight stress, indicating that stress, and not hypogravity, is likely to be the major effector of these changes.

Author

A84-15171* National Aeronautics and Space Administration, Washington, D. C.

CONCEPTS FOR NASA LONGITUDINAL HEALTH STUDIES

A. E. NICOGLOSSIAN, S. L. POOL, C. S. LEACH, E. MOSELEY, and P. C. RAMBAUT (NASA, Washington, DC) Aviation, Space, and Environmental Medicine (ISSN 0095-0562), vol. 54, Dec. 1983, p. 568-572 refs

Clinical data collected from a 15-year study of the homogenous group of pre-Shuttle astronauts have revealed no significant long-term effects from spaceflight. The current hypothesis suggests that repeated exposures to the space environment in the Shuttle era will similarly have no long-term health effects. However, a much more heterogeneous group of astronauts and non-astronaut scientists will fly in Shuttle, and data on this group's adaptation to the space environment and readaptation to earth are currently sparse. In addition, very little information is available concerning the short- and long-term medical consequences of long duration exposure to space and subsequent readaptation to the earth environment. In this paper, retrospective clinical information on astronauts is reviewed and concepts for conducting epidemiological studies examining long-term health effects of spaceflight on humans, including associated occupational risks factors, are presented.

Author

A84-15726

CORRELATION BETWEEN HEMOGLOBIN MASS AND BODY COMPOSITION IN HEALTHY YOUNG MALES [KORRELIATSIIA MEZH DU MASSOI GEMOGLOBINA I SOSTAVOM TELA U ZDOROVYKH MOLODYKH MUZHCHIN]I. S. BALAKHOVSKII, R. K. KISELEV, and M. A. KAPLAN
Fiziologiya Cheloveka (ISSN 0131-1646), vol. 9, Nov.-Dec. 1983, p. 883-887. In Russian refs

Body composition, including hemoglobin mass, extracellular-fluid volume, and total potassium, was investigated in 31 healthy males 18-19 years in age. The volume of circulating blood and hemoglobin mass in the subjects correlated equally well with the value of the cellular mass and the extracellular-fluid volume. The cellular components of the body (i.e., the hemoglobin mass and the potassium mass) correlated equally well with the growth and mass of the body, while the extracellular components correlated better with body mass than with growth.

B.J.

A84-15727

AGE-RELATED DYNAMICS AND SEX-RELATED DIFFERENCES OF CERTAIN RHEOENCEPHALOGRAPH INDICATORS OF HEALTHY HUMANS [VOZRASTNAIA DINAMIKA I POLOVYE RAZLICHIIA NEKOTORYKH POKAZATELEI REOENTSEFALOGRAMMY ZDOROVOGO CHELOVEKA]

V. A. SAVOSTIN and A. K. GUSKOVA Fiziologiya Cheloveka (ISSN 0131-1646), vol. 9, Nov.-Dec. 1983, p. 888-891. In Russian. refs

A84-15728

CHANGES IN THE ARTERIAL PRESSURE UNDER STATIC WORK DEPENDING ON THE TIME OF THE DAY AND THE DISTURBANCE LEVEL OF THE GEOMAGNETIC FIELD [IZMENENIIA ARTERIAL'NOGO DAVLENIIA PRI STATICHESKOI RABOTE V ZAVISIMOSTI OT VREMENI SUTOK I STEPENI VOZMUSHCHENNOSTI MAGNITNOGO POLIA ZEMLI]

V. A. KUZMENKO and A. B. BULUEV (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Fiziologiya Cheloveka (ISSN 0131-1646), vol. 9, Nov.-Dec. 1983, p. 892-896. In Russian. refs

The amount of increase in systolic arterial pressure during the static contraction of right-hand muscles in 28 healthy young males 18-30 years in age was found to vary depending on the time of day and the geomagnetic disturbance level. The mean value of the response was about the same in the period from 8 AM to 8 PM but increased by 58 percent toward 4 AM. The dependence of the pressor reaction on the geomagnetic disturbance level was nonlinear, and describable by an M-shaped curve. Changes in arterial-pressure reactions to physical load depending on the disturbance level were not conditioned by changes in the initial level of arterial pressure and in most cases were not associated with variations of the cardiac reaction.

B.J.

A84-15729

THE RELATIONSHIP BETWEEN INDICATORS OF MENTAL WORK CAPACITY AND PARAMETERS OF THE BLOOD-CIRCULATION SYSTEM BEFORE AND AFTER PHYSICAL EXERCISE [SVIAZ' POKAZATELEI UMSTVENNOI RABOTOSPOBNOСТИ S PARAMETRAMI SISTEMY KROVOOBRAŠCHENIIA DO I POSLE FIZICHESKOI NAGRUIKI]

N. I. SAPOVA and T. A. PAVLOVA Fiziologiya Cheloveka (ISSN 0131-1646), vol. 9, Nov.-Dec. 1983, p. 897-901. In Russian. refs

Psychophysiological tests were used to investigate the mental work capacity of 16 males 23-35 years in age before and after exercise on a bicycle ergometer at a power of 75 W for a duration of 3 min. Results showed an increase in the blood supply of the brain and the heart rate as the variability of the pulse rate decreased during the performance of mental work that did not cause significant nervous-emotional stress. Light physical exercise of short duration was found to lead to an increase in mental work capacity; the psychophysiological indicators increased on the average by 9 percent. This increase was apparently caused by a higher level of

blood supply of the brain and an intensification of sympathetic effects after physical exercise.

B.J.

A84-15730

INDIVIDUAL FEATURES OF RESPONSE OF THE CARDIOVASCULAR SYSTEM TO STANDARD PHYSICAL EXERCISE AND INDICATORS OF WATER-SALT BALANCE [INDIVIDUAL'NYE OSOBNOSTI REAGIROVANIIA SERDECHNO-SOSUDISTOI SISTEMY NA STANDARTNUIU FIZICHESKUIU NAGRUIZKU I POKAZATELI VODNO-SOLEVOGO RAVNOVESIIA]

I. V. LOBOVA, V. D. SLEPUSHKIN, and D. V. DEMIN (Akademiia Meditsinskikh Nauk SSSR, Tomsk, USSR) Fiziologiya Cheloveka (ISSN 0131-1646), vol. 9, Nov.-Dec. 1983, p. 902-906. In Russian. refs

A84-15731

THE EFFECT OF PHYSICAL TRAINING IN THE ISOMETRIC REGIME ON REACTIONS OF THE CARDIOVASCULAR SYSTEM [VLIANIE FIZICHESKOI TRENIROVKI V IZOMETRICHESKOM REZHIME NA REAKTSII SERDECHNO-SOSUDISTOI SISTEMY]

A. B. GANDELSMAN, T. A. EVDOKIMOVA, and V. P. PONOMAREV (Institut Fizicheskoi Kul'tury, Leningrad, USSR) Fiziologiya Cheloveka (ISSN 0131-1646), vol. 9, Nov.-Dec. 1983, p. 913-916. In Russian refs

A84-15732

QUALITY OF HEART-RHYTHM REGULATION AND ADAPTIVE POSSIBILITIES OF THE BODY UNDER PHYSICAL WORK [KACHESTVO REGULIROVANIIA SERDECHNOGO RITMA I ADAPTATSIONNYE VOZMOZHNOСТИ ORGANIZMA PRI FIZICHESKOM TRUDE]

N. P. GREBNIK (Nauchno-Issledovatel'skii Institut Gigieny Truda i Profzabolevani, Donetsk, Ukrainian SSR) Fiziologiya Cheloveka (ISSN 0131-1646), vol. 9, Nov.-Dec. 1983, p. 917-920. In Russian. refs

The features characterizing the functional condition of principal body systems and the response of the cardiorespiratory system to physical work was investigated in 296 healthy miners with various qualities of heart-rhythm regulation. A greater mobilization of physiological functions and greater potential blood supply, oxygen-transport function, and energy metabolism were found in workers with higher coefficients of regulation quality. It is suggested that the regulation quality is a reflection on the intersystem level of the general properties of the principal body systems, having great significance for human adaptation to work conditions.

B.J.

A84-15733

CONDITION OF THE SYMPATHETIC-ADRENAL SYSTEM IN THE CASE OF SHORT-TERM PHYSICAL EXERCISE OF MAXIMUM INTENSITY [SOSTOIANIE SIMPATO-ADRENALOVOI SISTEMY PRI KRATKOVREMENNYKH FIZICHESKIKH NAGRUIKAKH PREDEL'NOI INTENSIVNOSTI]

V. V. MEKHRIKADZE, S. D. GALIMOV, and G. N. KASSIL (Vsesoiuznyi Nauchno-Issledovatel'skii Institut Fizicheskoi Kul'tury, Moscow, USSR) Fiziologiya Cheloveka (ISSN 0131-1646), vol. 9, Nov.-Dec. 1983, p. 921-926. In Russian. refs

A84-15734

ELASTIC PROPERTIES OF ARTERIES AND THE HEMODYNAMICS OF WORKING AND NONWORKING EXTREMITIES [UPRUGIE SVOITVA ARTERII I GEMODINAMIKA RABOTAVSHIKH I NERABOTAVSHIKH KONECHNOSTEI]

M. D. ROIFMAN and B. I. MAZHBIKH (Akademiia Meditsinskikh Nauk SSSR, Novosibirsk, USSR) Fiziologiya Cheloveka (ISSN 0131-1646), vol. 9, Nov.-Dec. 1983, p. 927-934. In Russian refs

A84-15735

VEGETATIVE REGULATION OF CENTRAL HEMODYNAMICS IN ACTIVE ORTHOSTASIS [VEGETATIVNAIA REGULIATSIIA TSENTRAL'NOI GEMODINAMIKI V AKTIVNOM ORTOSTAZE]

V. R. VEBER (Sempalatinskii Meditsinskii Institut, Sempalatinsk, Kazakh SSR) Fiziologiya Cheloveka (ISSN 0131-1646), vol. 9, Nov.-Dec. 1983, p. 939-941. In Russian. refs

Orthostatic changes of vegetative and hemodynamic indicators in 38 healthy persons were investigated, and it was found that the level of the orthostatic variability of the general peripheral resistance of blood vessels was directly dependent on the activity of the suprasegmentary (ergotropic) level of regulation. The dominance of the central node was accompanied by more marked deviations of the hemodynamic indicators from the initial values, while the weakening of central effects was accompanied by a lower variability of these indicators. Sex-related differences in the degree of participation of the suprasegmentary system in the regulation of the cardiovascular system were expressed in a higher tonicity of the ergotropic regulation in males. B.J.

A84-15736

CHANGES IN BODY-FLUID VOLUMES IN CONDITIONS OF ANTIORTHOSTATIC HYPODYNAMICS AND THE ACTION OF FUROSEMIDE [IZMENENIE OB'EMOV ZHIDKIKH SRED ORGANIZMA V USLOVIYAKH ANTIORTOSTATICHESKOI GIPODINAMII I DEISTVIA FUROSEMIDA]

I. G. DLUSSKAIA, E. V. LAPAEV, V. S. PANCHENKO, R. K. KISELOV, V. A. KARPUSHEVA, and B. F. ASIAMOLOV Fiziologiya Cheloveka (ISSN 0131-1646), vol. 9, Nov.-Dec. 1983, p. 942-945. In Russian. refs

The dynamics of the volume of circulating blood, extracellular fluid, and diuresis was investigated in seven healthy males 20-22 years in age, each of whom was subjected to a prolonged period of antiorthostatic (-10 deg) hypodynamics. It is shown that the double administration of furosemide at a dose of 40 mg at the second and eighth hours of the first seven days of antiorthostatic hypodynamics somewhat accelerated and intensified the contraction of the circulating-blood volume in the first 30 hours of the study. During the next two days of antiorthostatic hypodynamics, the circulating-blood volume practically returned to the initial values in persons to whom furosemide was administered. B.J.

A84-15737

THE EFFECT OF MUSCLE LOADING ON THE SECRETORY FUNCTION OF THE STOMACH AND PANCREAS [VLIANIE MYSHECHNOI NAGRUZKI NA SEKRETOURNIU FUNKTSIU ZHELUDKA I PODZHELUDOCHNOI ZHELEZY]

A. P. KUZNETSOV (Kurganskii Pedagogicheskii Institut, Kurgan, USSR) Fiziologiya Cheloveka (ISSN 0131-1646), vol. 9, Nov.-Dec. 1983, p. 946-955. In Russian. refs

A84-15738

DYNAMICS OF THE FUNCTIONAL CONDITION AND SUBJECTIVE SENSATIONS DURING ACCLIMATIZATION TO HEAT [DINAMIKA FUNKTSIONAL'NOGO SOSTOYANIYA I SUB'EKTIVNYKH OSHCHUSHCHENII V PROTSESSE TEPLOVOI ADAPTATSII]

A. T. MARIANOVICH, V. D. BAKHAREV, L. A. GRIDIN, and P. M. IARTSEV (Voenno-Meditsinskaya Akademiya, Leningrad, USSR) Fiziologiya Cheloveka (ISSN 0131-1646), vol. 9, Nov.-Dec. 1983, p. 956-962. In Russian. refs

Eight healthy subjects (young males) were subjected to daily two-hour effects of a hot environment (49 C) at a relative humidity of 20 percent over a five-day period. As the result of heat acclimatization, a reduction in rectal temperature and heart rate was noted in all the subjects, and an improvement in the subjective state in some. The results lead to the conclusion that the considerable return of the thermal condition to the initial level observed in some of the subjects is accomplished by the activity of homeostatic mechanisms, the unique manifestation of which is the increased sensation of discomfort. The possible subsequent condition, where the heat-balance disruption and the discomfort sensation of most of the subjects is set at a minimum level, is

then considered as a sign of a more complete acclimatization to the environment B.J.

A84-15739

THE EFFECT OF BODY TEMPERATURE ON WORK CAPACITY IN HUMANS [VLIANIE TEMPERATURY TELA NA RABOTOSPOBNOST' CHELOVEKA]

A. S. PAVLOV (Voroshilovgradskii Mashinostroitel'nyi Institut, Voroshilovgrad, Ukrainian SSR) Fiziologiya Cheloveka (ISSN 0131-1646), vol. 9, Nov.-Dec. 1983, p. 963-968. In Russian. refs

Changes of a variety of indicators of physical and mental work capacity were investigated in trained and untrained persons at various levels of gradually developing muscular hyperthermia in the range of 1.5-2.0 deg. It is shown that in conditions of such hyperthermia the work-capacity indicators first increase by 108-112 percent and then decline. These results lead to the conclusion that an increase of body temperature under physical-load conditions is a positive phenomenon. B.J.

A84-15740

INVESTIGATION OF THE SPATIAL ASYMMETRY OF THE EXTERNAL ELECTRIC FIELD OF THE HUMAN BODY [ISSLEDOVANIE PROSTRANSTVENNOI ASIMMETRII VNESHNEGO ELEKTRICHESKOGO POLIA CHELOVEKA]

I. V. TORNUEV and S. A. KUDELKIN (Akademiya Meditsinskikh Nauk SSSR, Novosibirsk, USSR) Fiziologiya Cheloveka (ISSN 0131-1646), vol. 9, Nov.-Dec. 1983, p. 969-973. In Russian. refs

An analysis is made of experimental data concerning the spatial characteristics of the external electric field and impedance of the human body under normal conditions and under the effect of physical and physiological loads. The asymmetry index of the electrophysical properties of the body is considered as the informative parameter. A relationship is established between the dynamics of the external electric field and the impedance components, and mechanisms responsible for the formation of the structure of the external electric field are examined. It is shown that the condition of certain regulatory functions of the body can be evaluated by analyzing the structure and dynamics of the external field. B.J.

A84-15741

THE PSYCHOPHYSICS OF PROPRIOCEPTOR SENSITIVITY [PSIKHOFIZIKA PROPRIOTSEPTIVNOI CHUVSTVITEL'NOSTI]

I. A. RYBIN, A. N. SERGEEVA, and A. P. KASATOV (Ural'skii Gosudarstvennyi Universitet, Sverdlovsk, USSR) Fiziologiya Cheloveka (ISSN 0131-1646), vol. 9, Nov.-Dec. 1983, p. 974-978. In Russian. refs

The ability to assess the turn angle of the forearm in the horizontal plane was investigated in two series of observations on 150 subjects. In the first series, the subject himself, without visual monitoring, moved his arm to a certain intermediate value specified by the researcher (active movement A); while in the second series the arm was moved by the researcher (passive movement P). It is shown that the Stevens function power distribution was normal in A movement but asymmetric in P movement. It is suggested that this heterogeneity is caused by an indeterminacy factor in the case of P movement. B.J.

A84-15742

INTERACTION OF THE EXTERNAL AND INTERNAL SYSTEMS OF COORDINATES DURING THE ORIENTATION OF THE HAND WITH RESPECT TO DIFFERENT TARGETS [VZAIMODEISTVIE VNESHNEI I VNYTRENNEI SISTEMY KOORDINAT PRI ORIENTIROVKE RUKI OTNOSITEL'NO RAZLICHNYKH TSELEI]

B. B. BOKHOV Fiziologiya Cheloveka (ISSN 0131-1646), vol. 9, Nov.-Dec. 1983, p. 979-988. In Russian. refs

A84-15743

THE STRUCTURAL ORGANIZATION OF SLEEP AND THE RELATIONSHIP BETWEEN THIS ORGANIZATION AND THE PSYCHOLOGICAL CHARACTERISTICS OF HEALTHY PERSONS [STRUKTURNAIA ORGANIZATSIIA SNA I EE SVIAZ' S PSIKHOLOGICHESKIMI OSOBENOSTIAMI ZDOROVYKH LITS]

K. K. NIKIFORUK, N. M. PROKOPOVA, V. S. ROTENBERG, and P. I. U. FILENKOV (I Moskovskii Meditsinskii Institut, Moscow, USSR) *Fiziologiya Cheloveka* (ISSN 0131-1646), vol. 9, Nov.-Dec. 1983, p. 989-993. In Russian. refs

A correlation analysis is made of the indicators of the structure of night sleep and results of a complex psychodiagnostic evaluation of healthy persons. Factors are identified which affect the structural organization of sleep, and the character of delta and REM sleep. It is shown that the organization of the first cycle of sleep has a determining effect on its further character. In healthy persons, psychological factors are shown to have a greater effect on the duration of delta sleep than on the duration of REM sleep, the latter duration correlates only with the degree of frustration. B.J.

A84-15744

RELATIONSHIP BETWEEN THE CHARACTERISTICS OF THE BIOCONTROL OF EEG RHYTHMS AND INDICATORS OF OPERATOR ACTIVITY [SVIAZ' KHARAKTERISTIK BIOUPRAVLENIIA RITMAMI EEG S POKAZATELIAMI OPERATORSKOI DEIATEL'NOSTI]

V. G. MARKMAN, S. S. KURGUZOV, and M. Z. KHANDOV (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR) *Fiziologiya Cheloveka* (ISSN 0131-1646), vol. 9, Nov.-Dec. 1983, p. 994-998. In Russian. refs

The relationship between indicators of operator activity and the ability to voluntarily regulate various EEG rhythms was investigated in 16 healthy males 18-20 years in age. It is shown that the biocontrol characteristics are not associated with temporal assessments of the quality of operator activity. The success with which an operator finds the right solution in an extreme situation depends, to a considerable degree, on the ability to control the alpha rhythm, not the theta rhythm. B.J.

A84-15746

THE OBJECT, TASKS, AND MAIN TRENDS OF CHRONOBIOLOGICAL STUDIES IN SOVIET PHYSIOLOGY [PREDMET, ZADACHI I OSNOVNYE NAPRAVLENIIA KHRONOBIOLOGICHESKIKH ISSLEDOVANIÍ V OTCHESTVENNOI FIZIOLOGII]

F. I. KOMAROV (I Moskovskii Meditsinskii Institut, Moscow, USSR) and N. I. MOISEEVA (Akademiia Meditsinskikh Nauk SSSR, Leningrad, USSR) *Fiziologiya Cheloveka* (ISSN 0131-1646), vol. 9, Nov.-Dec. 1983, p. 1011-1022. In Russian. refs

A survey of the Soviet literature on chronobiology is presented. Particular attention is given to the main tasks of chronobiological studies: (1) the elucidation of the general properties of biological time and their evolution, (2) the investigation of the human (psychological) perception of time; and (3) the investigation of the structure of biorhythm processes. The development of methods for the analysis of chronobiological data is also discussed. B.J.

A84-15747

RELATIONSHIP BETWEEN CATECHOLAMINE LEVELS IN THE BLOOD AND INDIVIDUAL FEATURES OF THE ERROR DYNAMICS OF OPERATOR ACTIVITY [SVIAZ' UROVNEI KATEKHOLAMINOV V KROVI S INDIVIDUAL'NYMI OSOBENOSTIAMI DINAMIKI OSHIBOCHNOSTI DEIATEL'NOSTI OPERATORA]

S. E. POPOV and A. V. MIROLIUBOV (Voenno-Meditsinskaiia Akademiia, Leningrad, USSR) *Fiziologiya Cheloveka* (ISSN 0131-1646), vol. 9, Nov.-Dec. 1983, p. 1023, 1024. In Russian.

A84-15788

ACUTE POISONING BY TETRAHYDROFURFURYL ALCOHOL IN COMBINATION WITH METHANOL [OSTRYE OTRAVLENIIA TETRAGIDROFURFURILOVYM SPIRTOM V KOMBINATSII S METANOLOM]

B. F. MURASHOV, V. K. DRUCHENKO, V. D. GENZHEEV, and V. A. KARAULOV *Voenno-Meditsinskii Zhurnal* (ISSN 0026-9050), Oct. 1983, p. 32-34. In Russian.

An analysis is presented of the symptoms exhibited by 12 persons who took perorally a mixture (technical grade) of tetrahydrofurfuryl alcohol and methanol. The eight persons who suffered mild cases took 30-100 ml; the one person whose case was of moderate severity took 100-120 ml; and the three who were seriously poisoned took 150-200 ml. For the severe cases, the most striking feature was the effect on the central nervous system (cerebral coma). With timely hemodialysis it was possible to prevent the development of acute hepatonephric insufficiency. For the moderate case, the effect on the central nervous system manifested itself through symptoms of toxic encephalopathy; this was followed by the development of acute hepatonephric insufficiency. With the mild cases, the symptoms were those of ordinary intoxication, and recovery was rapid. C.R.

A84-15790

EVALUATING THE ADAPTIVE SELF-REGULATION OF HEART RHYTHM FREQUENCY DURING AN ACTIVE ORTHOSTATIC TEST [K OTSENKE ADAPTIVNOI SAMOREGULIATSII CHASTOTY SERDECHNOGO RITMA PRI AKTIVNOI ORTOPROBE]

A. I. ZHEVZHIK and V. A. SERGEEV *Voenno-Meditsinskii Zhurnal* (ISSN 0026-9050), Oct. 1983, p. 43-45. In Russian. refs

A pilot who is not in a pathological state but who, say, is showing the first signs of overwork or has not yet fully recovered from an illness may not perform as expected when subjected to a demanding situation or unusual conditions during flight. Medical examinations must increase in sophistication to detect such physiological states. One approach that is thought to hold promise is a qualitative and quantitative analysis of the transitional characteristics exhibited in the adaptive self-regulation of important physiological functions during stress tests. An orthostatic test is described in which pilots and navigators rapidly stand from a sitting position. It is shown that the time necessary for the pulse to return to normal is a useful physiological indicator. C.R.

N84-12712* National Aeronautics and Space Administration, Washington, D. C.

AEROSPACE MEDICINE AND BIOLOGY: A CONTINUING BIBLIOGRAPHY WITH INDEXES (SUPPLEMENT 250)

Oct. 1983 78 p
(NASA-SP-7011(250); NAS 1 21:7011(250)) Avail: NTIS HC \$7.00 CSCL 06E

This bibliography lists 265 reports, articles and other documents introduced into the NASA scientific and technical information system in September 1983. Author

N84-12713# Committee on Science and Technology (U. S. House).

BIOLOGICAL CLOCKS AND SHIFT WORK SCHEDULING

Washington GPO 1983 411 p refs Hearings before the Subcomm. on Invest. and Oversight of the Comm. on Sci. and Technol., 98th Congr., 1st Sess., no. 7, 23-24 Mar. 1983 (GPO-21-747) Avail: Subcommittee on Investigations and Oversight

A variety of problems which hold consequences for labor, management, and the general public result for shift work scheduling that is not based on research in circadian rhythm. Representatives of airline pilots, nurses, police, factory workers, and nuclear power plant operators delineate the physiological, psychological, and social effects of rotating shifts. Pilot fatigue and desynchronization as factors in aircraft accidents is examined as well as management efforts to address problems of biological rhythms and shift work scheduling. A.R.H.

N84-12714# Army Aeromedical Research Lab., Fort Rucker, Ala.

EXTENT OF HEARING LOSS AMONG ARMY AVIATORS AT FORT RUCKER, ALABAMA

L. J. PETERS and H. FORD Aug. 1983 62 p
(Contract DA PROJ. 3E1-62777-A-878)
(AD-A132069; USAARL-83-12) Avail: NTIS HCA04/MFA01
CSCL 06S

This study provided hearing threshold data for Army aviators stationed at Fort Rucker, Alabama, from February through August 1982. The mean pure tone thresholds were found to be improved when compared to data gathered by Walden and McCurdy in 1971. This improvement partially was attributed to redesign of the aviation helmet and increased awareness and compliance with hearing conservation measures. It is possible that tighter administrative controls also contributed to the reduced threshold values. This study further indicated that, for Fort Rucker aviators, there exist three threshold regions correlated with flight hours: 50-400 flight hours, 401-3000 flight hours, and 3001-6000 flight hours. Each region has a specific range of hearing loss measured by comparing 2000 and 4000 Hz thresholds for the left ear. Anyone falling outside the threshold range for her/his respective region could be identified for possible follow-up procedures.

Author (GRA)

N84-12715# Naval Aerospace Medical Research Lab., Pensacola, Fla.

FIGURAL AFTEREFFECTS: AN EXPLANATION IN TERMS OF MULTIPLE MECHANISMS IN THE HUMAN VISUAL SYSTEM

M. Y. ERAUD, F. M. BAGRASH, and G. R. STOFFER 19 Apr 1983 21 p
(AD-A132066; NAMRL-MONOGRAPH-30) Avail: NTIS
HCA02/MFA01 CSCL 05J

As an alternative to the classical explanation of figural aftereffects (FAE), it was hypothesized that FAE are due to changes in the relative activities of multiple mechanisms tuned to specific features of the stimulus pattern. Changes along the stimulus dimensions of size and orientation were studied. The rationale was that prolonged exposure to an inspection figure (IF) of a particular size or orientation would change the appearance of a test figure (TF) to the extent that these two figures stimulate the same mechanism. Following selective adaption to a particular IF, subjects were required to make size or orientation judgements with the size or orientation of the IF serving as the anchor for these judgments. Results indicated that there was a particular range of TF size or orientation over which a given IF would produce perceptual changes. The TFs outside this range were not affected. Findings were compared with the classical explanation and the role of multiple mechanisms as a basis of FAE was elaborated.

Author (GRA)

N84-12716# Naval Aerospace Medical Research Lab., Pensacola, Fla.

AN AGE COMPARISON OF THE VESTIBULO-OCULAR COUNTERROLL REFLEX Interim Report

J. G. POLLACK and C. DIAMOND 22 Feb. 1983 20 p
(Contract NAMRL PROJ. F58528)
(AD-A132064; NAMRL-1292) Avail: NTIS HCA02/MFA01
CSCL 06P

This report examines the relationship between age and a measure considered to be related to static otolith function; viz., the amplitude of ocular counterroll under conditions of static whole body tilts. Amount of counterroll was measured for two groups of subjects (22 to 34 years, and 50 to 74 years) to whole body tilts to the right and left. It was found that the young group exhibited more counterroll to tilt than the older group, but this difference was small. In addition, head tilts to the right produced larger counterrolls than tilts to the left in both groups. It is concluded that, because of the considerable variability in the responses from subject to subject, the potential contribution of the static counterroll response to the establishment of agefree biomedical standards is limited.

Author (GRA)

N84-12717# Naval Aerospace Medical Research Lab., Pensacola, Fla.

VESTIBULO-OCULAR REFLEX GAIN IN MAN DURING ACTIVE VERSUS PASSIVE OSCILLATION AND THE INFLUENCE OF VOLUNTARY GAZE-CONTROL TASKS Interim Report

R. M. JELL, C. W. STOCKWELL, G. T. TURNIPSEED, and F. E. GUEDRY, JR. 13 Dec. 1982 15 p
(AD-A132006; NAMRL-1290) Avail: NTIS HCA02/MFA01
CSCL 06S

This report compares passive and active oscillation and also examines effects of instruction sets on the vestibulo-ocular reflex in order to establish procedural guidelines for simple procedures for testing visual and vestibular interaction in operational settings. Manual oscillation was feasible for generating passive whole-body oscillations up to 1.0 Hz. Below 1.0 Hz, VOR gain was virtually zero when subjects tracked a head-fixed target and -1.0 when they tracked an earth-fixed target. Below 1.0 Hz in darkness, VOR gain was intermediate between these two values, but it was markedly influenced by instructions: when subjects were instructed to track an imagined earth-fixed target, the gain was significantly higher than it was when they were instructed to track an imagined head-fixed target. At oscillation frequencies above 1.0 Hz, VOR gain converged at approximately -0.90, regardless of instructions or stimulus conditions. VOR gain was the same whether oscillation was active or passive, except under the condition imagined head-fixed target in darkness, where active oscillation yielded higher gains than passive oscillation.

Author (GRA)

N84-12718# Army Command and General Staff Coll., Fort Leavenworth, Kansas.

PHYSICAL FITNESS AS A MODERATOR OF COGNITIVE DEGRADATION DURING SLEEP DEPRIVATION M.S. Thesis

H. L. THOMPSON, III 3 Jun. 1983 164 p
(AD-A131962; AD-E750837) Avail: NTIS HCA08/MFA01
CSCL 06N

There has been considerable speculation in the military as to the ability of physical fitness to moderate cognitive degradation resulting from sleep deprivation during continuous combat operations. The purpose of this investigation was to test the hypothesis that the level of physical fitness would moderate cognitive degradation such that individuals in a high fitness group would show less cognitive degradation during sleep deprivation than individuals in a low fitness group. To test the hypothesis, 16 male ROTC students participated in a 48 hours field training exercise without sleep. Cognitive performance measures made at regular intervals throughout the exercise revealed significant cognitive performance degradation beginning at 24 hours. Degradation continued throughout the exercise. Performance decrements appeared to have recovered to pre-deprivation levels after 24 hours of rest. Analyses did not reveal a significant main effect of physical fitness level. Although there were several interesting findings, the physical fitness hypothesis was not supported. (author)

GRA

N84-12719# Army Research Inst. of Environmental Medicine, Natick, Mass.

EFFECT OF ATROPINE ON THE EXERCISE-HEAT PERFORMANCE OF MAN

M. N. SAWKA, L. LEVINE, M. A. KOLKA, B. S. APPLETON, and B. E. JOYCE Jul. 1983 18 p
(Contract DA PROJ. 3M1-62734-A-875)
(AD-A131843; USARIEM-M41/83) Avail: NTIS HCA02/MFA01
CSCL 06S

This paper summarizes the findings from two recent studies involving the physiological effects of atropine (0-4 mg, i.m.) on soldiers performing physical exercise in hot-dry environments. Study I determined the threshold of physiological effects and the gradation of these effects with increasing dosage of atropine. Study II examined the effects of exercise-heat acclimation on the reduced physical exercise performance that occurs following atropine administration. The following new observations were made: (1) a 0.5 mg dose of atropine elevates heart rate, rectal temperature and mean skin temperature; (2) atropine exerts its peak

physiological effects approximately 70 minutes after intramuscular injection; (3) within the dosage levels tested, the magnitude of the elevated heart rate response is curvilinearly related to atropine dosage, whereas, the magnitude of the elevated rectal temperature response is linearly related atropine dosage; (4) repeated administration of atropine over a number of days does not alter thermoregulatory responses; (5) heat acclimation improves exercise-heat performance of individuals under the influence of atropine by enabling a reduced rectal temperature; and (6) heat acclimation increases the sweat output of individuals under the influence of atropine; however, the absolute reduction in sweat output from atropine is the same pre- and post-heat acclimation.

GRA

N84-12720# Brookhaven National Lab., Upton, N. Y. Div. of Chemical Sciences.

USES OF SYNCHROTRON RADIATION

B. M. GORDON 1983 11 p refs Presented at the Workshop on Uses of Nucl. Anal. Methods in Metal Toxicology, Upton, N.Y., 11 Oct. 1982

(Contract DE-AC02-76CH-00016)

(DE83-014431; BNL-33143; CONF-8210106-5) Avail: NTIS HC A02/MF A01

X-ray fluorescence has long been used as a techniques for elemental analysis X-ray fluorescence techniques have a number of features that make them attractive for application to biomedical samples. In the past few years synchrotron radiation X-ray sources have been developed and, because of their properties, their use can improve the sensitivity for trace element analysis by two to three orders of magnitude. Also, synchrotron radiation will make possible an X-ray microprobe with resolution in the micrometer range. The National Synchrotron Light Source (NSLS), a dedicated synchrotron radiation source recently built at Brookhaven National Laboratory, will have a facility for trace element analysis by X-ray fluorescence and will be available to all interested users DOE

N84-13374# National Bureau of Standards, Washington, D.C.
STUDY OF BIOLOGICAL SAMPLES OBTAINED FROM VICTIMS OF MGM GRAND HOTEL FIRE

M. BIRKY, D. MALEK, D. MAYNE, and M. PAABO *In Building Research Inst. Proc. of the 6th Joint Panel Meeting* p 622-652 1982 refs

Avail: NTIS HC A99/MF A01

Sample treatment and analytical schemes used to examine blood samples and thawed lung tissues four months after the fire are described. Results of THb, COHb, MetHb and O2Hb tests are presented and compared with the initial values obtained immediately after the fire as well as with results obtained following a fire in Maryland. Approximately 47% of the MGM Grand Hotel fire victims had less than 50% COHb saturation, a COHb level that was used as a criterion for lethality. Efforts to identify other toxic products through head space analysis on the lung tissue samples did not provide additional information on the toxic nature of the products; however, X ray fluorescence measurements in scraping taken from 2 bronchii samples showed that a compound containing bromine was an inhaled product Findings of methylbromine in soot collected from filters in the air handling system, bromine in synthetics used in the interior materials in the casino, and bromine in soot taken from the respiratory tracts suggest that toxicants other than carbon monoxide could have contributed to the toxic nature of the fire.

A.R.H.

N84-13375# Building Research Inst., Tokyo (Japan).
US-JAPAN COOPERATIVE RESEARCH ON EVALUATION OF TOXICITY

S. YUSA, F. SAITO, and M. YOSHIDA *In its Proc. of the 6th Joint Panel Meeting* p 655-663 1982 refs

Avail: NTIS HC A99/MF A01

The sensitivity of toxicity in mice and rats from the combustion products of Douglas fir, acrylic carpet, and particle board was examined. Experiments conducted using the Japanese method yielded results which contradict those obtained from using the NBS method. The cause of this may be the difference in the

process of forming the combustion product. Accordingly, the atmospheric oxygen condition for combustion may affect the formation of effluent products.

A.R.H.

N84-13376# Yokohama Municipal Univ. (Japan). Dept. of Legal Medicine.

PHYSIOLOGICAL FUNCTION OF COMBUSTION GAS AND ESPECIALLY THAT OF CN

Y. NISHIMARU and Y. TSUDA *In Building Research Inst. Proc. of the 6th Joint Panel Meeting* p 664-669 1982

Avail: NTIS HC A99/MF A01

When cyanide is absorbed and enters the blood stream, functions of the oxigenate ferment are suppressed in internal organs and tissues cells; the oxygen in blood is prevented from being consumed. The CN immediately unites with ferments such as cytochrome and interferes with their functions. In examples of death due to cyanide poisoning, cyanide hemoglobin is sometimes detected but it is now thought the CNHb probably does not function as a blood poison. A minute quantity of CN causes stimulation of the central nervous system but paralysis occurs immediately after. The respiratory functions are most easily affected, then the vasomotor and convulsion centers. There is evidence that CN also causes myocardial infarction. Research is needed to determine how much of the damages done by CN, which is more poisonous than CO, is reversible.

A.R.H.

N84-13767*# National Aeronautics and Space Administration, Washington, D. C.

AEROSPACE MEDICINE AND BIOLOGY: A CONTINUING BIBLIOGRAPHY WITH INDEXES (SUPPLEMENT 251)

Nov. 1983 95 p

(NASA-SP-7011(251); NAS 1 21.7011(251)) Avail: NTIS HC A05/MF A01 CSCL 06E

This bibliography lists 322 reports, articles and other documents introduced into the NASA scientific and technical information system in October 1983.

Author

N84-13768 Pennsylvania State Univ., University Park.
PHYSIOLOGICAL RESPONSES OF NORMOTENSIVES AND ESSENTIAL HYPERTENSIVES TO EXERCISE IN THE HEAT
Ph.D. Thesis

W. L. KENNEY, JR. 1983 128 p

Avail: Univ. Microfilms Order No DA8312640

Six essential hypertensives (mean resting arterial pressure = 149/97 mm Hg) and eight normotensive controls (mean resting arterial pressure = 115/73 mm Hg) were tested during one hour of dynamic leg exercise in the heat. Environmental conditions were set at a dry bulb temperature of 38 C and a wet bulb temperature of 28 C; exercise intensity was preset to approximate 40% of each individual's maximal aerobic capacity. During exercise in the heat, the difference in arterial blood pressure between the two groups was maintained. No difference in heat strain (as measured by core temperature and heart rate responses) was noted. Stroke volumes and cardiac outputs of the hypertensive group were significantly lower than those of the control group during the exercise session. The elevated blood pressure of the hypertensives was maintained by an elevated total peripheral resistance, both at rest and during exercise in the heat.

Dissert. Abstr.

N84-13769 Ohio State Univ., Columbus.
AN EXPERIMENTAL STUDY OF MULTI-LINK MODELS OF HUMAN POSTURAL DYNAMICS AND CONTROL Ph.D. Thesis

K. BARIN 1983 527 p

Avail: Univ. Microfilms Order No. DA8311724

The human postural control system is a multi-input, hierarchical, and adaptive system with over 200 degrees of freedom. The goal of this investigation was to develop a model of the human postural system that is realistic, yet simple enough to permit analytical study of the control scheme. This system is viewed as having two major components. (1) a 'plant', consisting of the musculo-skeletal system, and (2) feedback system, consisting of the sensory modalities and central processor. The dynamics of the plant in the sagittal plane can be viewed as a multi-link inverted pendulum.

A general formulation of the inverse dynamics for an N-link planar mechanism was obtained by employing Newton-Euler principles. Using this formulation, an evaluation procedure for N-link planar models was developed based on measurement of the center of pressure. To model the feedback system, a simple feedback control law was postulated in which the torque acting at a given segment is a linear combination of the state variables--the segment angles and angular velocities
Dissert Abstr.

N84-13770# Bowling Green State Univ., Ohio. Dept of Psychology.

DECISION MAKING AND INFORMATION PROCESSING UNDER VARIOUS UNCERTAINTY CONDITIONS Final Report

L. M. SCHIPPER and M. DOHERTY Brooks AFB, Tex. AFHRL Aug. 1983 55 p

(Contract F33615-81-K-0014; AF PROJ. 2313)
(AD-A132051; AFHRL-TR-83-19) Avail: NTIS HCA03/MFA01 CSCL 05J

Seven experiments were conducted in the area of decision making and information processing under conditions of uncertainty. Several different experimental tasks were used, all of which presented the subject with multiple independent sources of information regarding the likelihood that some event would occur. The input was a probabilistic estimate, and the problems had no correct answers. Study I used Air Force pilots as subjects. All other studies used undergraduate college students. The independent variables included the number of inputs, the reliability of the inputs, the effects of discrepant (i.e., outlying) inputs, the format of the problem, and the time available to respond. All tasks and subsequent analyses were non-Bayesian, yielding both normative and idiographic information. The subject's varied somewhat with each study but basically was to indicate which event was most likely to occur or to make an estimate of the likelihood of a given event. The results of these studies indicated no significant differences between F-16 pilots and student pilots in their use of averaging as the predominant strategy chosen. The effects of unreliable feedback were studied in an information seeking diagnostic task. The results indicated that when the post decision feedback was unreliable, the consistency of subsequent decision-making patterns was disrupted. The effects of information reliability were equivocal in that sometimes unreliable information was incorporated into the decision making processes in predictable patterns, and in other instances, the information labelled as unreliable was simply ignored
GRA

N84-13771# School of Aerospace Medicine, Brooks AFB, Tex.
DECOMPRESSION PROCEDURES FOR FLYING AFTER DIVING, AND DIVING AT ALTITUDES ABOVE SEA LEVEL Final Report, May 1979 - Jun. 1982

B. E. BASSETT Dec. 1982 43 p

(Contract AF PROJ. 7930)
(AD-A132039; SAM-TR-82-47) Avail: NTIS HCA03/MFA01 CSCL 06S

Decompression procedures were developed for divers exposed to reduced atmospheric pressures shortly after diving. These procedures involved human subjects and multiple diving exposures in laboratory hyperbaric and altitude chambers. The studies were conducted in two phases. In Phase I, six exposure schedules were tested using 16 - 20 subjects per exposure. The six exposures tested--dive depth in feet sea water/no-decompression limit (minutes) for direct ascent to 10,000 ft--were 130/7; 100/10; 80/14; 60/20; 40/34; and 10.75/1440. Exercise was performed at depth. Subjects remained at 10,000 ft for 4 hr, during which they exercised and breathed ambient chamber air. Then the subjects went to 16,000 ft for 1 hr, and used a diluter-demand oxygen system. Subjects were monitored for venous gas emboli (vge) by means of a precordial Doppler ultrasonic bubble detector. At 10,000 ft: 11.8% of the exposures produced vge, and 6.4% of exposures were terminated because of bends or high vge scores. At 16,000 ft: 4.9% of the 103 exposures ended with bends or vge. Phase II used three exposures--100/10, 80/14, and 60/20 schedules--and altitude exposures were changed from 10,000 to 8,500 ft, and from 16,000 to 14,250 ft. Of the 57 subject exposures

in Phase II, none developed bends or high vge scores at 8,500 ft. At 14,250 ft, 5.3% developed bends or high vge scores. GRA

N84-13772# Desmatics, Inc., State College, Pa.
MOTION SICKNESS INCIDENCE: DISTRIBUTION OF TIME TO MOTION EMESIS AND COMPARISON OF SOME COMPLEX MOTION CONDITIONS

K. C. BURNS Aug. 1983 4035 p

(Contract N00014-79-C-0128)
(AD-A131930; TR-112-15) Avail: NTIS HCA03/MFA01 CSCL 06S

A statistical mixture model is used to fit time-to-emesis data. The Weibull probability distribution is shown to provide a good fit for those subjects who either become sick or withdraw from the experiment within two hours. The second part of the mixture accounts for those subjects who neither quit nor vomit within two hours. The lognormal probability model is shown to give a poorer fit to the data and figures showing the relative fits of the estimated Weibull and lognormal distributions are provided. A nonparametric test is used to compare the five motion conditions of the Correlation Study. That test shows that there are significance differences in seventy among the conditions. Author (GRA)

N84-13773# Technology, Inc., San Antonio, Tex. Life Sciences Div.

STRESS ASSESSMENT THROUGH VOICE ANALYSIS Final Report

N. C. CHAMBERS, J. C. BRAKEFIELD, D. I. YAHIEL, and D. D.

FULGHAM Brooks AFB, Tex. AFHRL Sep 1983 47 p

(Contract F33615-80-C-0018; AF PROJ. 7719)
(AD-A132577; AFHRL-TP-83-47) Avail: NTIS HCA03/MFA01 CSCL 17B

An attempt was made to assess emotional stress through voice analysis. The involuntary vocal musculature microtremor, which has been reported in some literature as correlated with stress, was chosen as the variable for analysis. An autocorrelation technique was developed using a CD&A array processor installed in a DEC PDP 11/34 computer. Although the technique isolated frequency modulation (FM), the microtremor was not identified, primarily due to excessive noise in the 5-15 Hz frequency band of interest. Author (GRA)

N84-13774# Arizona Univ., Tucson. Div. of Respiratory Sciences

RESPIRATORY EFFECTS ON POPULATION FROM LOW-LEVEL EXPOSURES TO OZONE

M. D. LEBOWITZ, C. J. HOLBERG, and R. R. DODGE 1983 12 p refs

(Contract EPA-R-805318; N01-HL-1-4136)
(PB83-246132; EPA-600/D-83-108) Avail: NTIS HC A02/MF A01 CSCL 06T

A symptom stratified, geographic cluster sample of 117 middleclass households (211 subjects) was studied in Tucson, AZ. Daily symptom diaries and peak flows were obtained. Included were 24 white children age 5 to 25 (middleclass) with total person days of 1512 and adults by chronic symptom group. GRA

N84-13775# Health Effects Research Lab., Research Triangle Park, N. C. Neurotoxicology Div.

EVENT-RELATED BRAIN POTENTIALS: AN ALTERNATIVE METHODOLOGY FOR NEUROTOXICOLOGICAL RESEARCH

D. A. OTTO Aug. 1983 18 p refs Presented at the Symp

on Neuropsychological Effects of Solvents, London, Apr. 1982

(PB83-246116; EPA-600/D-83-105) Avail: NTIS HC A02/MF A01 CSCL 06T

One of the problems encountered in studies of glue sniffing, and other types of solvent poisoning is addiction. This problem also afflicts researchers who tend to become addicted to a particular methodology. Some alternatives to the behavioral methods to which many of us have become addicted are reviewed. These alternatives include sensory evoked potentials and event-related slow potentials of the brain. Evoked potentials are sensitive, clinically proven, indices of sensory deficits, while

event-related slow potentials are sensitive, albeit experimental, indices of cognitive dysfunction. Evidence is accumulating that evoked and slow potential measures may also be sensitive indices of neurotoxic effect. Author (GRA)

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BEHAVIORAL SCIENCES

Includes psychological factors, individual and group behavior, crew training and evaluation, and psychiatric research.

A84-13474

ON THE OCCUPATIONAL PSYCHOLOGICAL SELECTION OF MILITARY PERSONNEL [K VOPROSU O PROFESSIONAL'NOM PSIKHOLOGICHESKOM OTBORE VOENNO-SLUZHASHCHIKH]
I. D. KUDRIN, I. F. DIAKONOV, and B. V. KULAGIN
Voenno-Meditsinskii Zhurnal (ISSN 0026-9050), May 1983, p. 46, 47. In Russian.

A84-14976

SYSTEMS ANALYSIS OF RATIOCINATION [SISTEMNYI ANALIZ MYSHLENIIA]
D. N. ZAVALISHINA (Akademiia Nauk SSSR, Institut Psikhologii, Moscow, USSR) Psikhologicheskii Zhurnal, vol. 4, May-June 1983, p. 3-11. In Russian. refs

The principle of interchangeable structures (Kuz'min, 1976) is used in analyzing the thought process by which a problem is solved. The analysis encompasses both micro- and macrogenetic characteristics. The process of ratiocination is first construed as a system, and the new formations of the micro- and macrodevelopment of thinking are then compared with respect to content. The parameters of both forms of the genetic analysis of thought processes are distinguished. Author

A84-14977

SUBJECTIVE CHARACTERISTICS OF THE SENSORY PROCESS [SUB'EKTIVNYE KHARAKTERISTIKI SENSORNOGO PROTSESSA]
IU. M. ZABRODIN (Akademiia Nauk SSSR, Institut Psikhologii, Moscow, USSR) and V. I. SHAPOVALOV (Tashkentskii Gosudarstvennyi Universitet, Tashkent, Uzbek SSR) Psikhologicheskii Zhurnal, vol. 4, May-June 1983, p. 21-31. In Russian. refs

The use of subjective measures of signal detection has made it possible to discover the psychological mechanism underlying the interaction between the various subsystems of the sensory process. In untrained subjects, the detection process is characterized by maximum efficiency with respect to the subjective probability of the occurrence of the signal. In the case studied, this probability is represented, by the percentage of the positive answer. A subject may use extrasensory information to master this internal mechanism. The subjective characteristics of the detection process are sufficiently stable and depend on the information contained in the signal sequence; as a rule, they are independent of experimental conditions. V.L.

A84-14978

LINE-LENGTH ESTIMATION IN A LIMITED FIELD OF VISION [OTSENKA DLINY LINII V OGRANICHENNOM POLE VIDENIIA]
S. I. AVGUSTEVICH (Volga Region Transportation Management, USSR) Psikhologicheskii Zhurnal, vol. 4, May-June 1983, p. 32-41. In Russian. refs

A84-14979

EXPERIMENTAL MODELING AND INVESTIGATION OF THE ACTIVITY OF AN OPERATOR UNDER CONDITIONS OF EMOTIONAL STRESS [EKSPERIMENTAL'NOE MODELIROVANIE I ISSLEDOVANIE DEIATEL'NOSTI OPERATORA V USLOVIAKH EMOTSIONAL'NOGO STRESSA]
I. B. SOLOVEVA Psikhologicheskii Zhurnal, vol. 4, May-June 1983, p. 42-50. In Russian. refs

The difficulty in inducing stress experimentally that arises from the subject's awareness that he is in a controlled environment is discussed. To overcome this difficulty, the experimental conditions chosen are those of a parachute jump. Only experienced parachutists are tested. Each subject is given a task to perform during freefall, namely deciphering a series of numbers on a card. The numbers that do not belong in the series are included as 'interference'. The time required to arrange the series is measured. C.R.

A84-14980

CONFLICTS AMONG EMPLOYEES AND WAYS OF RESOLVING THEM [KONFLIKTY V TRUDOVOM KOLLEKTIVE I PUTI IKH RAZRESHENIIA]
V. V. BOIKO and A. G. KOVALEV (Leningrad Institute of Culture, Leningrad, USSR) Psikhologicheskii Zhurnal, vol. 4, May-June 1983, p. 51-60. In Russian. refs

A84-14981

THE INFLUENCE OF FORMS OF WORK ORGANIZATION ON PERSONAL RESPONSIBILITY IN PRODUCTION WORK [VLIANIE FORM ORGANIZATSII TRUDA NA OTVETSTVENNOST' LICHNOSTI NA PROIZVODSTVE]
K. MUZDYBAEV (Academy of Sciences, Institute of Social Economic Problems, Leningrad, USSR) Psikhologicheskii Zhurnal, vol. 4, May-June 1983, p. 61-69. In Russian. refs

A84-14982

DEVELOPMENT OF THE PSYCHOLOGICAL DIAGNOSTICS OF OCCUPATIONAL SUITABILITY IN THE USSR [RAZVITIE PSIKHOLOGICHESKOI DIAGNOSTIKI PROFESSIONAL'NOI PRIGODNOSTI V SSSR]
E. A. MILERIAN Psikhologicheskii Zhurnal, vol. 4, May-June 1983, p. 73-86. In Russian. refs

A84-14983

TRENDS AND PROSPECTS OF STUDY OF THE NATURAL FOUNDATIONS OF INDIVIDUAL DIFFERENCES [NEKOTORYE NAPRAVLENIIA I PERSPEKTIVY ISSLEDOVANIIA PRIRODNYKH OSNOV INDIVIDUAL'NYKH RAZLICHII]
E. A. GOLUBEVA (Akademiia Pedagogicheskikh Nauk SSSR, Moscow, USSR) Voprosy Psikhologii (ISSN 0042-8841), May-June 1983, p. 16-28. In Russian. refs

A84-14984

PSYCHOSEMANTIC STUDIES OF MOTIVATION [PSIKHOSEMANTICHESKIE ISSLEDOVANIIA MOTIVATSII]
V. F. PETRENKO (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR), IU. K. ALLIK (Tartuskii Gosudarstvennyi Universitet, Tartu, Estonian SSR), and N. D. LINDE Voprosy Psikhologii (ISSN 0042-8841), May-June 1983, p. 29-39. In Russian. refs

A84-14985

DETECTION OF OSCILLATORY MOTION [OBNARUZHENIE KOLEBATEL'NOGO DVIZHENIIA]
E. N. DZHAFAROV (Akademiia Nauk SSSR, Institut Psikhologii, Moscow, USSR), IU. K. ALLIK (Tartuskii Gosudarstvennyi Universitet, Tartu, Estonian SSR), and N. D. LINDE Voprosy Psikhologii (ISSN 0042-8841), May-June 1983, p. 90-96. In Russian. refs

Dzhafarov's (1981) kinematic model is used to analyze the frequency-amplitude threshold relationships characterizing the visual detection of the oscillatory motion of various shapes. Experimental data are analyzed which lead to the conclusion (stated with some caution) that the applicability of the proposed general model of absolute motion detection is determined only by those

factors which limit the accuracy of localization in the foreground of the moving object. B.J.

A84-14987
DATA STORAGE IN LOGICAL MEMORY [SOKHRANENIE MATERIALA V LOGICHESKOI PAMIATI]

E. F. IVANOVA (Khar'kovskii Gosudarstvennyi Universitet, Kharkov, Ukrainian SSR) and E. V. ZAIKA Voprosy Psikhologii (ISSN 0042-8841), May-June 1983, p. 112-117. In Russian. refs

Consideration is given to the hypothesis that persons employing different methods of thinking when attempting to remember particular data should differ in the way these data are stored in their logical memory. It is claimed that this hypothesis has been proved experimentally. In particular, two types of thinking, theoretical and empirical, are examined in a number of aspects. It is argued that, based on the observation of significant differences between these two types of thinking, it is possible to assume the existence of the two corresponding types of intellectual-mnemonic activity: theoretical and empirical. B.J.

A84-14988
INVESTIGATION OF COMMUNION FROM MIASISHCHEV'S POINT OF VIEW [OB IZUCHENII OBSHCHEENIIA S POZITSII V. N. MIASISHCHEVA]

A. A. BODALEV (Akademii Pedagogicheskikh Nauk SSSR; Moskovskii Gosudarstvennyi Universitet, Moscow, USSR) Voprosy Psikhologii (ISSN 0042-8841), May-June 1983, p. 131-135. In Russian.

Current issues in the psychology of communion are examined in the framework of Miasishchev's theory, which considers communion as interpersonal interaction comprising three aspects: interpersonal cognition, relations, and mutual treatment. A systematic investigation is made of how this scheme can be used to study the laws and mechanisms of human communion in various domains of psychology. B.J.

A84-15570
ABRUPT ONSETS DO NOT AID VISUAL SEARCH

E. KOWLER (Rutgers University, New Brunswick, NJ) and G. SPERLING (New York University, New York, NY) Perception and Psychophysics (ISSN 0031-5117), vol. 34, no. 4, Oct. 1983, p. 307-313. refs
 (Contract F49620-81-K-0008; AF-AFOSR-82-0085, AF-AFOSR-82-0279)

The effect of sudden onsets of visual stimuli on human performance were examined in terms of comparisons between gradual onsets and sudden onsets of waveform displays and responses. The intensity was varied for the gradual onset trials, ranging from zero to a maximum value, with 150 or 250 msec between displays. Abrupt onset displays were presented with either an abrupt onset and gradual decay, or abrupt appearance and abrupt demise. The tests were run with nine character set displays, with the subjects being required to identify the number and location of the display. Abrupt onsets were proven unnecessary for initiating visual image processing, and image processing was determined to depend more on the time permitted to process the visual data than on the time apportioned among images. Additionally, saccadic movements enhanced by the placement of the images were found to have no effect on the visual data processing. M.S.K.

A84-15571
DYNAMIC OCCLUSION IN THE PERCEPTION OF ROTATION IN DEPTH

G. J. ANDERSEN and M. L. BRAUNSTEIN (California, University, Irvine, CA) Perception and Psychophysics (ISSN 0031-5117), vol. 34, no. 4, Oct. 1983, p. 356-362. refs
 (Contract NIH-EY-04553)

Occlusion of more distant texture elements by nearer elements can provide relative distance information in parallel projections of rotating objects, according to Braunstein, Andersen, and Riefer (1982). In that study, occlusion was present in static views in the form of contour interruptions or interposition. In the present study, all visible contours were eliminated. Dots were located within implicit

pentagonal texture elements on a transparent sphere. The proportion of the sphere's surface covered by pentagons and dot density within the pentagons was varied. Accuracy of direction of rotation judgments was significantly affected by area, but not by dot density. Accuracy levels with purely kinetic occlusion were as high as in the early study, which included static interposition. Judgments of depth and shape were not affected significantly by occlusion, suggesting that occlusion is a specialized source of information for depth order. Levels of texture and the separability of depth and relative distance judgments are discussed. Author

A84-15572* California Univ., Berkeley
ROLE OF COROLLARY DISCHARGE IN SPACE CONSTANCY
 L. STARK and B. BRIDGEMAN (California, University, Berkeley, CA) Perception and Psychophysics (ISSN 0031-5117), vol. 34, no. 4, Oct. 1983, p. 371-380. refs
 (Contract NCC2-86; NSF BNS-79-06858)

Visual fixation can be maintained in spite of finger pressure on the monocularly viewing eye. The amount of extraocular muscle effort required to counter the eye-press is measured as the secondary deviation of the occluded fellow eye. Using this method, without drugs or neurological lesions, it is shown that corollary discharge (CD) governs perception of position of a luminous point in darkness, that is, an unstructured visual field. CD also controls visuomotor coordination measured with open-loop pointing and the matching of visual and auditory direction in light and in darkness. The incorrectly biased CD is superseded by visual position perception in normal structured environments, a phenomenon called visual capture of Motion. When the structured visual field is extinguished, leaving only a luminous point, gradual release from visual capture and return to the biased CD direction follows after a delay of about 5 sec. Author

A84-15573
PARADOXICAL RETINAL MOTIONS DURING HEAD MOVEMENTS - APPARENT MOTION WITHOUT EQUIVALENT APPARENT DISPLACEMENT

W. L. SHEBILSKE and D. R. PROFFITT (Virginia, University, Charlottesville, VA) Perception and Psychophysics (ISSN 0031-5117), vol. 34, no. 5, Nov. 1983, p. 476-481. refs
 (Contract NIH-R01-EY-02291-03; NIH-HD-16195)

Gogel's (1982) results in studies of visual-motor coordination, motion perception, and distance perception are discussed in terms of the concept of apparent concomitant motion (ACM-motion parallax). Two different theories for the phenomena are compared, one (Gogel) suggesting that apparent motions are perceived because humans underestimate the distance between objects, while the other (the authors) involves apparent motions due to human paradoxical sensations of retinal motions. It is suggested that visual direction constancy and visual location constancy are governed by different processes. Experimental evidence is presented to question the primacy of perceived distance for perceived motion. It is also doubted that perceptual processes strictly follow geometric logic in judging distances, since an observer may direct attention to difference distance information depending on the purposes of computing the distance. M.S.K.

A84-15574
AN ILLUSORY MOTION OF A STATIONARY TARGET DURING HEAD MOTION IS UNAFFECTED BY PARADOXICAL RETINAL MOTION - A REPLY TO SHEBILSKE AND PROFFITT (1983)

W. C. GOGEL (California, University, Santa Barbara, CA) Perception and Psychophysics (ISSN 0031-5117), vol. 34, no. 5, Nov. 1983, p. 482-487. refs

A84-15792
A SYSTEMS APPROACH TO THE MIND-BODY PROBLEM [SISTEMNYI PODKHOD K PSIKHOFIZIOLOGICHESKOI PROBLEME]

V. B. SHVYRKOV, ED Moscow, Izdatel'stvo Nauka, 1982, 232 p. In Russian.

A collection of papers representing a systems approach to the mind-body problem is presented. Particular consideration is given

to: (1) the problem of the neurophysiological foundations of the mind; (2) the relationship between the mind and activity organization, with attention given to experimental data characterizing the organization of behavior and activity at different levels; and (3) the systems organization of neurophysiological processes, including studies of the activity of brain structures and individual neurons. No individual items are abstracted in this volume B.J.

N84-12721# Tennessee Univ., Knoxville. Dept. of Psychology.
EFFECT OF NOISE IN THE THREE-PARAMETER LOGISTIC MODEL

F SAMEJIMA 25 Dec. 1982 99 p
(Contract N00014-81-C-0569, DA PROJ. RR04204)
(AD-A131867; AD-E850387; RR-82-2-ONR) Avail NTIS
HCA05/MFA01 CSCL 05J

In the preceding research report, ONR/RR-82-1 (Information Loss Caused by Noise in Models for Dichotomous Items), observations were made on the effect of noise accommodated in different types of models on the dichotomous response level. In the present paper, focus is put upon the three-parameter logistic model, which is widely used among researchers. An emphasis is put upon the speed of convergence to the normality of the conditional distribution of the maximum likelihood estimate, given a specific ability level. Author (GRA)

N84-12722# Naval Postgraduate School, Monterey, Calif.
RACIAL BIAS AND PREDICTIVE VALIDITY IN TESTING FOR SELECTION

R. A. WEITZMAN Jul. 1983 43 p
(AD-A131830; NPS54-83-008) Avail NTIS HCA03/MFA01
CSCL 05J

In contrast to the Cleary-McNemar view affirmed by Cole in the October 1981 issue of the American Psychologist on testing, questions of bias are fundamentally question of validity, this report shows that freedom from statutory test bias, as interpreted by the courts, is different from predictive validity. Use of a score adjustment formula developed here to correct for statutory test bias shows in typical cases not only that the correction tends only negligibly to reduce predictive validity but also that the enhancement of predictive validity without regard to statutory test bias can add a sizable criterion-independent decrement selectively to the already low test scores of low scoring demographic groups. Author (GRA)

N84-12723# Los Alamos Scientific Lab., N. Mex.
VARIATIONS IN TASK AND THE IDEAL OBSERVER

K. M. HANSON 1983 9 p refs Presented at the SPIE Conf. on Appl of Opt. Instr to Med. 11, Atlanta, 17-19 Apr. 1983
Submitted for publication
(Contract W-7405-ENG-36)
(DE83-015394; LA-UR-83-2166; CONF-8304111-1) Avail NTIS
HC A02/MF A01

In most previous studies involving the ideal observer, the task considered was that of simple detection where it is assumed that there is complete a priori knowledge of the background and of the possible object's shape, amplitude, and position. It is shown that redefining the detection task to include the possibility of an unknown, slowly varying background reduces the importance of the low-frequency components in the image for the ideal observer. More complicated tasks than object detection are also considered, such as determination of an object's position and width and the resolution of two objects. These higher-order tasks further enhance the importance of the high-frequency information content of the image. DOE

N84-12724# Research Inst. of National Defence, Stockholm (Sweden). Dept. 5

COHERENCE OF APPRAISAL AND COPING: PARACHUTE JUMP EFFECTIVENESS

B. SHALIT, L. CARLSTEDT, B. STAHLBERG CARLSTEDT, and I. L. TAELJEDALSHALIT Jul. 1983 25 p refs
(FOA-C-55058-H3; ISSN-0347-7665) Avail NTIS HC A02/MF A01

A model describing the perceptual process, the sequential adjustment model (SAM), based on the interaction of three phases (appraisal, mobilization, realization) with three modalities (cognitive, affective, instrumental) describing nine sequential (conditional probability) perceptual processing stages is proposed. Model sequentiality and predictive power is tested against the criterion of the performance of a first parachute jump. The sequentiality in each individual's appraisal was tested. The criterion for sequentiality was that all stages were cleared in terms of appraisal effectiveness. Results show that 85% of those who jumped well show sequentiality, while 53% of those who jumped poorly show sequentiality, and 10% of those who do not show sequentiality jumped well. Analysis of SAM's conjunctive character shows prediction effectiveness of 90% for the poor jump. Analysis based on a compensatory model gives a prediction effectiveness of 80% for the poor jump. A hypothesis that the sequentiality in the perceptual process is more important for good performance than the quality of the process' stages was generated. Author (ESA)

N84-13351# Kansai Univ., Osaka (Japan).

HUMAN BEHAVIOR Progress Report

S. HORIUCHI and T. JIN /n Building Research Inst. Proc. of the 6th Joint Panel Meeting p 140-144 1982 refs
Avail NTIS HC A99/MF A01

The decrease in thinking power and memory in fire smoke was studied. The result of inspection to folding type ladder evacuation equipment installed in each balcony of high residential buildings are considered. Sound guidance for evacuation, and effect of carbon monoxide on firefighters are examined. E.A.K.

N84-13352# Maryland Univ., College Park.

HUMAN BEHAVIOR Progress Report

J. L. BRYAN /n Building Research Inst. Proc. of the 6th Joint Panel Meeting p 146-151 1982 refs
Avail NTIS HC A99/MF A01

Human behavior and fire research and safety were studied. The studies include: (1) questionnaire of participants in the MGM Grand Hotel fire; (2) behavior response patterns in fire situations in health care occupancies; (3) creation of a fire safety evaluation system for group homes for the developmentally disabled; (4) the waking effectiveness of household smoke and fire detection devices; (5) development of an annotated bibliography on human behavior and fire emergencies; (6) review of code provisions and the technical literature; and (7) development of a behavior based computer simulation of emergency egress during fires. E.A.K.

N84-13358# Maryland Univ., College Park. Dept. of Fire Protection Engineering.

THE MGM GRAND HOTEL FIRE: A CASE STUDY OF HUMAN REACTION TO FIRE

J. L. BRYAN /n Building Research Inst. Proc. of the 6th Joint Panel Meeting p 218-250 1982 refs
Avail NTIS HC A99/MF A01

Results of a questionnaire study involving the guests registered in the MGM Grand Hotel on the night of the fire are examined. Means and time of fire awareness, specific response actions, and evacuation analysis are discussed. M.G.

N84-13776# National Inst. for Personnel Research, Johannesburg (South Africa).

THE PROGRAMMING AND VALIDATION OF THE COMPUTERISED VERSION OF THE INTERMEDIATE MENTAL ALERTNESS TEST

T. R. TAYLOR, M. WERBELOFF, and M. R. EBERTSOHN Jul. 1982 81 p refs (CSIR-PERS-303; CSIR-PERS-339; ISBN-0-7988-2325-9) Avail: NTIS HC A05/MF A01

The programming of the Intermediate Mental Alertness Test (IMA) on the PLATO systems, the validation of the computerized IMA, and the computerization of the manual for the tests are covered. N.W.

N84-13777# National Inst. for Personnel Research, Johannesburg (South Africa). Management Studies Div.

WOMEN AT WORK AND STRESS

J. VANROOYEN Sep. 1982 10 p Presented at the Occupational Health Seminar, Johannesburg, 1982 (R/PERS-626) Avail: NTIS HC A02/MF A01

The implications which occupational involvement and the stress of meeting multiple role demands may have on women's health and quality of life experiences are discussed. Stress and stress patterns are analyzed. The coping strategies use by females are also discussed S.L.

N84-13778# Stanford Univ., Calif. Dept. of Psychology. **EXTERNAL VERSUS INTUITIVE REASONING: THE CONJUNCTION FALLACY IN PROBABILITY JUDGMENT**

A. TVERSKY and D. KAHNEMAN Jun. 1983 71 p (Contract N00014-79-C-0077) (AD-A131801) Avail: NTIS HCA04/MFA01 CSCL 05J

Perhaps the simplest and the most basic qualitative law of probability is the conjunction rule: the probability of a conjunction $P(A \& B)$ cannot exceed the probabilities of its constituents, $P(A)$ and $P(B)$, because the extension (or the possibility set) of the conjunction is included in the extension of its constituents. Judgments under uncertainty, however, are often mediated by intuitive heuristics that are not bound by the conjunction rule. A conjunction can be more representative than one of its constituents and instances of a specific category can be easier to imagine or retrieve than instances of a more inclusive category. The representativeness and availability heuristics therefore can make a conjunction appear more probable than one of its constituents. This phenomenon is demonstrated in a variety of contexts including estimation of word frequency, personality judgment, medical prognosis, decision under risk, suspicion of criminal acts and political forecasting. Systematic violations of the conjunction rule are observed in judgments of lay people and of experts in both between-subjects and within-subjects comparisons. GRA

N84-13779# Rice Univ., Houston, Tex. **COGNITIVE COMPONENTS UNDERLYING THE DIGIT SYMBOL TEST**

D. M. LANE Nov. 1982 16 p (Contract PHS-MH-36551) (PB83-250464, NIMH-83-310) Avail: NTIS HC A02/MF A01 CSCL 05J

What the Symbol Digit Test measures in terms of its underlying information processing components and which of these components are most responsible for age and sex differences on the test were studied. It was found that the test measures perceptual speed and abilities in different populations. No explanation was found for why females perform better on the Symbol Digit Test than do males. GRA

N84-13780# Internal Revenue Service, Arlington, Va. Federal Interagency Group for Computer-Based Training.

COMPUTER-BASED TRAINING STARTER KIT

May 1983 92 p refs (PB83-248815; FIGCBT/DOC-1; DOCUMENT-6846) Avail: NTIS HC A05/MF A01 CSCL 05I

The kit describes the process steps necessary for the successful implementation of computer-based training (CBT) programs without falling into the various pitfalls inherent in the new technology. Topics include: needs assessment, feasibility studies, getting approval, system plans and proposals, prototype systems development, courseware development and evaluation and maintenance. Six appendices list references and sources of further information. The kit is being issued as a final draft to solicit comments and suggestions from users for next year's edition. GRA

MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering, biotechnology; and space suits and protective clothing.

A84-13450 THE PUL'SOTEMP PT-01 DEVICE [PRIBOR PUL'SOTEMP PT-01]

V. I. LEBEDEV and A. I. KAZETS (Nauchno-Issledovatel'skaia Laboratoriia Biotelemetrii, Kislovodsk, USSR) Voprosy Kurortologii, Fizioterapii i Lechebnoi Fizicheskoi Kul'tury (ISSN 0042-8787), May-June 1983, p. 68, 69. In Russian

The paper briefly describes the basic characteristics of the handheld Pul'sotemp PT-01 device which is designed to measure pulse rate and to monitor physical-exercise rate by means of acoustic signals with controlled repetition frequency. The device includes a photoplethysmographic sensor, an amplifier of photoplethysmographic signals with the formation of rectangular voltage, and a digital calculating structure and display. B.J.

A84-14450* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

HUMAN FACTORS OF FLIGHT-DECK AUTOMATION - REPORT ON A NASA-INDUSTRY WORKSHOP

D. A. BOEHM-DAVIS, R. E. CURRY, R. L. HARRISON (NASA, Ames Research Center, Moffett Field, CA), and E. L. WIENER (Miami, University, Coral Gables, FL) Ergonomics (ISSN 0014-0139), vol. 26, Oct. 1983, p. 953-961. refs

The scope of automation, the benefits of automation, and automation-induced problems were discussed at a workshop held to determine whether those functions previously performed manually on the flight deck of commercial aircraft should always be automated in view of various human factors. Issues which require research for resolution were identified. The research questions developed are presented. Previously announced in STAR as N81-16022 A.R.H.

A84-15033 STANDARDIZATION OF MICROCLIMATE FOR PERSONS PERFORMING MENTAL WORK (ON THE EXAMPLE OF THE DRIVER'S CAB OF A MAINLINE LOCOMOTIVE) [K VOPROSU O NORMIROVANII MIKROKLIMATA DLIA LITS UMSTVENNOGO TRUDA /NA PRIMERE KABINY MASHINISTA MAGISTRAL'NOGO LOKOMOTIVA/]

E. M. RATNER, D. M. DEMINA, M. N. EVLAMPIEVA, B. I. SHKOLNIKOV, A. B. KIRPICHNIKOV, E. G. KAKHOIAN, and N. E. STRELIAEVA (Ministerstvo Putei Soobshcheniia SSSR, Vsesoiuznyi Nauchno-Issledovatel'skii Institut Zheleznodorozhnoi Gigeny, Moscow, USSR) Gigena Truda i Professional'nye Zabolevaniia, June 1983, p. 10-15. In Russian. refs

A84-15034

CHARACTERISTICS OF THE ADAPTATION OF SEAMEN TO WORKING CONDITIONS IN SETTING STANDARDS FOR THE MICROCLIMATE OF THE LIVING QUARTERS ON SHIPS [OSOBENNOSTI ADAPTATSII MORIAKOV K PROIZVODSTVENNYM USLOVIAM PRI NORMIROVANII MIKROKLIMATA ZHILYKH POMESHCHENII SUDOV]

A. A. VOROB'EV (Institut Gigieny Vodnogo Transporta, Moscow, USSR) Gigiena Truda i Professional'nye Zabolevaniia, June 1983, p. 15-18. In Russian. refs

A84-15045

MORPHOPHOTOMETRIC METHODS FOR EXAMINING THE MICROSCOPIC BLOOD VESSELS IN THE BULBAR CONJUNCTIVA [K METODIKE MORFOFOTOMETRII MIKROSUDOV KON'IUNKTIVY GLAZNOGO IABLOKA]

M. F. ISMAGILOV, R. I. ALIYEV, and G. KH. KHAMITOVA (Kazanski Meditsinski Institut, Kazan; Ministerstvo Zdravookhraneniia Tatarskoi ASSR, Detskaia Respublikanskaia Klinicheskaia Bol'nitsa, USSR) Kazanski Meditsinski Zhurnal, vol. 64, May-June 1983, p. 229-231. In Russian.

A84-15164

RADIATION PROTECTION DURING SPACE FLIGHT

E. E. KOVALEV (Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR) Aviation, Space, and Environmental Medicine (ISSN 0095-0562), vol. 54, Dec. 1983, p. S16-S23. refs

The evaluation of space radiation hazards and shielding requirements is discussed. The proton and electron exposures encountered in earth orbit from the earth radiation belts and solar-flare activity are calculated as functions of orbital altitude and inclination, and the probabilities of exceeding a given dose equivalent are given in tables for missions of varying duration. The Galactic space radiation is characterized and shown to be significant only beyond the earth's vicinity. The Radiation Shielding Design Criteria approved by the USSR Ministry of Health are discussed, and the need for a more heavily shielded shelter module to be used whenever solar-flare activity is detected is indicated. The shielding of interplanetary spacecraft is considered, and it is shown that much heavier shielding is needed for missions longer than about 2 yrs during solar minimum or 3 yrs during solar maximum, or for spacecraft with nuclear energy installations (NEI). A typical shielding thickness requirement is 20 g/sq cm for the radiation shelter of a spacecraft powered by liquid propellant or by a nuclear rocket engine (but without an NEI) on a 600-d interplanetary flight. T.K.

A84-15170* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

TOXICOLOGICAL EVALUATION OF THE COLUMBIA SPACECRAFT

W. J. RIPPSTEIN, JR. and M. E. COLEMAN (NASA, Johnson Space Center, Houston, TX) Aviation, Space, and Environmental Medicine (ISSN 0095-0562), vol. 54, Dec. 1983, p. S60-S67. (Contract NAS9-15425; NAS9-14743)

The toxicology procedures developed for the Space Shuttle program to evaluate and eliminate contaminants in the cabin atmosphere characterized, and results from STS missions 1-5 are reviewed. Shuttle maximum-allowable-concentration standards (SMAC) equal to 10-50 percent of those established for normal 40-h work weeks on the ground have been established for a broad range of substances, and outgassing data are employed in choosing spacecraft construction materials. Gases are removed by the atmospheric revitalization system (CO₂-removal bed, catalytic oxidizer, and dehumidifier). Whole-gas and adsorbed-gas samples are employed in ground-based and in-flight measurements of contaminants. Results are presented in tables. A total of 152 substances, of which 64 were well defined, were detected in STS-1-5. Only the toluene contamination on STS-2 (17 ppm compared to the SMAC of 20 ppm) was considered serious. T.K.

A84-15419#

THE LIMITS OF THE PRINCIPLE 'SEE AND AVOID' [DIE GRENZEN DES PRINZIPI 'SEHEN UND AUSWEICHEN']

O. WEBER (Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Institut fuer Flugmechanik, Brunswick, West Germany) IN: Problems and development trends in general aviation; Symposium, Friedr. Schafen, West Germany, March 24, 25, 1983, Reports. Bonn, Deutsche Gesellschaft fuer Luft- und Raumfahrt, 1983, p. 253-273. In German. refs

One of the risks encountered in air traffic is related to a mid-air collision of two aircraft. A research program concerning the prevention of aircraft collisions on the basis of the principle 'see and avoid' was conducted in West Germany. The program consisted of theoretical and experimental studies. The present investigation has the objective to provide a survey of human and operational factors which may have a critical effect on the applicability of the principle 'see and avoid'. A necessary condition for the utilization of the considered principle is that, at least, the pilot of the aircraft which is obligated to conduct an evasive maneuver will see the other aircraft. Attention is given to questions of flight visibility, horizontal standard visibility, the maximum detection range, aspects of visual search, the error circle as a symbol of observational uncertainty, the characteristics of the operational limits, and the problems considered by the Visual Flight Rules Operations Panel. G.R.

A84-15544

A NEW STACKED TWO-DIMENSIONAL SPECTRAL ITERATIVE TECHNIQUE (SIT) FOR ANALYZING MICROWAVE POWER DEPOSITION IN BIOLOGICAL MEDIA

R. KASTNER (Raphael Armament Development Authority, Haifa, Israel) and R. MITTRA (Illinois University, Urbana, IL) IEEE Transactions on Microwave Theory and Techniques (ISSN 0018-9480), vol. MTT-31, Nov. 1983, p. 898-904. refs (Contract N00014-81-K-0245; NSF ECS-81-20305)

Conventional numerical methods for analyzing power deposition in biological media have been restricted to bodies which are relatively small electrically. A new, stacked-two-dimensional-spectral-iterative-technique (SIT), presented below, does not involve the generation and inversion of a matrix and is capable of analyzing larger bodies. It is based on modeling the body by a set of planar parallel slabs and utilizing the simple (convolution-type) relationship between a current distribution on any slab and the field due to this current. This invertible relationship is conveniently formulated in the transform domain in a strictly algebraic fashion. The interactions between the various slabs are also simple and algebraic in the spectral domain. The solution is generated in an iterative manner by applying these relationships sequentially over the slabs until convergence is achieved. Discussion on convergence and numerical examples are given. Author

A84-15670

OBJECT ORIENTATION USING SENSOR EQUIPPED END EFFECTORS

B. E. BEAKLEY (NL Industries, Inc., Houston, TX) IN: NTC '82; National Telesystems Conference, Galveston, TX, November 7-10, 1982, Conference Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1982, p. D1.5.1-D1.5.5.

Research activities related to the development of intelligent robotic manipulators have been mainly concerned with vision systems. The determination of part orientation is one area for which an employment of vision systems has been considered. There are, however, a number of situations for which vision systems are not a feasible solution. Thus, vision systems may be impractical on the basis of considerations related to cost or the time involved in software development. There are also cases in which computer vision is simply not suited for the required operations. The present investigation is concerned with the feasibility of a technique which uses an end effector equipped with sensors to determine part orientation. The use of the discussed technique is based on the assumption that the shape of the object or objects is known. G.R.

A84-15745

QUANTITATIVE ASSESSMENT OF THE ROLE OF THE SPATIAL FREQUENCIES OF IMAGES IN THE VISUAL RECOGNITION OF NUMERALS [KOLICHESTVENNAIA OTSENKA ROLI PROSTRANSTVENNYKH CHASTOT IZOBRAZHENII V ZRITEL'NOM OPOZNANII TSIFR]

E. D. BORISOVA (Vsesoiuznyi Tsentral'nyi Sovet Professional'nykh Soiuzov, Vsesoiuznyi Nauchno-Issledovatel'skii Institut Okhrany Truda, Leningrad, USSR) *Fiziologiya Cheloveka* (ISSN 0131-1646), vol. 9, Nov.-Dec. 1983, p. 999-1004. In Russian. refs

Digital spatial rejection filtering together with psychophysiological methods for evaluating recognition efficiency is used to investigate the role of spatial frequencies of the Fourier spectrum in the image-recognition process. The level of spatial frequency filtering serves as the criterion determining the effect of various conditions that hamper observation on the received image of the numerical and, hence, on the recognition efficiency. The results support the idea that there is a definite time sequence for the processing of image properties by the human visual system, and that the lower spatial frequencies play a leading role in the recognition process. B.J

A84-15748

VISUAL-CONTRAST MEASUREMENT - TEST TABLES AND METHODS FOR PERFORMING MEASUREMENTS [VIZOKONTRASTOMETRIIA - TESTIRUIUSHCHIE TABLITSY, METODIKI PROVEDENIIA]

V. V. VOLKOV, L. N. KOLESNIKOVA, I. I. LEVKOVICH, N. M. MIALO, and I. E. SHELEPIN (Voenno-Meditsinskaiia Akademiia, Leningrad, USSR) *Fiziologiya Cheloveka* (ISSN 0131-1646), vol. 9, Nov.-Dec. 1983, p. 1030-1035. In Russian. refs

Visual-contrast measurement is defined as a technique which makes it possible to determine the quality of the visual functions on the basis of frequency-contrast characteristics. This paper describes four variants of this technique, each of which is based on the utilization of six grid images. The application of these variants to neurophysiological, psychophysiological, and clinical studies is discussed, and the construction of test tables is described. B.J.

A84-15789

MONITORING SYNTHETIC MATERIALS AND CHEMICAL SUBSTANCES TO ENSURE OCCUPATIONAL HEALTH AND SAFETY [TOKSIKOLOGO-GIGIENICHESKII KONTROL' ZA PRIMENENIEM SINTETICHESKIKH MATERIALOV I KHIMICHESKIKH VESHCHESTV]

L. A. TIUNOV, V. G. ZHUKOV, and V. A. PAVLOVSKII (Voenno-Meditsinskii Zhurnal (ISSN 0026-9050), Oct. 1983, p. 41, 42 In Russian.

It is noted that the unpolymerized monomers that are used with polymers readily separate out from synthetic materials. Even though the polymer is biologically inert, other substances are used for which this may not be true. These include the initiators, catalysts, plasticizers, stabilizers, regulators, blowing agents, dyes, emulsifiers, and fillers. These substances may also separate out from the materials. The importance of considering occupational health and safety at the production stage of synthetic materials is stressed, along with modeling and laboratory experiments under the actual conditions of use. The articles must also be subjected to odorometric tests. Even after production and testing, the materials must continue to be monitored since they may undergo 'aging' during use, and processes of depolymerization may commence. Attention is also called to the risk of long-term effects. C.R.

A84-15801

A GEOMETRICAL THEORY OF SCALING IN THE SENSORY SYSTEM WITH SEVERAL INPUTS AND SINGLE OUTPUT

R. TAKIYAMA (Kyushu Institute of Design, Fukuoka, Japan) *Electronics and Communications in Japan* (ISSN 0424-8368), vol. 66, Jan. 1983, p. 1-9 Translation. refs

Psychophysical functions and processes involved in multi-input, one-output sensory systems are discussed and modelled analytically. A geometrical scaling system is introduced. The

psychological sensation arising from multiple physical stimuli is determined by the particular receptive sensory channel. The stimuli elicit the response when a certain threshold is crossed, thereby permitting the stimuli to be measured in terms of a state vector. An n-dimensional Riemannian space is defined to map the point at which the stimuli provoke a reaction, and a fundamental metric is formulated for the n-dimensional space. The type of permissible function in the space is determined by the thresholds and how they can be reached. The techniques are applied to study the law representing the relation between luminance and the brightness of colored light. Further, the method is used to characterize Weber's and Ekman's laws for the discrimination threshold and Stiles' and Abney's laws for the relation between the luminance and the brightness of colored light. M.S.K.

N84-12040*# National Aeronautics and Space Administration Langley Research Center, Hampton, Va.

PILOT RESPONSE WITH CONVENTIONAL DISPLAYS

J. J. ADAMS *In its Controls, Displays and Inform.* Transfer for Gen. Aviation IFR Operations p 155-157 Oct. 1983 Avail. NTIS HC A12/MF A01 CSCL 05H

A critical examination of pilot-aircraft-display system response was conducted for conventional displays. The system frequency and damping both by visual examination of system responses to initial errors and by pilot model analysis was studied. Examples of system response at two points in a flight are shown. The long periods and the occasional loss of system damping in these responses are a matter of concern. These system characteristics can be duplicated with the pilot model given on the pilot-model-aircraft system block diagram. The responses obtained with the pilot model are also shown, together with the pilot model gains used in obtaining these responses. The factors that determine what these gains will be are the requirements for system stability, the sensitivity of the displays, and the scanning required in looking at the displays. The effects of scanning on system response can be determined with the test set-up given. Using this test equipment, it was found that separating bank angle information from heading information caused a noticeable degradation in system response. R.J.F.

N84-12041*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

SINGLE PILOT SCANNING BEHAVIOR IN SIMULATED INSTRUMENT FLIGHT

J. E. PENNINGTON *In its Controls, Displays and Inform.* Transfer for Gen. Aviation IFR Operations p 159-169 Oct. 1983 refs Avail. NTIS HC A12/MF A01 CSCL 05H

Results from a simulation of general aviation instrument flight tasks in which the pilot's scan pattern and lookpoint were measured along with control inputs and state variables are given. The objective was to provide a baseline for comparing results from later studies of advanced avionics. Some of the scanning parameters measured are described, and conclusions from this and subsequent studies are presented. R.J.F.

N84-12043*# National Aeronautics and Space Administration Langley Research Center, Hampton, Va.

DISPLAY RESEARCH: PILOT RESPONSE WITH THE "FOLLOW-ME" BOX DISPLAY

J. J. ADAMS *In its Controls, Displays and Inform.* Transfer for Gen. Aviation IFR Operations p 181-188 Oct. 1983 Avail. NTIS HC A12/MF A01 CSCL 05H

A study of display configurations and their effect on pilot-aircraft system response was undertaken. An examination of conventional displays was done to provide a set of data that can be used for comparison with advanced displays. An examination of an advanced display design that includes the use of a digital computer and a cathode ray tube to provide a drawing of a three dimensional box is done. The results show the improvement in system performance that can be obtained with the advanced display. Studies were conducted using the General Aviation Simulator, but verification of the results with the advanced display was also obtained from flight tests. R.J.F.

N84-12047*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

PROPOSED STUDY TO DETERMINE POTENTIAL FLIGHT APPLICATIONS AND HUMAN FACTORS DESIGN GUIDELINES OF VOICE RECOGNITION/SYNTHESIS SYSTEMS

H. P. BERGERON *In its* Controls, Displays and Inform. Transfer for Gen. Aviation IFR Operations p 225-227 Oct. 1983
Avail: NTIS HC A12/MF A01 CSCL 05H

An effort to evaluate the human factors aspects and potential of voice recognition/synthesis techniques and the application of present and near-future (5 years) voice recognition/synthesis systems as a pilot/aircraft cockpit interface capability in an operational environment is discussed. The analysis will emphasize applications for single pilot instrument flight rules operations but will also include applications for other categories of aircraft with various levels of complexity. R.J.F.

N84-12725*# Whitmore Enterprises, San Antonio, Tex
LOWER BODY GRADUATED NEGATIVE PRESSURE SYSTEM Final Report
1983 3 p
(Contract NAS9-16810)
(NASA-CR-171717; NAS 1 26:171717) Avail: NTIS HC A02/MF A01 CSCL 05H

The first task concerning the Lower Body Negative Pressure Suit was to determine the best type construction for a leg section with these goals in mind: good mobility, minimum amount of bulk, ease of storage, lightweight, rigid enough to withstand atmospheric pressure, and minimum amount of preparation before donning and donning time. After a study of three systems, wire hoops (rings) separated on inch apart in an airtight material furnished by NASA were chosen. Author

N84-12726# Army Research Inst. of Environmental Medicine, Natick, Mass.
EFFECTIVENESS IN REDUCING HEAT STRESS OF THREE CONDITIONED-AIR COOLING VESTS WORN WITH AND WITHOUT COOLING AIR SUPPLIED TO A FACE PIECE
G F. FONSECA Mar. 1983 42 p
(Contract DA PROJ 3E1-62777-A-878)
(AD-A131975; AD-F000018; USARIEM-T-1/83) Avail: NTIS HCA03/MFA01 CSCL 06Q

The auxiliary cooling provided by three different air-cooled vests and a ventilated XM-29 Face Piece was directly measured on a life-sized, heated, sectional manikin. These air-cooled systems were worn with a combat vehicle crewman (CVC) ensemble with a complete chemical protective (CW) suit. Cooling rates (watts) were determined for both dry (non-sweating) and completely wet (maximal sweating) skin conditions. At low ventilating air flow rates these air-cooled vests provided cooling primarily over the torso surface. Up to 95% of the cooling provided over the torso-arms-legs areas was over the torso. At higher air flows this percentage decreased to 55%. The design of an air-cooled vest can increase the efficiency of cooling of the ventilating air by maximizing the proportion of cooling air that diffuses over the surface of the body and minimizing the proportion of cooling air that exits an air-cooled vest directly through the clothing to the hot environment. Under the experimental conditions of this study the air-ventilated XM-29 Face Piece contributed about 20% to the total cooling. Author (GRA)

N84-13781*# Bionetics Corp., Hampton, Va.
TECHNOLOGY EVALUATION OF MAN-RATED ACCELERATION TEST EQUIPMENT FOR VESTIBULAR RESEARCH Final Report
I. TABACK, R L KENIMER, and A J. BUTTERFIELD Sep. 1983 99 p refs
(Contract NAS1-16978)
(NASA-CR-172160, NAS 1.26 172160) Avail: NTIS HC A05/MF A01 CSCL 05H

The considerations for eliminating acceleration noise cues in horizontal, linear, cyclic-motion sleds intended for both ground and shuttle-flight applications are addressed. the principal concerns

are the acceleration transients associated with change in direction-of-motion for the carriage. The study presents a design limit for acceleration cues or transients based upon published measurements for thresholds of human perception to linear cyclic motion. The sources and levels for motion transients are presented based upon measurements obtained from existing sled systems. The approaches to a noise-free system recommends the use of air bearings for the carriage support and moving-coil linear induction motors operating at low frequency as the drive system. Metal belts running on air bearing pulleys provide an alternate approach to the driving system. The appendix presents a discussion of alternate testing techniques intended to provide preliminary type data by means of pendulums, linear motion devices and commercial air bearing tables. Author

N84-13782# National Bureau of Standards, Washington, D.C. National Engineering Lab.
SIZE OF LETTERS REQUIRED FOR VISIBILITY AS A FUNCTION OF VIEWING DISTANCE AND OBSERVER VISUAL ACUITY
G. L. HOWETT Jul. 1983 75 p refs Sponsored by OSHA (PB83-250589; NBS-TN-1180) Avail: NTIS HC A04/MF A01 CSCL 05E

A formula is derived giving the letter stroke-width needed for legibility of words on a sign at any given distance by an observer with any given visual acuity. The stroke width, in turn, determines the letter size, depending upon the characteristics of the type face used. The derivation is strictly mathematical and is based on the assumption that beyond a distance of a few meters, a person's visual acuity is specificable by a fixed visual angle, independent of distance. The information implicit in the formula is also presented graphically, in four plots that apply to four different combinations of length units for measuring stroke width and viewing distance. Also presented are formulas and graphs for correcting the critical stroke width for nonstandard contrast of background luminance. Author (GRA)

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PLANETARY BIOLOGY

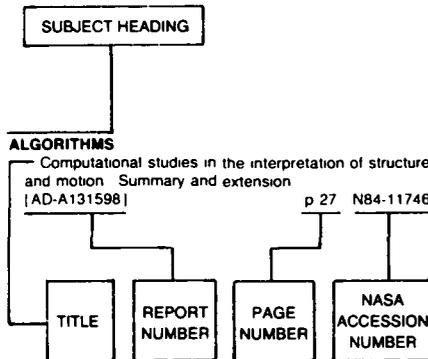
Includes exobiology; and extraterrestrial life.

A84-14879
THE EFFECT OF LUNAR SOIL AND METAL OXIDES ON THE THERMAL AND RADIATIVE-CHEMICAL STABILITY OF AMINO ACIDS [VLIANIE LUNNOGO GRUNTA, OKISLOV METALLOV NA TERMICHESKUII I RADIATIONNO-KHIMICHESKUII USTOICHIVOST' AMINOKISLOT]

E. M. LAPINSKAIA (Akademiia Nauk SSSR, Institut Tsitologii, Leningrad, USSR) and M. A. KHENOKH (Akademiia Nauk SSSR, Doklady (ISSN 0002-3264), vol. 272, no. 6, 1983, p 1502-1505. In Russian. refs

The paper examines results of laboratory experiments concerning the effect of lunar soil and a number of metal oxides (Al₂O₃, SiO₂, CaO, and TiO₂) characteristic for highland and mare basalts on the thermal and radiative-chemical stability of amino acids. The results suggest that the fact that only a very small quantity of amino acids has been found in lunar soil can be explained by their decomposition under the combined effect of various forms of radiation, solar wind, and abrupt temperature change. In addition, the data indicate that certain minerals composing the regolith have a considerable effect on the stability of amino acids with respect to heat and ionizing radiation. B.J.

Typical Subject Index Listing



The subject heading is a key to the subject content of the document. The title is used to provide a description of the subject matter. When the title is insufficiently descriptive of the document content, the title extension is added, separated from the title by three hyphens. The (NASA or AIAA) accession number and the page number are included in each entry to assist the user in locating the abstract in the abstract section. If applicable, a report number is also included as an aid in identifying the document. Under any one subject heading, the accession numbers are arranged in sequence with the AIAA accession numbers appearing first.

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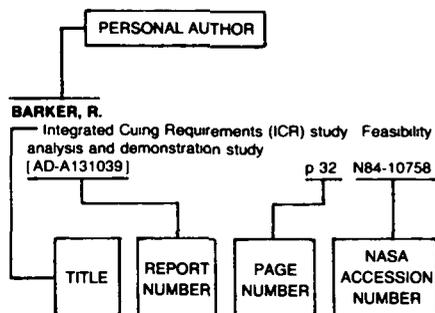
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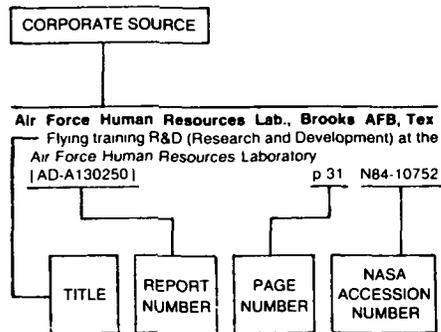
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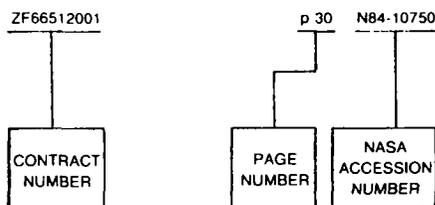
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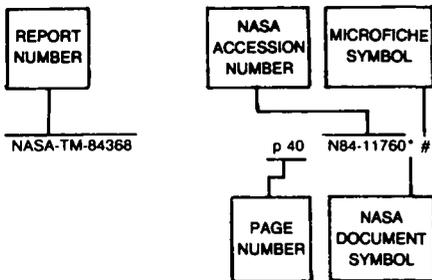
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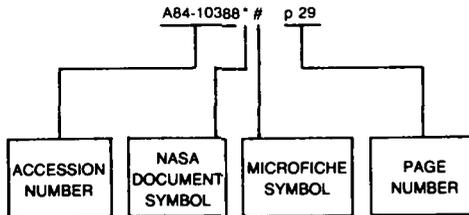


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