NASA

Aerospace Medicine and Biology
A Continuing Bibliography with Indexes

NASA SP-7011(273)
July 1985

Aerospace Medicine & Biology

SPECIAL NOTICE ENCLOSED
NEW FOREIGN TECHNOLOGY INDEX INCLUDED IN THIS ISSUE

ACCESSION NUMBER RANGES

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

STAR (N-10000 Series)	N85-19221 – N85-22341
IAA (A-10000 Series)	A85-26197 – A85-29826

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SPECIAL NOTICE

FOREIGN TECHNOLOGY INDEX IN THIS ISSUE

Documents referred to in this bibliography whose country of intellectual origin is other than the United States are listed in the Foreign Technology Index (see page D-1).

A great deal of excellent scientific and technical work is done throughout the world. To the extent that U.S. researchers, engineers, and industry can utilize what is done in foreign countries, we save our resources. We can thus increase our country's productivity.

We are testing out this approach by helping readers bring foreign technology into focus. We would like to know whether it is useful, and how it might be improved.

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NASA SP-7011(273)

AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES

(Supplement 273)

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in June 1985 in

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

NASA Scientific and Technical Information Branch 1985
National Aeronautics and Space Administration
Washington, DC

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.

This supplement is available as NTISUB/123/093 from the National Technical Information Service (NTIS), Springfield, Virginia 22161 at the price of $7.00 domestic; $14.00 foreign.

INTRODUCTION

This Supplement to *Aerospace Medicine and Biology* lists 265 reports, articles and other documents announced during June 1985 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, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* or *STAR*, including the original accession numbers from the respective announcement journals. The *IAA* items will precede the *STAR* items within each category.

Seven indexes -- subject, personal author, corporate source, foreign technology, 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 1985 Supplements.

AVAILABILITY OF CITED PUBLICATIONS

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DOMESTIC: NASA and NASA-sponsored documents and a large number of aerospace publications are available to the public for reference purposes at the library maintained by the American Institute of Aeronautics and Astronautics, Technical Information Service, 555 West 57th Street, 12th Floor, New York, New York 10019.

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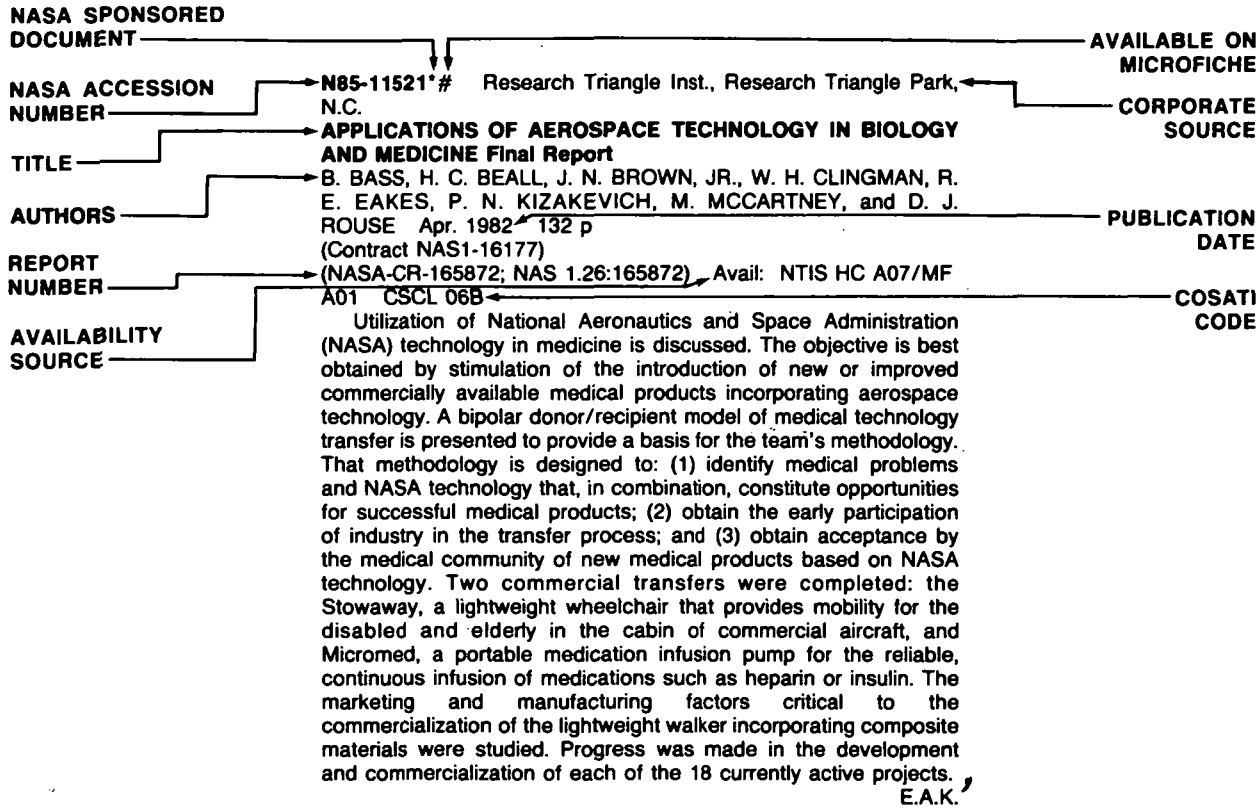

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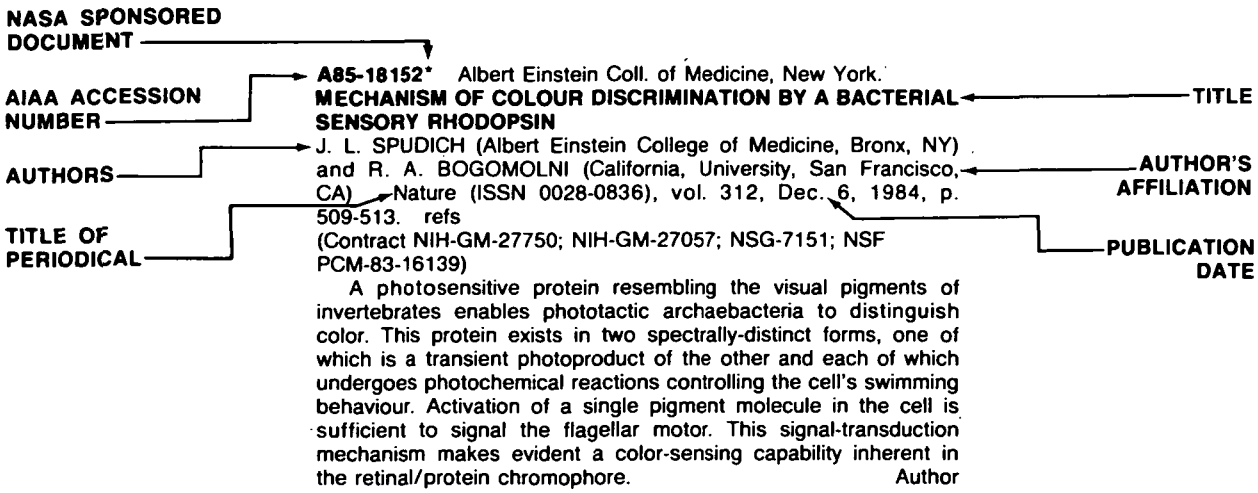

AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 273)

JULY 1985

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LIFE SCIENCES (GENERAL)

Includes genetics.

A85-26720
'LEARNING' IN THE SUBICULAR NEURONS AND THETA RHYTHM ['OBUCHENIE' NEIRONOV SUBIKULUMA I THETA-RITM]
L. R. KVIRKVELIIA (Akademiia Nauk Gruzinskoi SSR, Institut Fiziologii, Tbilisi, Georgian SSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol. 71, Jan. 1985, p. 22-29. In Russian. refs

The subicular neuron response to hippocampal stimulation by single electrical pulses, and by pulse trains has been investigated in anesthetized cats. Active neurons in the subicular region were divided into two different groups: the first group was associated with phasic discharges in response to single pulses; and the second group was associated with inhibitory reactions. The second group was found to reorganize neuronal activity during pulse train stimulation, and showed a tendency to fire pulses in advance of each pulse in the train. It is shown that the anticipatory firings occurred only during stimulation by pulses with intervals similar to theta rhythms. On the basis of experimental results, the role of hippocampal theta rhythms in memory processes is discussed. I.H.

A85-26721
THE ROLE OF PEPTIDE MECHANISMS IN CARDIOVASCULAR RESPONSES TO HYPEROXIA [UCHASTIE PEPTIDNYKH MEKHANIZMOV V FIZIOLOGICHESKIKH REAKTSIIAKH SERDECHNO-SOSUDISTOI SISTEMY NA GIPEROKSIIU]
A. V. FILATOV (Gosudarstvennyi Meditsinskii Institut, Tsentral'naia Nauchno-Issledovatel'skaia Laboratoriia, Voronezh, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol. 71, Jan. 1985, p. 120-125. In Russian. refs

A85-26722
THE IMPORTANCE OF ADRENOREACTIVE VESSELS IN THE MECHANISMS OF THE VASOCONSTRICTIVE RESPONSE TO HYPEROXIA [ZNACHENIE ADRENOREAKTIVNOSTI SOSUDOV V MEKHANIZMAKH VAZOKONSTRIKTORNOI REAKTSII NA GIPEROKSIIU]
A. N. LEONOV and A. V. FILATOV (Gosudarstvennyi Meditsinskii Institut, Tsentral'naia Nauchno-Issledovatel'skaia Laboratoriia, Voronezh, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol. 71, Jan. 1985, p. 126-130. In Russian. refs

A85-26748
THE DISTINCTIVE FEATURES OF TRANSCRIPTIONAL ACTIVITY OF NUCLEAR DNA IN LIVER CELLS DURING PROLONGED ADAPTATION TO HIGH-ALTITUDE HYPOXIA [OSOBENNOSTI TRANSKRIPTSIONNOI AKTIVNOSTI IADERNOI DNK PECHENI PRI DLITEL'NOI ADAPTATSII K VYSOTNOI GIPOKSII]
G. S. KOMOLOVA and I. A. EGOROV (Akademiia Nauk SSSR, Institut Biokhimii, Moscow, USSR) Akademiia Nauk SSSR, Izvestiia, Seriia Biologicheskaia (ISSN 0002-3329), Jan.-Feb. 1985, p. 25-30. In Russian. refs

Variations in the functional activity of the genetic mechanisms of rat liver cells were studied during intermittent exercise training in an altitude chamber. The intensity of DNA synthesis activity in liver cells nuclei was found to increase following a 30-day training period. Equal increases were found in AU-type and CG-type RNA synthesis activity. A training-period of two-months had no effect on the rate of RNA synthesis in a second-generation of animals. Changes in the composition of transcribed RNA were observed in both generations using a molecular hybridization technique. Analysis of the respective hybridization curves for 14-C RNA and Total RNA from cell samples in all the experimental groups showed that transcribed RNA spectra vary with respect to the different stages of the adaptation process. Author

A85-26749
FUNCTIONAL CHANGES OF PROTEIN METABOLISM IN VARIOUS BRAIN STRUCTURES AND IN RAT LIVER [FUNKTSIONAL'NO OBUSLOVLENNYE IZMENENIIA OBMENA BELKOV V RAZLICHNYKH OTDELAKH MOZGA I PECHENI KRYS]
V. N. VITVITSKII (Akademiia Nauk SSSR, Institut Obshchei Genetiki, Moscow, USSR) Akademiia Nauk SSSR, Izvestiia, Seriia Biologicheskaia (ISSN 0002-3329), Jan.-Feb. 1985, p. 31-40. In Russian. refs

The relationship between intense locomotor load and functional changes in the metabolism of individual proteins in cytoplasm, chromatin and in cellular membranes in various regions of the brain and liver has been investigated in experiments with rats. It is found that functional changes due to locomotor loads effect not only the rate of protein metabolism, but also the pattern of protein distribution in the brain and the liver. The distinctive features of the variations in protein synthesis are described in detail. I.H.

A85-26750
A STUDY OF THE MECHANISMS FOR THE EFFECT OF MICROWAVES ON MODEL MEMBRANE SYSTEMS [ISSLEDOVANIE MEKHANIZMA DEISTVIIA MIKROVOLN NA MODEL'NYE MEMBRANNYE SISTEMY]
I. G. AKOEV, V. V. TIAZHELOV, O. V. KOLOMYTKIN, S. I. ALEKSEEV (Akademiia Nauk SSSR, Institut Biologicheskoi Fiziki, Pushchino, USSR), and P. A. GRIGOREV Akademiia Nauk SSSR, Izvestiia, Seriia Biologicheskaia (ISSN 0002-3329), Jan.-Feb. 1985, p. 41-52. In Russian. refs

The physical mechanisms for the effect of microwaves on ionic channels in membrane systems have been investigated experimentally. In the experiments, two model membrane systems were used: an artificial bilayer from a phopholipid membrane; and a model of the postsynaptic membrane of the glutamate synapse. Microwave emission was produced by a waveguide and a generator

capacitor at frequencies ranging form 0.4 to 0.9 GHz. The specific abosrbing power (SAP) of the membranes was from 30 to 300 Wt/kg and was the same for both membrane systems. In both membrane systems displacement of ion conductivity was found to increase with the SAP of the microwaves. Estimates of the amount of dinitriphenol proton heat transport through the bilayer lipid membrane suggested that local heat emission in the near surface layer membrane layer was 20 to 30 times higher than in the chamber as a whole. On the basis of the experimental results, it is concluded that local heating may be the primary physical mechanism for the effect of low intensity microwaves on membrane systems. I.H.

A85-27150
TWO CONTRARY MODES OF CHEMOLITHOTROPHY IN THE SAME ARCHAEBACTERIUM
A. SEGERER, K. O. STETTER (Regensburg, Universitaet, Regensburg, West Germany), and F. KLINK (Kiel, Universitaet, Kiel, West Germany) Nature (ISSN 0028-0836), vol. 313, Feb. 28, 1985, p. 787-789. Sponsorship: Deutsche Forschungsgemeinschaft. refs
(Contract DFG-SFB-43)

The isolation of a group of extremely thermophilic solfataric archaebacteria that are able to grow either strictly anaerobically by reduction, or fully aerobically by oxidation of molecular sulfur, depending on the oxygen supply, is reported. It is also reported that Sulfolobus brierleyi, a well-known less thermophilic sulfur-oxidizing archaebacterium capable of ore-leaching, can also grow in these two ways. The pheomenon may be dependent on a fundamental switch in genome expression. These organisms might represent the primitive forerunners of sulfur-oxidizing archaebacteria, meeting their energy requirement either by oxidation or reduction of the same element. C.D.

A85-27151
PLASMID-RELATED ANAEROBIC AUTOTROPHY OF THE NOVEL ARCHAEBACTERIUM SULFOLOBUS AMBIVALENS
W. ZILLIG, S. YEATS, I. HOLZ, F. GROPP, M. RETTENBERGER (Max-Planck-Institut fuer Biochemie, Martinsried, West Germany), A. BOECK, and S. LUTZ (Muenchen, Universitaet, Munich, West Germany) Nature (ISSN 0028-0836), vol. 313, Feb. 28, 1985, p. 789-791. Research supported by the National Research Council of Iceland. refs

A85-27176
NEW PERSPECTIVES ON THE USE OF HORMONAL PREPARATIONS FOR THE REGULATION OF IMMUNOGENESIS [NOVYE PERSPEKTIVY ISPOL'ZOVANIIA GORMONAL'NYKH PREPARATOV DLIA REGULIATSII IMMUNOGENEZA]
N. D. TRONKO and V. F. CHEBOTAREV (Ministerstvo *Zdravookhraneniia Ukrainskoi* SSR, *Kievskii* Nauchno-Issledovatel'skii Institut Endokrinologii i Obmena Veshchestv, Kiev, Ukrainian SSR) Problemy Endokrinologii, vol. 30, Nov.-Dec. 1984, p. 49-52. In Russian. refs

It is shown through a series of experiments with mice and guinea pigs that testosterone and its metabolite dihydrosterone have different effects on the content of antibody-forming cells in the spleen: testosterone decreases the number of antibody cells and dihydrosterone increases it. Adrenalectomy was found to exert a temporary intensifying effect on cell immunity in guinea pigs, as well as an increased sensitivity to thymozine stimulation. When hydrocortisone and the mineral-corticoid DOCA were substituted for the hormones, no similar changes in thymozine activity or antibody content were observed. I.H.

A85-27177
THE ROLE OF PEROXIDATION IN STRESS-INDUCED TISSUE DAMAGE IN THE PRESENCE OF ADRENAL INSUFFICIENCY [UCHASTIE PEREKISNOGO OKISLENIIA LIPIDOV V STRESSOVOM POVREZHDENII TKANEI PRI NADPOCHECHNIKOVOI NEDOSTATOCHNOSTI]
T. A. DEVIATKINA, L. M. TARASENKO, and O. N. VOSKRESENSKII (Poltavskii Meditsinskii Stomatologicheskii Institut, Poltava, Ukrainian SSR) Problemy Endokrinologii, vol. 30, Nov.-Dec. 1984, p. 60-65. In Russian. refs

The relationship between lipid peroxidation and acute emotional-painful stress has been investigated experimentally in adrenalectomized rats. A complex of indicators was used to determine the status of lipid peroxidation in the blood and tissues the myocardium and perodontium, and to find variations in bone tissue mineralization processes. It is found that adrenal insufficiency activated lipid peroxidation in the tissues investigated. Corticosteroid deficiency was found to reduce lipid peroxidation during stress, and contributed to the demineralization of bone tissues. I.H.

A85-27188
JUSTIFICATION FOR THE MAXIMUM PERMISSIBLE INTENSITY LEVELS FOR HIGH-FREQUENCY NOISE IN THE AUDITORY ORGAN [OBOSNOVANIE PREDEL'NO DOPUSTIMYKH UROVNEI INTENSIVNOSTI VYSOKOCHASTOTNYKH SHUMOV DLIA ORGANA SLUKHA]
V. F. ANICHIN and B. V. SHISHOV (Leningradskii Sanitarno-Gigienicheskii Meditsinskii Institut, Leningrad, USSR) Zhurnal Ushnykh, Nosovykh i Gorlovykh Boleznei (ISSN 0044-4650), Sept.-Oct. 1984, p. 25-29. In Russian. refs

Maximum permissible intensity levels for high-frequency noise were determined through a series of experiments with guinea pigs. Changes in the level of nucleic acid and nucleus volume in the ear following exposure were used as criteria for the intensity levels. It is found that safe noise intensity levels were dependent on the frequency characteristics of narrowband noise: when frequency was increased by one octave it was necessary to decrease intensity by 5 dB in order to maintain a safe intensity level. A 5 dB decrease in intensity is also recommended for exposures lasting longer than 4-6 hours. I.H.

A85-27196
ATHLETIC STRESS, TRAINING LEVEL, AND ENDURANCE [SPORTIVNYI STRESS, TRENIROVANNOST', VYNOSLIVOST']
N. N. BARANOV and M. S. KAKHANA (Kishinevskii Gosudarstvennyi Universitet, Kishinev, Moldavian SSR) Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), Oct. 1984, p. 19, 20. In Russian. refs

Four phases of athletic stress are identified: catabolic, transitional, anabolic, and effector. It is concluded that the adaptation (training level) of various systems depends on the values of physical load having an effect on the body in the catabolic phase. B.J.

A85-27523
FUNCTIONAL BIOCHEMISTRY OF ADAPTATION [FUNKTSIONAL'NAIA BIOKHIMIIA ADAPTATSII]
S. KH. KHAIDARLIU Kishinev, Izdatel'stvo Shtiintsa, 1984, 272 p. In Russian. refs

Attention is given to the biochemical reactions underlying phenotypical adaptation mechanisms in humans and animals. The various interrelationships between individual adaptive responses and stress are analyzed. Stress is found to be a necessary component of urgent adaptive reactions to extreme environmental conditions, such as hypoxia, hyperthermia, and hypothermia. The metabolisms of the different chemical components of adaptation are described, and the mechanisms of metabolic regulation during adaptation to extreme environments are discussed. Particular emphasis is given to the mediator mechanisms of adaptation, and to the possible applications of drugs for maintaining and improving human adaptive capacity. I.H.

A85-27549* Jet Propulsion Lab., California Inst. of Tech., Pasadena.
ANALYSIS OF INDIVIDUAL BIOLOGICAL PARTICLES BY MASS SPECTROMETRY
M. P. SINHA (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA), R. M. PLATZ, V. L. VILKER, and S. K. FRIEDLANDER (California, University, Los Angeles, CA) International Journal of Mass Spectrometry and Ion Processes (ISSN 0168-1176), vol. 57, 1984, p. 125-133. Army-supported research. refs
(Contract NSF CPE-80-08686)

A method is developed for the detection and identification of biological particles introduced in aerosol form into a quadrupole mass spectrometer. The bacterial aerosol is generated by nebulizing an ethanol suspension. The particles are introduced into the ion source of the mass spectrometer in the form of a beam, where they are individually volatilized on a V-type rhenium filament and ionized by electron impaction. It is shown that the average intensity of a mass peak is obtained from the pulse height distribution of about a thousand ion pulses from different particles. Pseudomonas putida, Bacillus subtilis, and Bacillus cereus are used in the studies. Differences between the relative intensities of mass peaks in the spectra from P. putida and B. subtilis are found and may provide a method for differentiation of microorganisms. The results for the two species agree reasonably well with those reported by Kistemaker et al. (1975) and Schulten et al. (1973). However, there exist some differences between the two spectra in the high mass range due to the difference in the pyrolysis conditions. M.D.

A85-27666* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
HYPER-G STRESS-INDUCED HYPERGLYCEMIA IN RATS MEDIATED BY GLUCOREGULATORY HORMONES
B. C. DALIGCON and J. OYAMA (NASA, Ames Research Center, Moffett Field, CA) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 56, Jan. 1985, p. 37-42. refs

The present investigation is concerned with possible relations of the hyperglycemic response of rats exposed to hyper-G stress to (1) alterations in blood levels of the glucoregulatory hormones and gluconeogenic substrates, and (2) changes in insulin response on muscle glucose uptake. Male Sprague-Dawley rats weighing 250-300 g were used in the study. The results of the experiments indicate that the initial rapid rise in blood glucose of rats exposed to hyper-G stress is mediated by increases in circulating catecholamines and glucagon, both potent stimulators of hepatic gluconeogenesis. Lactate, derived from epinephrine stimulation of muscle glycogenolysis, appears to be a major precursor for the initial rise in blood glucose. The inhibition of the insulin-stimulated glucose uptake by muscle tissues may be a factor in the observed sustained hyperglycemia. G.R.

A85-27669
A DIRECT TEST FOR THE SURVIVAL OF GASEOUS NUCLEI IN VIVO
P. M. MCDONOUGH and E. A. HEMMINGSEN (California, University, La Jolla, CA) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 56, Jan. 1985, p. 54-56. refs
(Contract NIH-HL-16885)

It has recently been demonstrated that bubble formation in the crab Pachygrapsus crassipes is induced by limb motions following decompression from nitrogen pressures as low as 2 atm. Preformed gaseous nuclei are not involved in this process and are absent from this animal. It is further demonstrated here that nuclei do not remain in the body fluids when the motion-induced bubbles dissolve. This shows that gas phases do not become protected against dissolution in vivo as has been proposed by other workers. This may have important implications concerning the origin of bubbles causing decompression sickness in higher animals. Author

A85-27671
A MISCONCEPTION OF MOTION SICKNESS LEADS TO FALSE THERAPEUTIC EXPECTATIONS
H. L. BORISON (Dartmouth College, Hanover, NH) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 56, Jan. 1985, p. 66-68. refs

Motion sickness and its counterpart space sickness continue to be problems. It is pointed out that the rational therapy of these vestibular related disorders requires the identification of pharmacologically vulnerable points of intervention in the specific reflex pathways. The emetic chemoreceptor trigger zone (CTZ) in the medulla oblongata is generally considered as an indispensable link in the reflex chain of connections through the vomiting center. Since space sickness is thought to be a variant of terrestrial motion sickness, the CTZ is implicated by extrapolation in the discomforting effects of microgravity. The present investigation has the objective to examine the experimental evidence for and against the presumed essential role of the CTZ. It is shown that there is good reason to doubt the validity of the generally held concept. It follows that therapeutic strategies based on a misconceived role of the CTZ in motion sickness would not serve their intended purpose. G.R.

A85-27775
VITAMIN E AND A CONTENT AND MALONIC DIALDEHYDE PRODUCTION IN RAT TISSUES UNDER HYPOBARIC HYPOXIA [SODERZHANIE VITAMINOV E I A I OBRAZOVANIE MALONDIAL'DEGIDA V TKANIAKH KRYS PRI GIPOKSII]
Z. Z. VARSHKIAVICHENE, R. CH. CHERNIAUSKENE, and P. S. GRIBAUSKAS (Nauchno-Issledovatel'skii Institut Fiziologii i Patologii Serdechno-Sosudistoi Sistemy, Kaunas, Lithuanian SSR) Patologicheskaia Fiziologiia i Eksperimental'naia Terapiia (ISSN 0031-2991), Jan.-Feb. 1985, p. 24-26. In Russian. refs

A85-27793
RELATIONSHIP BETWEEN THE PHOTOSENSITIVITY OF RETINAL RODS AND CYCLIC-NUCLEOTIDE METABOLISM [SVIAZ'SVETOVOI CHUVSTVITEL'NOSTI PALOCHEK SETCHATKI OBMENOM TSIKLICHESKIKH NUKLEOTIDOV]
L. M. BOCHKIN, P. P. ZAK, and M. A. OSTROVSKII (Akademiia Nauk SSSR, Institut Khimicheskoi Fiziki, Moscow, USSR) Fiziologiia Cheloveka (ISSN 0131-1646), vol. 11, Jan.-Feb. 1985, p. 159-161. In Russian. refs

A85-27976
EFFECTS OF CENTRIFUGAL ACCELERATION (-GX, -GZ) UPON RESPIRATORY RESPONSES IN HAMSTERS
Y. MIZUNO, H. SATAKE, S. UEKI, K. ITO, H. URANO, Y. SEKIMOTO, A. MIYAKE, S. WATANABE (Gifu University, Gifu, Japan), and H. JIJIWA (Institute for Developmental Research, Kasugai, Japan) Japanese Journal of Aerospace and Environmental Medicine (ISSN 0387-0723), vol. 21, June 1984, p. 1-10. In Japanese, with abstract in English. refs

The tidal volume, minute volume, and wave forms of intact and labyrinthectomized rats exposed to 4-10 g centrifugal accelerations were studied. The accelerations were applied in either head-tail (-Gz) or back-abdomen (-Gx) directions. Wave forms decreased in both directions, while the tidal and minute volumes were both significantly suppressed in the -Gz tests. The -Gz accelerations were concluded to have a greater impact on respiratory performance than -Gx accelerations. Abdominal viscera are assumed to exert pressure on the chest cavity in -Gz acceleration, and the same bodily regions is protected by the thorax in -Gx accelerations. Finally, the decreases in the tidal and minute volumes were faster in the labyrinthectomized rats, a condition attributed to heightened skeletal muscle tension. M.S.K.

A85-28025* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
EFFECTS OF MEDIUM CONCENTRATION ON ANTIBODY PRODUCTION
J. WILLIAMS (NASA, Ames Research Center, Moffett Field, CA) Journal of Tissue Culture Methods (ISSN 0271-8057), vol. 8, no. 3, 1984, p. 115-118.

Antibody production by two different cell lines was measured as the media were supplemented with varied amounts of glucose and fetal bovine serum. Both cell lines elaborated antidinitrophenyl hapten antibodies. Two basic media were used: RPMI 1640 and Dulbecco's modified Eagle's medium. The production of antibodies was followed from 0 to 180 h and was assayed by radioimmunoassay. Author

A85-28026* Maryland Univ., Baltimore.
ANDROGEN-ESTROGEN SYNERGY IN RAT LEVATOR ANI MUSCLE GLUCOSE-6-PHOSPHATE DEHYDROGENASE
S. R. MAX (Maryland, University, Baltimore, MD) Molecular and Cellular Endocrinology (ISSN 0303-7207), vol. 38, 1984, p. 103-107. refs
(Contract NIH-NS-15760; NAG2-100)

The effects of castration and hormone administration on the activity of glucose-6-phosphate dehydrogenase in the rat levator ani muscle were studied. Castration caused a decrease in enzyme activity and in wet weight of the levator ani muscle. Chronic administration of testosterone propionate increased glucose-6-phosphate dehydrogenase activity in the levator ani muscle of castrated rats; the magnitude of the recovery of enzyme activity was related to the length of time of exposure to testosterone propionate after castration as well as to the length of time the animals were castrated. The longer the period of castration before exposure to testosterone propionate, the greater the effect. This result may be related to previously reported castration-mediated increases in androgen receptor binding in muscle. Dihydrotestosterone was less effective than testosterone propionate in enhancing glucose-6-phosphate dehydrogenase activity in the levator ani muscle from castrated rats; estradiol-17-beta alone was ineffective. Combined treatment with estradiol-17-beta and dihydrotestosterone, however, was as effective as testosterone alone. Thus, androgens and estrogens may exert synergistic effects on levator ani muscle. Author

A85-28447
CERTAIN MECHANISMS FOR COMPENSATION AND ADAPTATION IN THE BLOOD-CIRCULATION SYSTEM IN THE PRESENCE OF HEMIC HYPOXIA [NEKOTORYE MEKHANIZMY KOMPENSATSII I ADAPTATSII V SISTEME KROVI PRI GEMICHESKOI GIPOKSII]
V. P. DUDAREV (Akademiia Nauk Ukrainskoi SSR, Institut Fiziologii, Kiev, Ukrainian SSR) Fiziologicheskii Zhurnal (Kiev) (ISSN 0201-8489), vol. 31, Jan.-Feb. 1985, p. 21-27. In Russian. refs

Rats were injected with 30-50 mg/kg of sodium nitrite in a water solution five times a week for a period of two months in order to study the mechanism of adaptation in the blood circulatory system in the presence of hemic hypoxia. By the end of the experiment, it was found that methhemoglobin levels were lower than at the beginning. In the first 5-10 days after injection with the oxidizer, reduced levels of 2,3-DPG, lactate, and pyrivate were found, as well as reduced levels of blood catalse and carboanhydrase. Blood indices are found to normalize at the onset of lactatemia and when ATP levels were reduced. The most pronounced changes in the fractional composition of hemoglobin were observed after injection of 50 mg/kg of sodium nitrite. I.H.

A85-28448
THE EFFECT ON THE HEART OF ANTIBODIES OF VARYING SPECIFICITY [VLIIANIE NA SERDTSE IMMUNNYKH SYVOROTOK RAZLICHNOI SPETSIFICHNOSTI]
O. V. SHABLOVSKAIA, V. F. SAGACH, and L. F. POPOVICH (Akademiia Nauk Ukrainskoi SSR, Institut Fiziologii, Kiev, Ukrainian SSR) Fiziologicheskii Zhurnal (Kiev) (ISSN 0201-8489), vol. 31, Jan.-Feb. 1985, p. 38-44. In Russian. refs

The relationship between the extent of functional disturbances and structural changes in the heart and the serologic and immunochemical properties of antibodies was investigated in experiments with dogs. It is found that the extent of microcirculatory disorders and myocardial structural alteration is higher in the presence of anticardiac antibody activity than antiserumprotein antibody activity. A series of canine EGCs is presented in order to illustrate the experimental results. I.H.

A85-28449
THE ROLE OF THE THYMUS GLAND IN REGULATING ANTIBODY FORMATION IN THE PRESENCE OF A MAGNETIC FIELD [UCHASTIE VILOCHKOVOI ZHELEZY V MODULIATSII ANTITELOGENEZA VYZYVAEMOI VOZDEISTVIEM MAGNITNOGO POLIA]
E. V. GIULLING, O. F. MELNIKOV, V. N. PISANKO, and E. M. OLISHERSKII (Kievskii Institut Otolaringologii, Kiev, Ukrainian SSR) Fiziologicheskii Zhurnal (Kiev) (ISSN 0201-8489), vol. 31, Jan.-Feb. 1985, p. 71-73. In Russian. refs

The effects of a low-intensity magnetic field on the process of antibody formation in normal and thymectomerized rats has been investigated experimentally. Estimates of the amount of antibody forming cells in the spleen were obtained after one day of exposure to the magnetic field and following immunization with ovine erythrocytes. On the basis of the experimental results, it is concluded that the magnetic field increased both the speed and the volume of antibody production in the normal rats. I.H.

A85-28450
THE SEASONAL CHARACTERISTICS OF LIVER EXCRETORY FUNCTION IN NORMAL CONDITIONS AND IN THE PRESENCE OF LIVER DAMAGE DUE TO XENOBIOTICS [SEZONNYE OSOBENNOSTI EKSKRETORNOI FUNKTSII PECHENI V NORME I PRI PORAZHENII KSENOBIOTIKAMI]
N. P. SKAKUN, I. T. TSILIURIK, L. A. VOLKOVA, and A. T. KUDIN (Ternopol'skii Meditsinskii Institut, Ternopol, Ukrainian SSR) Fiziologicheskii Zhurnal (Kiev) (ISSN 0201-8489), vol. 31, Jan.-Feb. 1985, p. 85-87. In Russian. refs

The effect of seasonal variations on liver excretory function was studied in a group of normal animals and in animals with liver damage due to hematotoxic compounds. Excretory function was measured by the separation of the radioactive isotope I-131 from other components in bile samples obtained periodically over the course of one year. It is found that the presence of seasonal variations had no effect on liver excretory function in either group of animals, and that the main indices of excretory function remained the same for both groups. The experimental data are summarized in a table. I.H.

A85-28925
ULTRASTRUCTURAL ORGANIZATION OF NEUROMUSCULAR SYNAPSES OF RED MUSCLE FIBERS OF RATS UNDER INCREASED MOTOR ACTIVITY [UL'TRASTRUKTURNAIA ORGANIZATSIIA NERVNO-MYSHECHNYKH SINAPSOV KRASNYKH MYSHECHNYKH VOLOKON KRYSY PRI POVYSHENNOI DVIGATEL'NOI AKTIVNOSTI]
M. M. UMNOVA and T. P. SEENE (Akademiia Nauk SSSR, Institut Evoliutsionnoi Morfologii i Ekologii Zhivotnykh, Moscow, USSR) Akademiia Nauk SSSR, Doklady (ISSN 0002-3264), vol. 280, no. 5, 1985, p. 1239-1241. In Russian. refs

A85-29010
CHANGES IN THE ANTIGEN ACTIVITY OF HUMAN ERYTHROCYTES IN AN ULTRASONIC FIELD [K VOPROSU OB EFFEKTE IZMENENIIA ANTIGENNOI AKTIVNOSTI ERITROTSITOV CHELOVEKA V POLE UL'TRAZVUKOVOGO IZLUCHENIIA]
L. A. PIRUZIAN, R. G. MAEV, M. M. NISNEVICH, M. M. KOIFMAN, and Z. N. KORNEVA (Akademiia Nauk SSR, Institut Khimicheskoi Fiziki, Moscow, USSR) Akademiia Nauk SSSR, Doklady (ISSN 0002-3264), vol. 280, no. 6, 1985, p. 1499-1501. In Russian. refs

A85-29026
MUSCLE BLOOD FLOW PATTERNS DURING EXERCISE IN PARTIALLY CURARIZED RATS
R. B. ARMSTRONG, C. B. VANDENAKKER, and M. H. LAUGHLIN (Oral Roberts University, Tulsa, OK) Journal of Applied Physiology (ISSN 0161-7567), vol. 58, March 1985, p. 698-701. Research supported by the American Heart Association and Oral Roberts University. refs
(Contract NIH-AM-25472; NIH-HL-26963)

The distribution of blood flow within and among muscles of partially curarized (40-100 microgram/kg body wt) rats was studied during preexercise and at 1 min of low-speed treadmill exercise (15 m/min). Glycogen loss in the deep red muscles and parts of muscles was significantly reduced in the curarized animals during exercise, indicating the fibers in these muscles were recruited to a lesser extent and/or had lower metabolisms than fibers in the same muscles of control rats. However, elevations in blood flow in the red muscles of the curarized rats were as great or greater than those in the control rats. Thus reduced recruitment and/or metabolism of the deep red muscle fibers of the curarized animals was not accompanied by reduced blood flow. These findings suggest a dissociation between red fiber metabolism and blood flow in the curarized rats during the 1st min of slow treadmill exercise and indicate that release of vasodilator substances or local physical factors associated with muscle fiber activity are not solely responsible for the initial hyperemia during exercise.
Author

A85-29030
EFFECTS OF TRANSFUSION-INDUCED POLYCYTHEMIA ON O2 TRANSPORT DURING EXERCISE IN THE DOG
P. T. SCHUMACKER, B. GUTH, A. J. SUGGETT, P. D. WAGNER, and J. B. WEST (California, University, La Jolla, CA) Journal of Applied Physiology (ISSN 0161-7567), vol. 58, March 1985, p. 749-758. refs
(Contract NIH-HL-17731)

The effects of increased hematocrit on O2 transport has been studied experimentally in dogs at rest, and during graded treadmill exercises. The test animals were splenectomized and tracheostomized at normal hematocrit (38 + or - 3 percent). Measurements of O2 transport were made before and 48 hours after transfusion of type-matched donor cells. No changes were observed in resting cardiac output and heart rate following transfusion. During exercise, however, significant decreases in cardiac output were observed at each level of minute ventilation of O2 at high hematocrit. A reduction in cardiac output was also observed during polycythemic exercise with hypoxemia. Despite the reduction in cardiac output venous O2 pressure was not lower at high hematocrit, and the increase in the base deficit following minute ventilation with O2 was no different from control measurements. Both systemic and pulmonary arterial pressures were increased at rest after transfusion, but did not exceed basal levels during exercise at high hematocrit. On the basis of the experimental results, it is concluded that a hematocrit of 60 percent with increased blood volume is not associated with a cardiac limitation of O2 delivery, and does not interfere with peripheral O2 extraction during exercise in the dog. I.H.

A85-29033
EFFECTS OF CHRONIC HYPOXIA ON STRUCTURE AND REACTIVITY OF RAT LUNG MICROVESSELS
P. DAVIES, F. MADDALO, and L. REID (Children's Hospital, Boston, MA) Journal of Applied Physiology (ISSN 0161-7567), vol. 58, March 1985, p. 795-801. refs
(Contract NIH-HL-27352)

A85-29034
ENDOTOXIN-TOLERANT RATS ARE STILL PROTECTED FROM OXYGEN TOXICITY BY LOW-DOSE ENDOTOXIN TREATMENT
L. FRANK (Miami, University, Miami, FL) Journal of Applied Physiology (ISSN 0161-7567), vol. 58, March 1985, p. 819-822. refs
(Contract NIH-HL-26029; NIH-HL-01230)

A85-29035
DECREASED BRAIN LEVELS OF ASCORBIC ACID IN RATS EXPOSED TO HIGH PRESSURES
T. P. OBRENOVITCH (Newcastle-upon-Tyne, University, Newcastle-upon-Tyne, England; Centre d'Etudes et de Recherches Biophysiologiques Appliquees a la Marine, Toulon, France) and J. L. GILLARD (Centre d'Etudes et de Recherches Biophysiologiques Appliquees a la Marine, Toulon, France) Journal of Applied Physiology (ISSN 0161-7567), vol. 58, March 1985, p. 839-843. Sponsorship: Direction des Recherches et Etudes Techniques. refs
(Contract DRET-82-11-44)

Ascorbic acid was repeatedly monitored in vivo in the striatum of rats subjected to an increasing pressure (100 bar/h compression rate; 0.5 bar partial pressure of O2 He-O2 mixture, up to 120 bar (121 ATA), to which they were exposed for 1 h. Measurements were performed using differential pulse voltammetry and carbon fiber microelectrodes. High-pressure-exposed animals exhibited a dramatic decrease of striatal ascorbic acid. This decrease was detectable at pressures as low as 50 bar and significant over 70 bar (75 percent of the control level), and the lower level (25 percent of the control level) was reached shortly after the end of the compression period. This finding is discussed in relation to the physiological role of ascorbic acid in the brain, e.g., its participation in the defense mechanisms against reactive O2 intermediates and lipid peroxidations and its probable involvement in neurotransmission. Emphasis is placed on a possible increased sensitivity of nerve cell membrane phospholipids to peroxidation under stressful hyperbaric situations. Author

A85-29042
POTENTIATION OF LUNG VASCULAR RESPONSE TO ENDOTOXIN BY SUPEROXIDE DISMUTASE
D. L. TRABER, T. ADAMS, JR., L. SZIEBERT, M. STEIN, and L. TRABER (Texas, University, Galveston, TX) Journal of Applied Physiology (ISSN 0161-7567), vol. 58, March 1985, p. 1005-1009. refs

A85-29043
A HIGH-PRECISION AUTOMATIC CLOSED-CIRCUIT RESPIROMETER FOR SMALL ANIMALS
R. J. HOWLAND and K. NEWMAN (Surrey, University, Guildford, England) Journal of Applied Physiology (ISSN 0161-7567), vol. 58, March 1985, p. 1031-1033.

A85-29576
SOURCES OF DEVELOPMENT, STRUCTURE, AND METAPLASTIC POTENTIALS OF TRANSITIONAL EPITHELIUM (UROTHELIUM) IN CONNECTION WITH THE QUESTION OF ITS TISSUE TYPE [ISTOCHNIKI RAZVITIIA, STROENIE I METAPLASTICHESKIE POTENTSII PEREKHODNOGO EPITELIIA /UROTELIIA/ V SVIAZI S VOPROSOM O EGO TKANEVOM TIPE]
N. M. ANICHKOV (Leningradskii Sanitarno-Gigienicheskii Meditsinskii Institut, Leningrad, USSR) Arkhiv Anatomii, Gistologii i Embriologii (ISSN 0004-1947), vol. 87, Nov. 1984, p. 5-13. In Russian. refs

A85-29577
ULTRASTRUCTURE OF THE RAT CEREBRAL CORTEX UNDER NOISE STRESS AND ALCOHOL INTOXICATION [UL'TRASTRUKTURA KORY BOL'SHOGO MOZGA KRYSY PRI SHUMOVOM STRESSE I ALKOGOL'NOI INTOKSIKATSII]
N. I. ARTIUKHINA and I. P. LEVSHINA (Akademiia Nauk SSSR, Institut Vysshei Nervnoi Deiatel'nosti i Neirofiziologii, Moscow, USSR) Arkhiv Anatomii, Gistologii i Embriologii (ISSN 0004-1947), vol. 87, Nov. 1984, p. 23-30. In Russian. refs

A85-29578
SPATIAL LOCALIZATION OF PROLIFERATING AND DYING CELLS IN THE DEVELOPING HIPPOCAMPUS OF MICE [PROSTRANSTVENNAIA LOKALIZATSIIA PROLIFERIRUIUSHCHIKH I GIBNUSHCHIKH KLETOK V RAZVIVAIUSHCHEMSIA GIPPOKAMPE MYSHEI]
G. D. NAZAREVSKAIA and K. IU. REZNIKOV (Universitet Druzhby Narodov, Moscow, USSR) Arkhiv Anatomii, Gistologii i Embriologii (ISSN 0004-1947), vol. 87, Nov. 1984, p. 31-37. In Russian. refs

A85-29579
STRUCTURAL ORGANIZATION AND ORIENTATION OF THE HAIR CELLS IN THE SACCULAR MACULA OF THE MEMBRANOUS LABYRINTH OF THE RANA TEMPORARIA [STRUKTURNAIA ORGANIZATSIIA I ORIENTATSIIA VOLOSKOVYKH KLETOK PIATNA MESHOCHKA PEREPONCHATOGO LABIRINTA U TRAVIANOI LIAGUSHKI]
L. I. TIKHOMIROVA (Akademiia Nauk SSSR, Institut Evoliutsionnoi Morfologii i Ekologii Zhivotnykh, Moscow, USSR) Arkhiv Anatomii, Gistologii i Embriologii (ISSN 0004-1947), vol. 87, Nov. 1984, p. 37-42. In Russian. refs

A85-29580
CHANGE IN THE HYDRODYNAMIC RESISTANCE OF COLLATERALS AFTER LIGATION OF THE FEMORAL ARTERY [IZMENENIE GIDRODINAMICHESKOGO SOPROTIVLENIIA KOLLATERALEI POSLE PEREVIAZKI BEDRENNOI ARTERII]
G. G. PROKHOROV (Voenno-Meditsinskaia Akademiia, Leningrad, USSR) Arkhiv Anatomii, Gistologii i Embriologii (ISSN 0004-1947), vol. 87, Nov. 1984, p. 43-47. In Russian.

A85-29581
ULTRASTRUCTURAL CHARACTERISTICS OF MYOCYTES OF THE FEMORAL ARTERY IN AN EXPERIMENT INVOLVING LENGTHENING OF THE SHIN [UL'TRASTRUKTURNYE OSOBENNOSTI MIOTSITOV BEDRENNOI ARTERII PRI UDLINENII GOLENI V EKSPERIMENTE]
IU. M. IRIANOV, N. S. MIGALKIN, and L. M. KNIAZEVA (Nauchno-Issledovatel'skii Institut Eksperimental'noi i Klinicheskoi Ortopedii i Travmatologii, Kurgan, USSR) Arkhiv Anatomii, Gistologii i Embriologii (ISSN 0004-1947), vol. 87, Nov. 1984, p. 48-52. In Russian. refs

A85-29582
STRUCTURE OF THE RAT THYMUS IN THE ANTENATAL AND POSTNATAL PERIODS OF DEVELOPMENT AFTER THE ADMINISTRATION OF TETRACYCLINE DURING FETOGENESIS [STROENIE VILOCHKOVOI ZHELEZY KRYSY V ANTENATAL'NOM I RANNEM POSTNATAL'NOM PERIODAKH RAZVITIIA POSLE VOZDEISTVIIA TETRATSIKLINA V PERIOD FETOGENEZA]
T. B. PETROVA (Leningradskii Pediatricheskii Meditsinskii Institut, Leningrad, USSR) Arkhiv Anatomii, Gistologii i Embriologii (ISSN 0004-1947), vol. 87, Nov. 1984, p. 61-66. In Russian. refs

A85-29591
EFFECT OF HYPOKINESIA ON THE INTENSITY OF LIPID PEROXIDATION IN THE TISSUES OF RATS ON AN ATHEROGENIC DIET [VLIIANIE GIPOKINEZII NA INTENSIVNOST' PEREKISNOGO OKISLENIIA LIPIDOV V TKANIAKH KRYS, NAKHODIVSHIKHSIA NA ATEROGENNOI DIETE]
T. E. SHIDLOVSKAIA and A. N. GANSBURGSKII (Iaroslavskii Meditsinskii Institut, Yaroslavl, USSR) Kardiologiia (ISSN 0022-9040), vol. 24, Nov. 1984, p. 116-118. In Russian. refs

A85-29600
THE FUNCTIONAL MORPHOLOGY OF INTERSTITIAL CELLS IN THE RENAL MEDULLA [FUNKTSIONAL'NAIA MORFOLOGIIA INTERSTITSIAL'NYKH KLETOK MOZGOVOGO SLOIA POCHKI]
R. I. SOKOLOVA and A. M. VIKHERT (Akademiia Meditsinskikh Nauk SSSR, Institut Kardiologii, Moscow, USSR) Arkhiv Patologii (ISSN 0004-1955), vol. 46, no. 11, 1984, p. 22-28. In Russian. refs

N85-20211# Joint Publications Research Service, Arlington, Va.
RESEARCH IN ENVIRONMENTAL BIOLOGY REVIEWED
D. WANG *In its* China Rept.: Sci. and Technol. (JPRS-CST-84-039) p 78-92 3 Dec. 1984 Transl. into ENGLISH from Huanjing Kexue (China), no. 6, 30 Dec. 1983 p 61-67
Avail: NTIS HC A08/MF A01

Relevant institutes of the Chinese Academy of Sciences, colleges and universities, agricultural and forestry research units, environmental research units, etc., conducted much research and published many reports and summaries on pollution ecology, biological purification, biological degradation and the biological effects and biological monitoring of pollutants. Some specific areas of review are: (1) Research on the biological effects of pollutants, (2) progress in life Science Research, (3) useful indicator organisms applied to biological montioring and evaluation of water pollution, (4) the prevention of water pollution, (5) applied and mechanical studies of atmospheric pollution and plants, (6) farmland environmental protection, and (7) environmental conservation.
E.R.

N85-20621# School of Aerospace Medicine, Brooks AFB, Tex.
BEHAVIOR DEGRADATION DUE TO 1100-RAD PULSED RADIATION EXPOSURE (5.8:1 NEUTRON/GAMMA RATIO) Final Report, Jun. - Dec. 1982
G. C. BROWN, M. G. YOCHMOWITZ, G. B. HUBBARD, K. A. HARDY, D. M. HUGHES, and B. YARBROUGH Oct. 1984 60 p
(Contract AF PROJ. 7757)
(AD-A149284; USAFSAM-TR-84-30) Avail: NTIS HC A04/MF A01 CSCL 06R

A self-paced, 3-light, 3-lever discrete avoidance behavioral task was used for further study of behavioral performance effects of a high-neutron, low-gamma radiation pulse exposure (average 1100 rads midline tissue, 5,8:1 neutron/gamma ratio). Eight rhesus monkeys were exposed at the White Sands Missile Range Fast Burst Reactor and tested daily for up to 5 days after exposure. On the exposure day, all eight subjects had significantly degraded response accuracy, seven had increased reaction-time scores, seven experienced productive emesis. One day after exposure, most subjects performed near baseline levels except for occasional brief period(s). At 2 days, two subjects were unable to meaningfully perform the behavioral task and were euthanatized. The other six subjects were more variable than on the previous day. Three subjects experienced additional emetic episodes. At 5 days, only two of the remaining four animals performed at any reasonable degree. It is unlikely that any animal could have performed on the sixth day.
GRA

N85-20622# Smithsonian Institution, Rockville, Md. Environmental Research Center.
PRIMARY LIGHT HARVESTING SYSTEM: THE RELATIONSHIP OF PHYCOBILISOMES TO PHOTOSYSTEM 1 AND 2 Progress Report, Sep. 1983 - Mar. 1984
E. GANTT 1984 5 p
(Contract DE-AS05-76ER-04310)
(DE85-003075; DOE/ER-04310/T2) Avail: NTIS HC A02/MF A01

Phycobilisomes with photosystem (PS) 2 activity as measured by oxygen evolution, and reduction of dichlorophenol indophenol were isolated in special medium, the phycobilisomes remain intact, and the PS 2 activity is preserved. These preparations are deficient in the PS 1 reaction center pigment P700, and in the PS 1 polypeptide CO 1. Preparations of this system are further characterized to determine the P680 content, to ascertain the DCMU-binding protein, cytochromes, and other polypeptides which are specific for PS 2, and also for PS 1. In addition, the sidedness of thylakoid membranes of red algae and cyanobacteria are also explored by immunocytochemistry (EM) and fractionation on acrylamide gels. Attachment of the phycobilisomes, and the location of the terminal emitter of physobilisomes, are an integral part of these studies. Results will aid in an understanding of the energy transfer in the photosynthetic apparatus of these groups of organisms which appear to have a considerable convergence from green plants. DOE

N85-20623# Georgia Univ., Athens. Research Foundation.
NITROGEN CONTROL OF PHOTOSYNTHETIC PROTEIN SYNTHESIS Progress Report
G. W. SCHMIDT Nov. 1984 5 p
(Contract DE-FG09-84ER-13188)
(DE85-003513; DOE/ER-13188/1) Avail: NTIS HC A02/MF A01

The molecular relationship between nitrogen nutrition and the synthesis of photosynthetic proteins in Chlamydomonas reinhardtii was studied. Most of the effort has concerned development of analytical techniques and reagents to be used in studies of the effects of nitrogen deficiency on chloroplast biogenesis and the responses of such cells to nitrogen provision. These techniques are summarized. DOE

N85-20624# Hawaii Univ., Honolulu.
RESEARCH AND DEVELOPMENT OF SHALLOW ALGAL MASS CULTURE SYSTEMS FOR THE PRODUCTION OF OILS
E. A. LAWS Oct. 1984 59 p refs Prepared for Midwest Research Inst., Golden, Colo.
(Contract DE-AC02-83CH-10093)
(DE85-000518; SERI/STR-231-2496) Avail: NTIS HC A04/MF A01

The major accomplishment of the past nine months' work was the identification of a microalgal species which can be grown in the system on a 12-month basis without temperature control. The most promising species identified to date is a strain of platymonas sp. This strain grows rapidly at temperatures from 20(0) to to 34(0)C, and at salinities from 1.5 to 3.5%. Neither the lower temperature limit nor the lower salinity limit of the strain are known at this time. A factorial experiment designed to determine optimum growth conditions indicated that the optimum culture depth was 10 cm, the optimum pH about 7.5, and the optimum flow rate about 30 cm/s. A major discovery was that diluting the culture every third day greatly enhanced production. In this dilution mode daily yields averaged 46 g/m(2) ash-free dry weight (AFDW) over a one-month period, and photosynthetic efficiencies averaged 11% (based on visible light energy). The former figure is over twice the best long-term yields achieved in microalgal mass culture systems grown exclusively on inorganic nutrients. DOE

N85-20625# Yale Univ., New Haven, Conn. School of Medicine.
SIMULTANEOUS DETERMINATION OF CEREBRAL BLOOD FLOW AND PARTITION COEFFICIENT WITH A FREELY DIFFUSABLE TRACER
A. RESCIGNO, R. M. LAMBRECHT, C. C. DUNCAN, C. Y. SHIUE, and L. R. MENT 1984 9 p refs Presented at the NATO Advanced Study Inst. on Phys. and Eng. of Med. Imaging, Maratea (Italy), 24 Sep. 1984 Prepared in cooperation with Brookhaven National Laboratory, Upton, N.Y.
(Contract DE-AC02-76OR-00016; NIH R01-NS-16802)
(DE85-001226; BNL-35349; CONF-8409164-1) Avail: NTIS HC A02/MF A01

A method is described, whereby cerebral blood flow (CBF) and partition coefficient are determined using the tracer (18)F-4-1 fluoroantipyrine and positron emission tomography. DOE

N85-20626# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
MICROALGAE CULTURE COLLECTION, 1984-1985
Sep. 1984 62 p refs
(Contract DE-AC02-83CH-10093)
(DE84-013035; SERI/SP-231-2486) Avail: NTIS HC A04/MF A01

Twelve microalgae species important in fuel production and available from the Solar Energy Research Institute are enumerated. A major emphasis of the culture collection is to make available most of the existing scientific and culture data for each strain in the collection. Each strain is listed with a summary of its most important physiological and culture characteristics. DOE

N85-20627# Oak Ridge National Lab., Tenn. Chemical Technology Div.
PHOTOSYNTHETIC WATER SPLITTING
E. GREENBAUM 1984 3 p Presented at the Gas Research Inst. Contractor's Rev. Meeting on Gaseous Fuel Syn. from Inorg. Resources, Schaumberg, Ill., 17-18 Oct. 1984 Sponsored in part by Gas Research Inst.
(Contract DE-AC05-84OR-21400)
(DE85-002460; CONF-8410184-1) Avail: NTIS HC A02/MF A01

Algae photosynthesis is a key area of research for the production of gaseous fuels from inorganic resources. Absolute energy and quantum conversion efficiencies were measured for five green algae species. Wild Chlamydomonas reinhardtii strains were subject to anaerobiosis, CO2 deprivation, and irradiation in order to increase H2 and/or O2 photoproduction yields. DOE

N85-20628# Joint Publications Research Service, Arlington, Va.
USSR REPORT: LIFE SCIENCES. BIOMEDICAL AND BEHAVIORAL SCIENCES
25 Feb. 1985 95 p refs Transl. into ENGLISH from various Russian articles
(JPRS-UBB-85-010) Avail: NTIS HC A05/MF A01

Progress in life, biomedical, and behavioral sciences is reported. Categories discussed include: agrotechnology, biochemistry, biophysics, biotechnology, ecology, environment, epidemiology, genetics, human factors, immunology, laser application, marine mammals, medicine, microbiology, nonionizing electromagnetic radiation effects, pharmacology and toxicology, physiology, public health, psychology, radiation biology, veterinary medicine, and virology.

N85-20631# Joint Publications Research Service, Arlington, Va.
EFFECTS OF HYPERTHERMIA ON FREE AMINO ACIDS IN RAT BRAIN AND IN SUBCELLULAR FRACTIONS Abstract Only
I. M. TURYANITSA, A. Y. PASHCHENKO, M. V. DOROGIY, and T. M. FEDOROVICH *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-85-010) p 51 25 Feb. 1985 Transl. into ENGLISH from Ukr. Biokhim. Zh. (Kiev), v. 56, no. 6, Nov. - Dec. 1984 p 663-666
Avail: NTIS HC A05/MF A01

Effects of hyperthermia on free amino acid levels in the brain were studied in outbred rats to complement available data on the

effects of hypothermia. Analysis of the grey matter revealed marked depression of most amino acids in the first 7 min of hyperthermia, with the exception of glutamic acid which rose to 104.5 mg% from a backround value of 33.3 mg%. Thereafter, the levels of the various amino acids rose and in some cases exceeded control values. Analysis of mitochondria showed elevation of most acids during the initial 7 min, and thereafter depression to, or below, the control values by 20 min; a secondary rise was evident by 60 min. Analysis of the nuclear fraction of free amino acids revealed an opposite pattern to that observed with the mitochondria. It is indicated that hyperthermia has a profound metabolic effect on the brain, and results in redistribution of the free amino acid pool among the subcellular fractions. E.A.K.

N85-20650*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

SUSCEPTIBILITY OF CAT AND SQUIRREL MONKEY TO MOTION SICKNESS INDUCED BY VISUAL STIMULATION: CORRELATION WITH SUSCEPTIBILITY TO VESTIBULAR STIMULATION

N. G. DAUNTON, R. A. FOX (San Jose State Univ., Calif.), and G. H. CRAMPTON (Wright State Univ., Dayton, Ohio) *In* AGARD Motion Sickness: Mechanisms, Prediction, Prevention and Treatment 5 p Nov. 1984 refs

Avail: NTIS HC A08/MF A01

Experiments in which the susceptibility of both cats and squirrel monkeys to motion sickness induced by visual stimulation are documented. In addition, it is shown that in both species those individual subjects most highly susceptible to sickness induced by passive motion are also those most likely to become motion sick from visual (optokinetic) stimulation alone. Author

N85-21923*# Pennsylvania State Univ., University Park. Dept. of Biochemistry, Microbiology, Molecular and Cell Biology.

PURIFICATION AND CULTIVATION OF HUMAN PITUITARY GROWTH HORMONE SECRETING CELLS Final Progress Report, 1978 - 1984

W. C. HYMER 1 Aug. 1984 26 p refs

(Contract NAS9-15566)

(NASA-CR-171846; NAS 1.26:171846) Avail: NTIS HC A03/MF A01 CSCL 06C

A multiphase study was conducted to examine the properties of growth hormone cells. Topics investigated included: (1) to determine if growth hormone (GH) cells contained within the rat pituitary gland can be separated from the other hormone producing cell types by continuous flow electrophoresis (CFE); (2) to determine what role, if any, gravity plays in the electrophoretic separation of GH cells; (3) to compare in vitro GH release from rat pituitary cells previously exposed to microgravity conditions vs release from cells not exposed to microgravity; (4) to determine if the frequency of different hormone producing pituitary cell types contained in cell suspensions can be quantitated by flow cytometry; and (5) to determine if GH contained within the human post mortem pituitary gland can be purified by CFE. Specific experimental procedures and results are included. G.L.C.

N85-21924*# Phytoresource Research, Inc., College Station, Tex.

MODULAR PLANT CULTURE SYSTEMS FOR LIFE SUPPORT FUNCTIONS Final Report

1 Mar. 1985 35 p refs

(Contract NAS9-16671)

(NASA-CR-171853; NAS 1.26:171853) Avail: NTIS HC A03/MF A01 CSCL 06K

The current state of knowledge with regard to culture of higher plants in the zero-G environment is assessed; and concepts for the empirical development of small plant growth chambers for the production of salad type vegetables on space shuttle or space station are evaluated. American and Soviet space flight experiences in gravitational biology are summarized. A.R.H.

N85-21925*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

RESEARCH AND TECHNOLOGY ACTIVITIES AT AMES RESEARCH CENTER'S BIOMEDICAL RESEARCH DIVISION

N. MARTELLO (Johnson Engineering) Feb. 1985 154 p refs

(NASA-TM-86692; A-85144; NAS 1.15:86692) Avail: NTIS HC A08/MF A01 CSCL 06B

Various research and technology activities at Ames Research Center's Biomedical Research Division are described. Contributions to the Space Administration's goals in the life sciences include descriptions of research in operational medicine, cardiovascular deconditioning, motion sickness, bone alterations, muscle atrophy, fluid and electrolyte changes, radiation effects and protection, behavior and performance, gravitational biology, and life sciences flight experiments. Author

N85-21926*# Scripps Institution of Oceanography, La Jolla, Calif. Inst. of Marine Resources.

MICROPLANKTON SPECIES ASSEMBLAGES AT THE SCRIPPS PIER FROM MARCH TO NOVEMBER 1983 DURING THE 1982-1984 EL NINO EVENT

F. M. H. REID, C. B. LANGE (Museo Argentino de Ciencias Naturales), and M. M. WHITE 1984 29 p refs

(Contract NAGW-458)

(NASA-CR-175553; NAS 1.26:175553) Avail: NTIS HC A03/MF A01 CSCL 08A

A semiweekly sampling program at the Scripps Institution of Oceanography pier was begun in 1983 during an El Nino event. Microplankton data for March to November 1983 show a temporal sequence of species assemblages of the 24 important taxa, with a residence time of 1 to 4 weeks. From March to early September, the assemblages consisted of typical neritic taxa. From mid-September to mid-November, the presence of oceanic warm-wave species was associated with positive temperature anomalies characteristic of the El Nino condition. During the period studied numerical abundances were low. Author

N85-21927# Calspan Advanced Technology Center, Buffalo, N.Y. Dept. of Oral Biology.

INVESTIGATION OF THE INITIAL EVENTS IN BIOFOULING Final Report

A. E. MEYER, M. S. FORNALIK, R. E. BAIER, J. J. ZAMBON, and P. S. HUBER 26 Nov. 1984 210 p Prepared in cooperation with State Univ. of New York at Buffalo

(Contract N00014-81-C-0671)

(AD-A149995; CALSPAN-6962-M-1) Avail: NTIS HC A10/MF A01 CSCL 06M

The overall goals of this program include: (1) development and certification of methods for the in situ analysis of primary conditioning films and for the in situ speciation of the earliest attached microorganisms; and (2) correlation of biofilm properties with hydrodynamic factors and original substrata properties. In the study of in situ speciation of marine bacteria, specific organisms were isolated, cultured, and identified from primary microbial fouling layers and were used to generate immunofluorescent stains. The reagents were shown to be useful for specimens retrieved from controlled laboratory fouling tests and for specimens exposed to natural flowing waters of the Atlantic Ocean. Other experiments addressed the relationship between the original material substratum surface properties and mechanical/fluidic forces necessary to realize practical field benefits from the biofouling minimum (in the surface energy scale) already identified. These data are being correlated with natural fouling-resistant, low-drag surfaces such as those of living porpoises and killer whales. Preliminary data suggest the prospect of developing tethered interfacial films that will provide protection from drag-enhancing surface deposits and, possibly, give true drag reduction at no logistical penalty. GRA

N85-21928# Duke Univ., Durham, N. C. Dept. of Biochemistry.
TOXICITY, MUTAGENESIS AND AGING DUE TO ENDOGENOUS OXYGEN RADICALS Final Report, 1 Dec. 1981 - 30 Nov. 1984
I. FRIDOVICH 21 Dec. 1984 13 p
(Contract DAAG29-82-K-0020)
(AD-A150121; ARO-18529.29-LS) Avail: NTIS HC A02/MF A01 CSCL 06T

We have been examining the oxidation of ammonia to nitrite by oxygen radicals generated by the xanthine oxidase reaction. This oxidation (NH3-yields-NO2(-)), which can easily be demonstrated, is inhibited by superoxide dismutase, or by catalase, or by scavengers of the hydroxyl radical. We conclude that the iron-catalyzed reduction of H2O2 to OH(-) + OH by O2(-) is involved and that OH is the first oxidant of NH3. When NH3 is replaced by NH2OH we see NO2(-) production which is inhibited by superoxide dismutase but not by catalase. In this case we conclude that O2(-), per se, can oxidize NH2OH to NO2(-). We have been reinvestigating the killing of E. coli by paraquat. Our earlier studies showed that the lethality of paraquat was dependent upon O2 and an electron source and was decreased by elevated intracellular levels of superoxide dismutase. All of this, plus measurements of cyanide-resistant respiration, showed that O2 was essential for expression of the lethality of paraquat. This work was done in a nutrient broth medium. We now see that paraquat is much more lethal in the nutrient broth than it is in a simpler Vogel/Bonner medium. GRA

N85-21929# Skidaway Inst. of Oceanography, Savannah, Ga.
BIOLOGICAL PROCESSES IN THE WATER COLUMN OF THE SOUTH ATLANTIC BIGHT. VOLUME 1: PUBLISHED MANUSCRIPTS Progress Report, Jun. 1982 - Jun. 1985
G. A. PAFFENHOFER and J. A. YODER 14 Dec. 1984 19 p
(Contract DE-AS09-76EV-00936)
(DE85-004610; DOE/EV-00936/1-VOL-1) Avail: NTIS HC A02/MF A01

Effects of the Gulf Stream on the outer southeastern US continental shelf were determined. The relationships of phytoplankton productivity and related processes to the oceanography of the inner shelf were investigated. Upwelling studies on the northeastern Florida shelf are described, and feeding and excretory rates of juvenile and adult zooplankton characteristic of advanced and matured upwellings on the southeastern continental shelf are reported. DOE

N85-21930# Health Effects Research Lab., Research Triangle Park, N. C.
BIOLOGICAL EFFECTS ON RADIOFREQUENCY RADIATION
D. F. CAHILL and J. A. ELDER Sep. 1984 271 p refs
(PB85-120848; EPA-600/8-83-026F) Avail: NTIS HC A12/MF A01 CSCL 06R

A critical review of the available literature on the biological effects of radiofrequency (RF) radiation is given. The objective was to summarize and evaluate the existing database for use in developing RF-radiation exposure guidance for the general public. The frequency range of concern is 0.5 MHz to 100 GHz, which includes nearly all the significant sources of population exposure to RF radiation, except 60 Hz electrical power systems. Research reports that are judged to be credible according to a set of objective criteria are examined for the relation between the RF energy absorbed and the presence or absence of biological effects. The reported consequences of the interaction between RF radiation and biological systems are examined from two perspectives: whole-body-averaged specific absorption rate and RF-energy-induced core-temperature increases. GRA

N85-21931# Joint Publications Research Service, Arlington, Va.
USSR REPORT: SPACE BIOLOGY AND AEROSPACE MEDICINE, VOLUME 18, NO. 6, NOVEMBER - DECEMBER 1984
21 Feb. 1985 159 p refs Transl. into ENGLISH of Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 6, Nov. - Dec. 1984
(JPRS-USB-85-002) Avail: NTIS HC A08

Wide ranging research in the fields of aerospace medicine and bioastronautics were conducted. Test data were taken from humans in space flight and simulated spaceflight conditions as well as laboratory animals. Major concerns were the biological and physiological effects of spaceflight, both long and short term, on humans.

N85-21942# Joint Publications Research Service, Arlington, Va.
MORPHOLOGICAL STUDY OF MONKEYS SUBMITTED TO ANTIORTHOSTATIC HYPOKINESIA
A. S. KAPLANSKIY, C. N. DURNOVA, Z. F. SAVIK, G. S. BELKANIYA, V. I. POPOV, and D. S. TAVADYAN *In its* USSR Rept: Space Biol. and Aerospace Med., Vol. 18, No. 6, Nov. - Dec. 1984 (JPRS-USB-85-002) p 61-67 21 Feb. 1985 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 6, Nov. - Dec. 1984 p 44-48
Avail: NTIS HC A08

The hearts of seven monkeys exposed to head down tilt at -6 deg were examined histologically, morphometrically, and gravimetrically. During head down tilt the heart weight increased due to blood pooling in the thebesian vessels which was associated with blood redistribution and accumulation in the vessels and parenchymal organs of the upper body. During 7 and 12 day head down tilt myocardiocytes of the capillary muscles of the ventricles were not enlarged, and the number of functioning capillaries in the papillary muscles diminished. E.A.K.

N85-21943# Joint Publications Research Service, Arlington, Va.
FLUID METABOLISM OF MONKEYS DURING TWO-WEEK ANTIORTHOSTATIC HYPOKINESIA
V. P. KROTOV, Y. C. BAZUNOVA, and B. S. KULAYEV *In its* USSR Rept: Space Biol. and Aerospace Med., Vol. 18, No. 6, Nov. - Dec. 1984 (JPRS-USB-85-002) p 68-75 21 Feb. 1985 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 6, Nov. - Dec. 1984 p 48-54
Avail: NTIS HC A08

Water balance parameters were measured in hypokinetic rhesus monkeys using tritiated water. During exposure the water content decreased by 18.4%, with 11.3% lost within the first 7 days. The rate of water renovation measured with respect to H3 half life was decreased by a factor of 1.5 during the first week and increased by 10% during the second week, as compared to the pretest value. Daily water losses diminished by 30% during the first week and approached the pretest level during the second week. Three phases in the time course variations of water balance during head down tilt are indicated. E.A.K.

N85-21944# Joint Publications Research Service, Arlington, Va.
DISTINCTIVE MORPHOLOGICAL MANIFESTATIONS OF ACUTE STRESS REACTION IN ADRENAL CORTEX OF HYPOKINETIC RATS
Y. V. VOROTNIKOV *In its* USSR Rept: Space Biol. and Aerospace Med., Vol. 18, No. 6, Nov. - Dec. 1984 (JPRS-USB-85-002) p 76-82 21 Feb. 1985 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich Med. (Moscow), v. 18, no. 6, Nov. - Dec. 1984 p 54-58
Avail: NTIS HC A08

Adrenal changes in response to an acute stress effect (5 h immobilization stress) were investigated in female rats exposed to hypokinesia for 3 months. The rate of delipoidization in the adrenal cortex increased in the rats exposed to an acute stress after short term hypokinesia. The process of delipoidization did not advance in the rats exposed to an acute stress in the course of prolonged hypokinesia. It is evidenced that during prolonged hypokinesia the adrenals develop the capacity to react to an

additional effect without the entire complex of morphological signs typical of an acute stress reaction. The immobilization test used to assess the state of the adrenal cortex shows that it does not deteriorate even during 3 month hypokinesia. E.A.K.

N85-21946# Joint Publications Research Service, Arlington, Va.
INVESTIGATION OF ADAPTIVE DISTINCTIONS OF MECHANISM OF CONTROLLED GLYCEMIA IN MACACA RHESEUS MONKEYS
G. S. BELKANIYA *In its* USSR Rept: Space Biol. and Aerospace Med., Vol. 18, No. 6, Nov. - Dec. 1984 (JPRS-USB-85-002) p 89-95 21 Feb. 1985 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 6, Nov. - Dec. 1984 p 62-66
Avail: NTIS HC A08

Reactions of adult rhesus monkeys to the glucose tolerance test and the insulin sensitivity test were examined during different exposures. It was found that both tests are useful to evaluate responses to various environmental effects, psychoemotional strain, acute stress state and orthostatic effects. It is shown that orthostatics potentiates the inhibition of insulin secretion. The reciprocal relationship between glucose tolerance and insulin sensitivity was detected in the functional range of vago-insular regulation. The role of orthostatics in neurogenic disorders of the mechanism of glycemic regulation is discussed. The synergism of the combined effect of orthostatics and psychological stress is described. E.A.K.

N85-21947# Joint Publications Research Service, Arlington, Va.
MULTIPLE REGRESSION METHOD USED TO ASSESS ANIMAL ADAPTATION TO HYPOXIC HYPOXIA
V. V. KUSTOV, V. G. LITAU, Y. A. KUKUSHKIN, and S. M. RAZINKIN *In its* USSR Rept: Space Biol. and Aerospace Med., Vol. 18, No. 6, Nov. - Dec. 1984 (JPRS-USB-85-002) p 96-99 21 Feb. 1985 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 6, Nov. - Dec. 1984 p 67-69
Avail: NTIS HC A08

White mice were exposed to hypoxic hypoxia during 30 days. A correlation was established between the altitude ceiling and various physiological parameters, coefficients of adaptive oxygen consumption at 6000 m to that at sea level, and the ratio of oxygen consumption in hypoxic environment to that in a pormoxic atmosphere. It is concluded that the multiple regression method can be used for measuring objectively the tension of regulatory systems and for discriminating stages of animal adaptation to hypoxic hypoxia. E.A.K.

N85-21954# Joint Publications Research Service, Arlington, Va.
RAT TISSUE OPIOID PEPTIDE CONTENT DURING LONG-TERM HYPOKINESIA
R. A. TIGRANYAN and O. P. VAKULINA *In its* USSR Rept: Space Biol. and Aerospace Med., Vol. 18, No. 6, Nov. - Dec. 1984 (JPRS-USB-85-002) p 127-131 21 Feb. 1985 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 6, Nov. - Dec. 1984 p 83-85
Avail: NTIS HC A08

A conception has been formed to the effect that opioid peptides play an important part in adaptive protective changes under extreme conditions. It was shown that opioids are of substantial significance in controlling a number of physiological functions--respiration, blood pressure, endocrine and digestive system function, body temperature. On the basis of numerous data, it is postulated that there is an extensive antinociceptive system in the animal brain, the principal neurotransmitters and modulators of which are endorphins and enkephalins. When activated under stress, this endogenous analgesic system controls the level of pain sensibility, modulates emotional, behavioral and hemodynamic components of stressor effects. It is known that hypokinesia, which is one of the extreme factors of spaceflights, leads to marked changes in neurohumoral regulation of many body functions. The levels of enkephalins and beta-endorphins in blood, parts of the brain and adrenals during hypokinesia of different duration (up to 60 days) and in the recovery period after 60-day hypokinesia were studied. B.W.

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AEROSPACE MEDICINE

Includes physiological factors; biological effects of radiation; and weightlessness.

A85-26667* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
PLASMA LACTIC DEHYDROGENASE ACTIVITIES IN MEN DURING BED REST WITH EXERCISE TRAINING
J. E. GREENLEAF (NASA, Ames Research Center, Laboratory for Human Environmental Physiology, Moffett Field, CA), L. T. JUHOS (NASA, Ames Research Center, Laboratory for Human Environmental Physiology, Moffett Field; SRI International, Menlo Park, CA), and H. L. YOUNG (NASA, Ames Research Center, Laboratory for Human Environmental Physiology, Moffett Field; U.S. Environmental Protection Agency, San Francisco, CA) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 56, March 1985, p. 193-198. refs

Peak oxygen uptake and the activity of lactic dehydrogenase (LDH-T) and its five isoenzymes were measured by spectrophotometer in seven men before, during, and after bed rest and exercise training. Exercise training consisted of isometric leg exercises of 250 kcal/hr for a period of one hour per day. It is found that LDH-T was reduced by 0.05 percent in all three regimens by day 10 of bed rest, and that the decrease occurred at different rates. The earliest reduction in LDH-T activity in the no-exercise regimen was associated with a decrease in peak oxygen uptake of 12.3 percent. It is concluded that isometric (aerobic) muscular strength training appear to maintain skeletal muscle integrity better during bed rest than isotonic exercise training. Reduced hydrostatic pressure during bed rest, however, ultimately counteracts the effects of both moderate isometric and isotonic exercise training, and may result in decreased LDH-T activity. I.H.

A85-26668* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
VISCERAL PREDICTORS OF CARDIOVASCULAR DECONDITIONING IN LATE MIDDLE-AGED MEN
D. J. GOLDWATER, C. DE ROSHIA (NASA, Ames Research Center, Moffett Field, CA), B. H. NATELSON (U.S. Veterans Administration Medical Center, East Orange, NJ), and B. E. LEVIN (New Jersey, College of Medicine and Dentistry, Newark, NJ) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 56, March 1985, p. 199-203. NASA-supported research. refs

A number of visceral and behavioral factors connected with cardiovascular deconditioning were investigated, in order to identify a method for predicting the degree of orthostatic intolerance to spaceflight in several late-middle-aged men (55-65 years). Preliminary measurements were made of: mean arterial blood pressure plasma cortisol levels; and norepinephrine levels. Measurements of core temperature; plasma epinephrine level and subjective arousal from sleep were also obtained. Pairwise correlations were found for each of the variables and the time-to-blackout due centrifugal acceleration of up to +3 Gz. It is shown that the men with relatively low resting blood pressure were at greater risk of developing the clinical signs of cardiovascular deconditioning than were the men with higher basal blood pressure. Some applications of the experimental results to the development of selection criteria for Shuttle crews are discussed. I.H.

A85-26670* Jet Propulsion Lab., California Inst. of Tech., Pasadena.
EFFECT OF SIMULATED HYPEREMIA ON THE FLOW FIELD IN A MILDLY ATHEROSCLEROTIC CORONARY ARTERY CASTING OF MAN
Y. I. CHO, L. H. BACK (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA), and D. W. CRAWFORD (Southern California, University, Los Angeles, CA) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 56, March 1985, p. 212-219. refs
(Contract NAS7-100)

Changes in an arterial flow field due to mild atherosclerosis were determined using a main coronary artery casting with a maximum obstruction of about 50 percent by area. Local pressure changes were measured using six pressure tap holes along the wall of the casting. The test-fluid was a 33 percent sugar-water solution of approximately the same viscosity as human blood. Flow visualization results were obtained by injecting blue-dye through the pressure tap holes. Measurement of local pressure demonstrated a significant Reynolds number effect. At Reynolds numbers of 80-710, a local pressure rise was observed downstream of the mild atherosclerotic constriction due to momentum changes. The Reynolds number necessary for flow separation in the divergent region of the coronary casting was about 330. The experimental results can be used to obtain a quantitative relation between coronary morphology and the fluid dynamic consequences of mild diffuse disease under conditions of maximum cardiac demand i.e., higher coronary flow rates and Reynolds numbers associated with space and atmospheric flight. I.H.

A85-26671
ANTHROPOMETRIC CHANGES AT HIGH ALTITUDE
C. S. FULCO, A. CYMERMAN, N. A. PIMENTAL, A. J. YOUNG, and J. T. MAHER (U.S. Army, Research Institute of Environmental Medicine, Natick, MA) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 56, March 1985, p. 220-224. refs

Medical examinations were given to eight white males aged 18-25 years, before, during, and after 18 days on the summit of Pikes Peak at an altitude of 4300 meters. Anthropometric changes associated with weight loss during high-altitude exposure were determined. Measurements were made of: circumference, skinfold, and body density. Changes in body circumference and skinfold were measured every two days and body density was measured by hydrostatic body weighing before and after exposure. It is found that body weight at high-altitude was different from sea-level body weight by the ninth day of high-altitude exposure. Hydrostatic weight measurements indicated that weight-loss was divided between an average fat-free body mass of 2.06 kg, and an average fat-weight of 0.58 kg. The largest changes were recorded in the chest and scapula skinfolds, and in the circumferences of the hip, neck, and calf. On the basis of the experimental data, it is concluded that skinfold and circumference measurements alone do not provide an accurate assessment of the altered lean-to-fat ratio during weight loss at high-altitude. I.H.

A85-27141
INDEPENDENCE OF THE CIRCADIAN RHYTHM IN ALERTNESS FROM THE SLEEP/WAKE CYCLE
S. FOLKARD, K. I. HUME (Medical Research Council, Perceptual and Cognitive Performance Unit, Brighton, England), D. S. MINORS (Manchester Polytechnic, Manchester, England), J. M. WATERHOUSE, and F. L. WATSON (Manchester, Victoria University, Manchester, England) Nature (ISSN 0028-0836), vol. 313, Feb. 21, 1985, p. 678, 679. refs

The possibility that diurnal alertness/drowsiness cycles are dependent on an endogenous circadian oscillator has been tested by separating the body-temperature rhythm from the sleep/wake cycle by progressively shortening artifical time cues. The results indicate that the circadian rhythm in alertness can become independent of both the sleep/wake cycle and the rhythm in body temperature. The results also suggest that the sleep/wake cycle exerts less influence on the alertness rhythm that it does on that of temperature. C.D.

A85-27178
ENDOCRINE EXOPHTHALMIA [ENDOKRINNAIA EKZOFTAL'MOPATIIA]
M. P. BIRIUKOVA (Akademiia Meditsinskikh Nauk SSSR, Institut Eksperimental'noi Endokrinologii i Khimii Gormonov, Moscow, USSR) Problemy Endokrinologii, vol. 30, Nov.-Dec. 1984, p. 67-73. In Russian. refs

A85-27179
THE PHYSIOLOGICAL ASPECTS OF WORK AND THE PROBLEM OF OCCUPATIONAL DISEASE PREVENTION [ZADACHI FIZIOLOGII TRUDA V SVETE SOVREMENNYKH PROBLEM PROFILAKTIKI ZABOLEVANII RABOTAIUSHCHIKH]
N. F. IZMEROV, A. A. KASPAROV, and IU. V. MOIKIN (Akademiia Meditsinskikh Nauk SSSR, Institut Gigieny Truda i Profzabolevanii, Moscow, USSR) Gigiena Truda i Professional'nye Zabolevaniia (ISSN 0016-9919), Nov. 1984, p. 1-4. In Russian. refs

The negative effects of overstrain on the health status of workers are discussed, on the basis of available experimental data. It is shown that overstrain on the job can lead to a general increase in occupational disease and a total increase in morbidity rates. Some of the important physiological factors determining overstrain include: regional muscle tension and the monotony of the work. The development of comprehensive standards for overstrain in industrial enterprises in the USSR is discussed. I.H.

A85-27181
THE FUNCTIONAL STATE OF THE SEGMENTARY APPARATUS OF THE HUMAN SPINAL CORD DURING FATIGUE-CAUSING STATIC PHYSICAL-EXERCISE OF VARYING INTENSITY [ISSLEDOVANIE FUNKTSIONAL'NOGO SOSTOIANIIA SEGMENTARNOGO APPARATA SPINNOGO MOZGA CHELOVEKA PRI UTOMITEL'NYKH STATICHESKIKH NAPRIAZHENIIAKH RAZLICHNOI SILY]
I. V. MOIKIN, V. R. KUCHMA, and A. S. POBERZHSKAIA (Akademiia Meditsinskikh Nauk SSSR, Institut Gigieny Truda i Profzabolevanii; I Moskovskii Meditsinskii Institut, Moscow, USSR) Gigiena Truda i Professional'nye Zabolevaniia (ISSN 0016-9919), Nov. 1984, p. 12-15. In Russian. refs

A85-27182
THE EFFECT OF HEAT LOADS ON OPERATOR WORK CAPACITY [O VLIIANII TEPLOVOGO NAPRIAZHENIIA MA RABOTOSPOSOBNOST' OPERATOROV]
V. V. ROMANOV (Kalininskii Politekhnicheskii Institut, Kalinin, USSR) Gigiena Truda i Professional'nye Zabolevaniia (ISSN 0016-9919), Nov. 1984, p. 16-19. In Russian. refs

The relationship between work capacity and health status was investigated in four groups of men working at temperatures of 25, 30, 35, and 40 C. It is shown that fatigue among the workers developed twice as fast as normal in the temperature range 25-40 C. Moisture losses were found to be the most informative index of the effect of heat loads within the above conditions. I.H.

A85-27183
THE RELATIONSHIP BETWEENN CHANGES IN LIPID METABOLISM AND EMOTIONAL FACTORS [O ZAVISIMOSTI IZMENENII LIPIDNOGO OBMENA OT STEPENI VOZDEISTVIIA NERVNO-EMOTSIONAL'NYKH FAKTOROV]
A. N. MELKUMIAN, N. I. OZHAMALBEKOVA, V. V. LAGUNOVA, and A. I. ALLAKHVERDIEV (Institut Gigieny Truda i Profzabolevanii, Baku, Azerbaizhan SSR) Gigiena Truda i Professional'nye Zabolevaniia (ISSN 0016-9919), Nov. 1984, p. 23-26. In Russian. refs

A physiological study was carried out to determine the relationship between lipid metabolism changes and emotional factors in a group of petroleum processing workers. Spsecific attention was given to: engineers and technicians; operators of technical devices; operators of automated control systems. Variations in emotional state were examined as a function of the

length of service at a given job function for a period of 1-10 years. Measurements of lipid metabolism were carried out on the first and last day of the work week. A group of workers in a physical exercise program were used for comparison. It is found that certain functional shifts occur in the central nervous system in relation to job-type: the more pronounced variations were observed among the engineers and technical operators than among the operators of automated control systems. Variations in lipid metabolism were directly correlated with the length of service in a job function. In all the groups, the degree of the variations and their frequency were significantly greater for persons with a length of service of more than 10 years. Author

A85-27184
BLOOD CHOLINERGIC ACTIVITY IN HEALTHY WORKERS IN THE CHROMIUM INDUSTRY AND IN PATIENTS WITH CHROMIUM PATHOLOGY [KHOLINERGICHESKAIA AKTIVNOST' KROVI U ZDOROVYKH RABOCHIKH KHROMOVOGO PROIZVODSTVA I U BOL'NYKH S KHROMOVOI PATOLOGIEI]
N. A. IAKOVLEV, V. K. KASYMBEKOV, T. A. SLIUSAR, and G. F. REGER (Aktiubinskii Meditsinskii Institut, Aktyubinsk, Kazakh SSR) Gigiena Truda i Professional'nye Zabolevaniia (ISSN 0016-9919), Nov. 1984, p. 43-46. In Russian. refs

A85-27185
A METHOD TO AUTOMATE THE ACCUMULATION AND ANALYSIS OF ELECTRONYSTAGMOMETRIC DATA USING A MICROCOMPUTER [METOD AVTOMATIZIROVANNOGO NAKOPLENIIA I ANALIZA ELEKTRONISTAGMOMETRICHESKIKH DANNYKH NA BAZE MIKRO-EVM]
I. A. SKLIUT, V. I. PIVRIKAS, and A. B. ZHUKAUSKAS (Belorusskii Nauchno-Issledovatel'skii Institut Nevrologii, Neirokhirurgii i Fizioterapii, Minsk, Belorussian SSR; Klaipedskaia Klinika, Klaipeda, Lithuanian SSR) Zhurnal Ushnykh, Nosovykh i Gorlovykh Boleznei (ISSN 0044-4650), Sept.-Oct. 1984, p. 5-9. In Russian. refs

A85-27186
THE DISTINCTIVE FEATURES OF THE HUMAN THERMOREGULATORY RESPONSE TO CORIOLIS ACCELERATION [OSOBENNOSTI TERMOREGULIATORNYKH REAKTSII CHELOVEKA PRI VOZDEISTVII USKORENII KORIOLISA]
O. IA. PLEPIS and L. A. GLAZNIKOV (Voenno-Meditsinskaia Akademiia, Leningrad, USSR) Zhurnal Ushnykh, Nosovykh i Gorlovykh Boleznei (ISSN 0044-4650), Sept.-Oct. 1984, p. 9-15. In Russian. refs

The results of an experimental investigation of skin temperature response to Coriolis acceleration are reported. Mathematical analysis of the experimental data revealed a direct correlation between skin temperature change and variations in Coriolis acceleration and its after effects. The temperature change data can be used as diagnostic criteria for determining vestibulo-vegetative stability. I.H.

A85-27187
ACOUSTIC REFLEXOMETRY OF THE HEARING ORGAN IN NORMAL AND PATHOLOGICAL STATES [AKUSTICHESKAIA REFLEKSOMETRIIA PRI NORMAL'NOM I PATOLOGICHESKOM SOSTOIANII ORGANA SLUKHA]
T. G. GVELESIANI (Tbilisskii Institut Usovershenstvovaniia Vrachei, Tbilisi, Georgian SSR) Zhurnal Ushnykh, Nosovykh i Gorlovykh Boleznei (ISSN 0044-4650), Sept.-Oct. 1984, p. 21-25. In Russian. refs

A85-27189
THE CHARACTERISTICS OF SOUND CONDUCTION UNDER VARIATIONS OF ATMOSPHERIC PRESSURE [OSOBENNOSTI ZVUKOPROVEDENIIA PRI IZMENENII ATMOSFERNOGO DAVLENIIA]
E. V. LAPAEV and G. I. TARASENKO Zhurnal Ushnykh, Nosovykh i Gorlovyhk Boleznei (ISSN 0044-4650), Sept.-Oct. 1984, p. 29-33. In Russian. refs

The effect of intraural and extraural changes in atmospheric pressure on hearing ability is examined experimentally. It is found that in the presence of increases in extraural pressure of 40 mm of the water column, hearing acuity was diminished. In the pressure range 130-150 mm of the water column, hearing was further impaired. Intraural increases in pressure were also found to impair hearing. In the presence of intraural pressure increases from 200 to 700 mm of the water column, hearing acuity was also impaired. On the basis of the experimental results, it is suggested that there may be different mechanisms of sound conduction inside and outside the ear. Some practical applications of the experimental results in the field of aviation and deep sea diving are identified. I.H.

A85-27190
STATE OF THE CARDIOVASCULAR SYSTEM IN PERSONS WITH HEARING DISORDERS WORKING IN NOISY SUGAR PRODUCTION PLANTS [SOSTOIANIE SERDECHNO-SOSUDISTOI SISTEMY U LITS SO SLUKHOVYMI NARUSHENIIAMI, RABOTAIUSHCHIKH V SHUMNYKH TSEKHAKH SAKHARNOGO PROIZVODSTVA]
S. I. KUPRIENKO, N. I. PEREVOZNIKOVA, and V. K. CHAIKO (Kievskii Nauchno-Issledovatel'skii Institut Otolaringologii, Kiev, Ukrainian SSR) Zhurnal Ushnykh, Nosovykh i Gorlovykh Boleznei (ISSN 0044-4650), Sept.-Oct. 1984, p. 69, 70. In Russian.

A85-27191
DESCRIPTION OF THE FORM OF THE DIURNAL-RHYTHM WAVE WITH THE AID OF ULTRADIAN COMPONENTS [OPISANIE FORMY VOLNY SUTOCHNOGO RITMA S POMOSHCH'IU UL'TRADIANNYKH SOSTAVLIAIUSHCHIKH]
A. A. SOROKIN (Akademiia Nauk Kirgizskoi SSR, Institut Fiziologii i Eksperimental'noi Patologii Vysokogor'ia, Frunze, Kirgiz SSR) Akademiia Nauk Kirgizskoi SSR, Izvestiia (ISSN 0002-3221), July-Aug. 1984, p. 48-51. In Russian. refs

It is demonstrated that diurnal-rhythm wave form can be described quantitatively on the basis of the relationship between amplitudes and phases of the circadian and ultradian (with a period less than 20 hours) components of the diurnal rhythm. The study included data on persons adapted to an altitude of 2500 m, natives of an arid region, TV studio workers, and trade-school students. It is concluded that the use of cosinor analysis to study human diurnal rhythms should involve an investigation not only of the 24-hour component but also of ultradian components. The number and periods of possible ultradian components can be determined most simply by a spectral analysis that yields information about the general frequency structure of the process studied. B.J.

A85-27192
AN EVALUATION OF THE STATUS OF ARTERIAL HYPERTENSION CONTROL MEASURES [OTSENKA SOSTOIANIIA I MER BOR'BY S ARTERIAL'NOI GIPERTENZIEI]
A. V. BAUBINENE and IA. I. PIATRAUSKENE (Kaunasskii Meditsinskii Institut, Kaunas, Lithuanian SSR) Sovetskoe Zdravookhranenie (ISSN 0038-5239), no. 11, 1984, p. 11-16. In Russian. refs

A85-27194
DYNAMICS OF SPECIAL WORK CAPACITY IN THE MESOCYCLE OF THE PREPARATORY PERIOD OF THE ANNUAL TRAINING CYCLE OF FEMALE CANOE PADDLERS [DINAMIKA SPETSIAL'NOI RABOTOSPOSOBNOSTI V MEZOTSIKLE PODGOTOVITEL'NOGO PERIODA GODICHNOGO TRENIROVOCHNOGO TSIKLA BAIDAROCHNITS]
Z. R. IATSENKO (Kievskii Gosudarstvennyi Institut Fizicheskoi Kul'tury, Kiev, Ukrainian SSR) Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), Oct. 1984, p. 10,11. In Russian. refs

A85-27195
DETERMINATION OF THE GENERAL PHYSICAL ENDURANCE AND TRAINING-LEVEL OF ATHLETES [K VOPROSU OPREDELENIIA OBSHCHEI FIZICHESKOI VYNOSLIVOSTI I TRENIROVANNOSTI SPORTSMENOV]
V. I. GAVRILENKOV, V. V. GRITSENKO, and O. IU. MOCHALOV (I Leningradskii Meditsinskii Institut, Leningrad, USSR) Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), Oct. 1984, p. 16-19. In Russian. refs

The character of hemodynamic response to increasing physical load was clarified on the basis of blood-minute-volume measurements for 36 healthy persons, 20 of whom led a sedentary life, and 16 of whom were highly trained skiers. A determination is made of the level of optimal adaptation of the circulatory system to increasing load and changes in this level in the training process. B.J.

A85-27197
MANIFESTATION OF THE GAME SPECIALIZATION OF SOCCER PLAYERS IN THE ADAPTATION OF THEIR BODIES TO A TEST LOAD [PROIAVLENIE IGROVOI SPETSIALIZATSII FUTBOLISTOV V ADAPTATSII IKH ORGANIZMA K TESTIRUIUSHCHEI NAGRUZKE]
L. F. MURAVEVA, A. M. NEVMIANOV, and N. K. TSEPKOVA (Vsesoiuznyi Nauchno-Issledovatel'skii Institut Fizicheskoi Kul'tury, Moscow, USSR) Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), Oct. 1984, p. 23, 24. In Russian.

A85-27198
EFFECT OF ROUND-THE-YEAR TRAINING ON THE STATE OF CENTRAL HEMODYNAMICS AND GAS EXCHANGE IN HIGHLY QUALIFIED DISCUS THROWERS [VLIIANIE KRUGLOGODICHNOI TRENIROVKI NA SOSTOIANIE TSENTRAL'NOI GEMODINAMIKI I GAZOOBMENA U VYSOKOKVALIFITSIROVANNYKH METATELEI]
V. A. BOBROV (Zaporozhskii Institut Usovershenstvovaniia Vrachei, Zaporozhe, Ukrainian SSR) and E. L. MIKHALIUK (SK Metallurg, Mediko-Vosstanovitel'nyi Tsentr, USSR) Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), Oct. 1984, p. 25. In Russian. refs

A85-27199
PREDICTION OF LOAD VALUES IN HEALTH-PROMOTING PHYSICAL EXERCISE FOR PERSONS OF DIFFERENT AGE AND LEVEL OF PHYSICAL PREPAREDNESS [PROGNOZIROVANIE VELICHIN NAGRUZOK V OZDOROVITEL'NOI TRENIROVKE U LITS RAZNOGO VOZRASTA I UROVNIA FIZICHESKOI PODGOTOVLENNOSTI]
L. IA. IVASHCHENKO (Ministerstvo Zdravookhraneniia Ukrainskoi SSR, Kievskii Nauchno-Issledovatel'skii Institut Meditsinskikh Problem Fizicheskoi Kul'tury, Kiev, Ukrainian SSR) Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), Oct. 1984, p. 36-38. In Russian. refs

A85-27200
THE ADDUCTOR-RECTUS-SYMPHUS COMPLEX IN ATHLETES AND ITS TREATMENT [KOMPLEKS ARS U SPORTSMENOV I EGO LECHENIE]
I. A. BADNIN, M. B. TSYKUNOV, and T. V. SINITSYNA (Tsentral'nyi Nauchno-Issledovatel'skii Institut Travmatologii i Ortopedii, Moscow, USSR) Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), Oct. 1984, p. 54-56. In Russian.

A85-27661
KNEE LIGAMENT INJURY DURING LATERAL IMPACT
B. F. HEARON, J. W. BRINKLEY (USAF, Air Force Aerospace Medical Research Laboratory, Wright-Patterson AFB, OH), J. H. RADDIN, JR. (USAF, School of Aerospace Medicine, Brooks AFB, TX), and B. W. FLEMING, JR. (USAF Medical Center, Wright-Patterson AFB, OH) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 56, Jan. 1985, p. 3-8. refs

A volunteer woman subject incurred injury to her right knee consisting of a torn anterior cruciate ligament and stretched medial collateral ligament during a lateral (+Gy) impact test. Similar injury has not been reported in the English-language literature on accidental sideward automotive crashes or lateral impact experimentation involving humans. The primary mechanism which produced this injury was external tibial rotation on the femur with the knee flexed. The factors contributing to the injury included extraordinarily forceful leg bracing by the subject, her knee joint laxity or hypermobility, and the absence of side supports to limit lower extremity flailing during the impact response. In future lateral impact tests, women subjects should be used with caution and any subject with abnormal joint mobility should be excluded from participation. Author

A85-27662* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
EXERCISE THERMOREGULATION IN MEN AFTER 6 HOURS OF IMMERSION
J. E. GREENLEAF, W. A. SPAUL, S. E. KRAVIK, N. WONG, and C. A. ELDER (NASA, Ames Research Center, Laboratory for Human Environmental Physiology, Moffett Field, CA) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 56, Jan. 1985, p. 15-18. refs

The present investigation is concerned with thermoregulation at rest and during exercise after water-immersion deconditioning, giving particular attention to the effects of fluid shifts and negative water balance on sweat rate and rectal temperature. Six healthy males 20-35 years old were used in the experiments. Rectal and mean skin temperature, skin heat conductance, heart rate, and total body sweat rate were measured during 70 min of supine leg exercise at 50 percent of peak O2 uptake. The data were taken after a 6-h control period in air and after immersion to the neck in water (34.5 C) for 6 h after overnight food and fluid restriction. Attention is given to end exercise heart rates and data during exercise. The obtained results suggest that, compared with control responses, the equilibrium level of core temperature during submaximal exercise is regulated at a higher level after immersion. G.R.

A85-27670
A SOFTWARE PACKAGE FOR ADMINISTERING AND MONITORING THE ENVIRONMENTAL SYMPTOMS QUESTIONNAIRE (ESQ-III)
C. S. FULCO, A. CYMERMAN, and P. B. ROCK (U.S. Army Research Institute of Environmental Medicine, Natick, MA) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 56, Jan. 1985, p. 57-61. refs
(AD-A149965)

Upon acute exposure to elevations greater than 3000 m, most individuals will experience some degree of a symptom complex. This complex includes headache, nausea, dizziness, insomnia, tiredness, and loss of concentration. The complex has been termed acute mountain sickness (AMS). The subjectivity of most of the symptoms of AMS makes it necessary, to rely for a study of it on clinical interviews or questionnaires. For a study of AMS severity, Sampson et al. (1983) have proposed a definition and procedure for an operational measurement of AMS severity, taking into account the second revision of the Environmental Symptoms Questionnaire (ESQ). Difficulties with respect to the accuracy of the test are related to the need to insure that the responses of the subject are provided correctly. In an effort to eliminate these difficulties associated with the administration of the ESQ, an interactive computer software package was developed. Checks

for inconsistencies are made, and feedback to the subject is provided. G.R.

A85-27776
RELATIONSHIP BETWEEN THE PERCEPTION OF THE POSITION OF BODY PARTS AND MOVEMENT [O SVIAZI MEZHDU VOSPRIIATIEM POLOZHENIIA ZVEN'EV TELA I DVIZHENIEM]
V. S. GURFINKEL, E. E. DEGREVA, and IU. S. LEVIK (Akademiia Nauk SSSR, Institut Problem Peredachi Informatsii, Moscow, USSR) Fiziologiia Cheloveka (ISSN 0131-1646), vol. 11, Jan.-Feb. 1985, p. 7-11. In Russian. refs

Experiments were conducted in which a subject with closed eyes was instructed to touch the tip of a finger on his right hand by a stick held in his left hand. The task was rather difficult, resulting in failure 72-30 percent of the time depending on the conditions; the greatest success was achieved in conditions when the subject actively moved the target finger. The general conclusion is drawn that the movement of a body part to be localized facilitates the localization process. The increased localization accuracy is connected with an improvement efficiency of the utilization of 'external' afferent information as well as information contained at various CNS levels on mutual positions of body parts. B.J.

A85-27777
RELATIONSHIP BETWEEN VALUES OF VOLUNTARY MUSCULAR FORCE AND FEATURES OF ADAPTATION OF SKELETAL MUSCLES TO FORCE LOADS IN MALES AND FEMALES [SOOTNOSHENIE VELICHIN PROIZVOL'NOI MYSHECHNOI SILY I OSOBENNOSTI ADAPTATSII SKELETNOI MUSKULATURY K SILOVYM NAGRUZKAM Y ZHENSHCHIN I MUZHCHIN]
V. B. ISSURIN and I. V. SHAROBAIKO (Leningradskii Nauchno-Issledovatel'skii Institut Fizicheskoi Kul'tury, Leningrad, USSR) Fiziologiia Cheloveka (ISSN 0131-1646), vol. 11, Jan.-Feb. 1985, p. 17-22. In Russian. refs

A85-27778
SPECTRAL-TIME CHARACTERISTICS OF LONG-LATENCY AUDITORY EVOKED POTENTIALS [SPEKTRAL'NO-VREMENNYE KHARAKTERISTIKI DLINNOLATENTNYKH SLUKHOVYKH POTENTSIALOV]
E. A. BAKAI, I. V. MARCHUK, E. IU. SLAVINSKII, and V. G. VERBA (Nauchno-Issledovatel'skii Institut Otolaringologii, Kiev, Ukrainian SSR) Fiziologiia Cheloveka (ISSN 0131-1646), vol. 11, Jan.-Feb. 1985, p. 51-54. In Russian. refs

The characteristics of long-latency auditory evoked potentials (LAEPs) were determined for 10 male subjects of normal hearing 18-40 years of age. Results indicate that the LAEP response to simple tonal stimuli can be efficiently detected in the theta range of brain bioelectric activity. Detection in the theta range provides for the highest SNR and the possibility of observing the development pattern of LAEP components. The gain in SNR due to the theta filtering increases with stimulus intensity; beginning with 40 dB, the SNR is 2. In this case, the accuracy of detection of auditory-perception thresholds increases by 15 dB. B.J.

A85-27779
EFFECT OF EMOTIONAL STRESS ON THE HOMEOSTASIS SYSTEM OF HEALTHY PERSONS [VLIIANIE EMOTSIONAL'NOGO NAPRIAZHENIIA NA SISTEMU GEMOSTAZA ZDOROVYKH LITS]
E. I. SOKOLOV, T. P. KHOVANSKAIA, I. V. NOVIKOV, and M. V. BALUDA (Moskovskii Meditsinskii Stomatologicheskii Institut, Moscow, USSR) Fiziologiia Cheloveka (ISSN 0131-1646), vol. 11, Jan.-Feb. 1985, p. 79-82. In Russian. refs

Thirty-three healthy males 20-29 years of age were exposed to simulated emotional stress (ES). The ES was found to produce an increase in the blood catecholamine concentration and in the catecholamine excretion in the urine, and to activate the anticoagulant system of the blood. ES also raised the level of heparinum in the blood, which was accompanied by an increase in fibrinolytic activity and a decrease in blood fibrinogen concentration. In addition, ES induced a tendency to hypocoagulation in the first phase of coagulation, and a tendency to increased blood-plasma tolerance to heparinum. B.J.

A85-27780
IMPEDANCE OF THE HUMAN BODY AND CERTAIN PHYSIOLOGICAL INDICES UNDER PHYSICAL LOADS [IMPEDANS TELA CHELOVEKA I NEKOTORYE FIZIOLOGICHESKIE POKAZATELI PRI FIZICHESKIKH NAGRUZKAKH]
V. E. PALCHIKOV, A. S. OSENNII, L. B. ILIUKHINA, N. S. KONCHITS, and V. N. ZHEREBTSOV (Akademiia Meditsinskikh Nauk SSSR, Institut Fiziologii, Novosibirsk, USSR) Fiziologiia Cheloveka (ISSN 0131-1646), vol. 11, Jan.-Feb. 1985, p. 90-95. In Russian. refs

The information value of the impedance measurement method is evaluated on the basis of a study of impedance indices of the human body under graded physical loads in healthy persons (athletes and nonathletes) and persons with cardiac disorders but with a sufficiently high tolerance to physical loads. It is concluded that impedance and polarization-coefficient indices can serve as a criterion for judging the efficiency of body response to physical load. No reliable intergroup differences in these indices in a state of functional rest were found in relation to the training level and functional state of the subjects. B.J.

A85-27781
ASSESSMENT OF THE STATE OF THE CHRONOTROPIC AND INOTROPIC FUNCTIONS OF THE HEART FOR DIFFERENT PHYSICAL-TRAINING LEVELS OF THE BODY [K VOPROSU OTSENKI SOSTOIANIIA KHRONO- I INOTROPNOI FUNKTSII SERDTSA PRI RAZLICHNYKH STEPENIAKH FIZICHESKOI TRENIROVANNOSTI ORGANIZMA]
V. V. AKSENOV and I. G. TAZETDINOV (Cheliabinskii Institut Fizkul'tury, Cheliabinsk, USSR) Fiziologiia Cheloveka (ISSN 0131-1646), vol. 11, Jan.-Feb. 1985, p. 96-101. In Russian. refs

An approach to the mathematical analysis of cardiosignals is developed which makes it possible to quantitatively evaluate the chronotropic and inotropic functions of the heart from a systems point of view. Combining statistical, cross-correlation, and frequency analyses, this approach makes it possible to assess physical-training level in aerospace and sports medicine. As an example, cardiosignals from the flight commanders and engineers on the Salyut-5 and Salyut-6 orbital stations were analyzed. It is concluded that the mathematical analysis of cardiosignals recorded in conditions of rest makes it possible to evaluate physical-training level as the potential readiness of regulatory systems to provide for the required high level of body functioning under physical loads. B.J.

A85-27782
TWO TYPES OF ADAPTATION OF HUMAN CARDIORESPIRATORY INDICES TO PHYSICAL LOAD [DVA TIPA ADAPTATSII KARDIORESPIRATORNYKH POKAZATELEI CHELOVEKA K FIZICHESKOI NAGRUZKE]
V. V. ROZENBLAT, S. N. MALAFEEVA, A. M. POVODATOR, and S. V. ROZHKOVA (Ural'skii Lesotekhnicheskii Institut, Sverdlovsk, USSR) Fiziologiia Cheloveka (ISSN 0131-1646), vol. 11, Jan.-Feb. 1985, p. 102-106. In Russian. refs

The heart rate and lung ventilation indices in physical laborers and athletes were measured by a radio-telemetry technique. Two types of adaptation to physical load were revealed: respiratory and circulatory. The differences between these two types of adaptation is most pronounced at high intensities of physical loads. B.J.

A85-27783
BREAKDOWN OF THE FRANK-STARLING PRINCIPLE DURING DISEASES OF THE CIRCULATORY SYSTEM [O NARUSHENII PRINTSIPA FRANKA-STARLINGA PRI ZABOLEVANIIAKH SISTEMY KROVOOBKASHCHENIIA]
A. D. SMIRNOV, E. V. LOVIAGIN, and L. I. FEDOSENKO (Tsentral'nyi Nauchno-Issledovatel'skii Rentgeno-Radiologicheskii Institut, Leningrad, USSR) Fiziologiia Cheloveka (ISSN 0131-1646), vol. 11, Jan.-Feb. 1985, p. 107-112. In Russian. refs

Studies were performed on patients with various diseases of the circulatory system (including arterial hypertension and coronary heart disease) and a control group. A lack of agreement between left-ventricle contraction and the Frank-Starling principle was observed which pointed to the breakdown of this principle in the case of certain diseases of the circulatory system. However, this principle is still valid for experimental conditions and for the study of the biomechanics of the myocardium as such. B.J.

A85-27784
WORK CAPACITY AND HEMODYNAMICS IN MALE INHABITANTS AT MIDDLE AND HIGH LATITUDES [RABOTOSPOSOBNOST' I GEMODINAMIKA U MUZHCHIN V USLOVIIAKH PROZHIVANIIA V SREDNIKH I VYSOKIKH SHIROTAKH]
L. N. MATVEEV (Moskovskii Meditsinskii Stomatologicheskii Institut, Moscow, USSR) Fiziologiia Cheloveka (ISSN 0131-1646), vol. 11, Jan.-Feb. 1985, p. 113-120. In Russian. refs

Work capacity and hemodynamic indices were evaluated for comparable groups of male inhabitants of Moscow and the northeastern part of the USSR. The physical work capacity of the 'northerners' was less than that of Moscow inhabitants and depended on the length of residence in the north. A slowdown in rates of restoration after physical load depending on length of residence in the north was evidence for limited adaptive capacities of the cardiovascular system in notherners. In native northerners, the limitation of the level of physical work capacity is combined with sufficient restoration rates, suggesting a complex of adaptive changes. B.J.

A85-27785
INDIVIDUAL-TYPOLOGICAL FEATURES OF VEGETATIVE RESPONSES UNDER AUTOGENIC TRAINING IN ANTARCTIC WORKERS DURING A WINTER STAY [INDIVIDUAL'NO-TIPOLOGICHESKIE OSOBENNOSTI VEGETATIVNYKH REAKTSII PRI AUTOGENNOI TRENIROVKE U POLIARNIKOV V PERIOD ZIMOVKI V ANTARKTIDE]
IU. A. SIDOROV (Akademiia Meditsinskikh Nauk SSSR, Institut Eksperimental'noi Meditsiny, Leningrad, USSR) Fiziologiia Cheloveka (ISSN 0131-1646), vol. 11, Jan.-Feb. 1985, p. 121-128. In Russian. refs

A85-27786
EFFECT OF AN ADDITION OF ASCORBIC ACID INTO THE DAILY DIET ON THE DEGREE OF VITAMIN SATURATION OF THE BODY AND THE HEAT RESISTANCE OF ERYTHROCYTES DURING WORK IN AN ARID REGION [VLIIANIE DOPOLNITEL'NOGO VVEDENIIA ASKORBINOVOI KISLOTY V SUTOCHNYI PISHCHEVOI RATSION NA STEPEN' VITAMINNOI NASYSHCHENNOSTI ORGANIZMA I TERMOREZISTENTNOST' ERITROTSITOV PRI RABOTE V USLOVIIAKH ARIDNOI ZONY]
I. M. MOMMADOV, V. A. GRAFOVA, and G. A. TUPIKOVA (Akademiia Nauk Turkmenskoi SSR, Institut Fiziologii i Eksperimental'noi Patologii Aridnoi Zony, Ashkhabad, Turkmenian SSR) Fiziologiia Cheloveka (ISSN 0131-1646), vol. 11, Jan.-Feb. 1985, p. 129-133. In Russian. refs

A85-27787
EFFECT OF VARIOUS DOSES OF CERTAIN VITAMINS ON NONSPECIFIC MECHANISMS OF HUMAN ADAPTATION [VLIIANIE RAZLICHNYKH DOZ NEKOTORYKH VITAMINOV NA NESPETSIFICHESKIE MEKHANIZMY ADAPTATSII CHELOVEKA]
V. S. NOVIKOV and V. N. BORTNOVSKII (Voenno-Meditsinskaia Akademiia, Leningrad, USSR) Fiziologiia Cheloveka (ISSN 0131-1646), vol. 11, Jan.-Feb. 1985, p. 134-137. In Russian. refs

An experimental study was conducted to investigate the effect of vitamin additions on the state of the vascular system and the nonspecific resistance of the body in persons working in unfavorable environmental conditions. Thirty operators 19-23 years of age were studied whose work was characterized by high work strain, hypokinesia, and environmental discomfort (e.g., high air temperature). One group of ten subjects received the following vitamins daily: retinol acetate (0.00172 g), thiamine bromide (0.0026 g), riboflavin (0.002 g), nicotinamide (0.015 g) pyridoxin hydrochloride (0.002 g), and ascorbic acid (0.07 g). A second group of ten subjects received a double dose of the same vitamins, while a third group (the control) received placebos. Administration of the vitamins in a double dose was found to prevent the development of deadaptive changes. It is concluded that vitamin additions can prevent a reduction in the nonspecific resistance of the body under extreme environmental conditions. B.J.

A85-27788
ENDOCRINE MECHANISMS FOR THE REGULATION OF GASTRIC SECRETION AT REST AND DURING MUSCULAR ACTIVITY [ENDOKRINNYE MEKHANIZMY REGULIATSII ZHELUDOCHNOI SEKRETSII V POKOE I PRI MYSHECHNOI DEIATEL'NOSTI]
A. P. KUZNETSOV (Kurganskii Pedagogicheskii Institut, Kurgan, USSR) Fiziologiia Cheloveka (ISSN 0131-1646), vol. 11, Jan.-Feb. 1985, p. 138-146. In Russian. refs

Endocrine mechanisms for the effect of graded bicycle-ergometer exercise on the gastric secretion function were investigated in untrained male subjects 18-22 years of age. Also studied were the effects of muscular activity and food intake on the concentration of gastrin, somatotropic hormone, calciotonin, parathormone, cortisol, testosterone, and aldosterone in the blood serum. Pronounced shifts in 'empty-stomach', basal, and histamine-stimulated gastric secretion were observed in physically untrained subjects in response to half-hour graded bicycle-ergometer exercise. B.J.

A85-27789
ADRENOCORTICOTROPIC EFFECT ON THE ACTIVITY OF HUMAN KIDNEYS [ADRENOKORTIKOTROPNOE VLIIANIE NA DEIATEL'NOST' POCHEK CHELOVEKA]
V. B. NOSKOV and A. I. GRIGOREV Fiziologiia Cheloveka (ISSN 0131-1646), vol. 11, Jan.-Feb. 1985, p. 147-150. In Russian. refs

The functional state of the kidneys and mechanisms of electrolyte excretion in the urine in hormonal situations corresponding to high or low adrenocorticotropic (ACT) activity was studied in 24 healthy males. ACT hormone was found to increase water-diuresis-induced kaliuresis as well as magnesium and chlorine excretion. The excretion in urine of sodium, potassium, and chlorine was found to decrease sharply on the background of water diuresis after the suppression of the production of endogenic ACT hormone. The excretion of the total 17-oxycorticosteroids during water diuresis directly reflects the state of ACT activity: this excretion increases after the administration of the ACT hormone and decreases with suppression of the secretion of the endogenic ACT hormone. B.J.

A85-27790
INVESTIGATION OF CRANIOCEREBRAL TEMPERATURE BY THE METHOD OF DECIMETER-WAVE RADIO-THERMOMETRY [ISSLEDOVANIE KRANIOTSEREBRAL'NOI TEMPERATURY METODOM DETSIMETROVOI RADIOTERMOMETRII]
A. V. GUSTOV, V. S. TROITSKII, V. P. GORBACHEV, N. I. ARZHANOV, and V. N. TSEITLINA (Gor'kovskii Meditsinskii Institut; Gor'kovskii Nauchno-Issledovatel'skii Radiofizicheskii Institut, Gorki, USSR) Fiziologiia Cheloveka (ISSN 0131-1646), vol. 11, Jan.-Feb. 1985, p. 151-154. In Russian. refs

A 30-cm-wavelength radio-thermometer technique (RTT) for the measurement of craniocerebral temperature (CT) is described in detail, and results obtained with this technique are discussed. The RTT is shown to be an effective noninvasive method for the measurement of CT. CT as measured by this technique is characterized by symmetry, the absence of dependence on sex-related dimorphism, and stability in the 20-49 age range; at ages of 50 years and above, the CT is reliably found to decrease. B.J.

A85-27791
MENTAL AND MEMORY PROCESSES AFTER A SINGLE DOSE OF ETHYL ALCOHOL [INTELLEKTUAL'NO-MNESTICHESKIE PROTSESSY POSLE ODNOKRATNOGO PRIEMA ETANOLA]
S. S. LASEV and P. D. SHABANOV (Akademiia Meditsinskikh Nauk SSSR, Institut Eksperimental'noi Meditsiny, Leningrad, USSR) Fiziologiia Cheleveka (ISSN 0131-1646), vol. 11, Jan.-Feb. 1985, p. 155, 156. In Russian. refs

A85-27792
PATTERN OF CHANGES OF STATISTICAL INDICES OF HEART RHYTHM IN PERSONS WITH DIFFERENT DEGREES OF MOTION SICKNESS [DINAMIKA IZMENENII STATISTICHESKIKH POKAZATELEI SERDECHNOGO RITMA LIUDEI S RAZLICHNOI STEPEN'IU UKACHIVAEMOSTI]
S. S. MARKARIAN, A. V. IGREVSKII, and IU. A. KOROTKOV (Ministerstvo Zdravookhraneniia SSSR, Nauchno-Issledovatel'skii Institut Gigieny Vodnogo Transporta, Moscow, USSR) Fiziologiia Cheloveka (ISSN 0131-1646), vol. 11, Jan.-Feb. 1985, p. 157, 158. In Russian. refs

A85-27794
FEATURES OF SENSORIMOTOR RESPONSES AND RHEOENCEPHALOGRAMS IN PERSONS WITH A DESYNCHRONOUS TYPE OF EEG [OSOBENNOSTI SENSOMOTORNYKH REAKTSII I REOENTSEFALOGRAMM U LITS S DESINKHRONNYM TIPOM EEG]
V. G. RUSNAK (Proizvodstvennoe Energeticheskoe Ob'edinenie 'Donbassenergo', Gorlovka, Ukrainian SSSR) Fiziologiia Cheloveka (ISSN 0131-1646), vol. 11, Jan.-Feb. 1985, p. 161-163. In Russian. refs

A85-27995* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
EFFECTS OF THERMAL STRESS AND EXERCISE ON BLOOD VOLUME IN HUMANS
M. H. HARRISON (NASA, Ames Research Center, Laboratory for Human Environmental Physiology, Moffett Field, CA; Ministry of Defence, London, England) Physiological Reviews (ISSN 0031-9333), vol. 65, Jan. 1985, p. 149-209. refs

The available experimental data base on the effects of exercise, posture and the environment (heat) on the blood volume, composition and concentration in humans is surveyed in depth to synthesize supportable conclusions. A large disparity is noted in the effective controls which were initiated in previous experimental conditions, resulting in contradictory findings regarding, e.g., hemoconcentrations and hemodilution in response to exercise. Comparisons between the results of exercise and of supine, seated and upright subjects has underscored the importance of gravity in hemoconcentration, particularly in the legs, and the generation of aldotestosterone. Hemoconcentration has been confirmed to increase with exercise in a seated or supine position. Exercise in a heated environment transfers cardiac output from core areas and reduces filtration efficiencies. Also, plasma volume increases, an action which cannot yet be associated with crystalloidal or colloidal influences on the osmotic behavior of cell walls. M.S.K.

A85-28021* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
INHIBITION OF PLASMA VASOPRESSIN AFTER DRINKING IN DEHYDRATED HUMANS
G. GEELEN, L. C. KEIL, S. E. KRAVIK, C. E. WADE, T. N. THRASHER, P. R. BARNES, G. PYKA, C. NESVIG, and J. E. GREENLEAF (NASA, Ames Research Center, Moffett Field; U.S. Army, Letterman Army Medical Center; California, University, San Francisco, CA) American Journal of Physiology (ISSN 0002-9513), vol. 247, 1984, p. 968-971. refs

The effects of nonosmotic and nonvolumetric factors on vasopressin secretion in dehydrated humans has been investigated experimentally, before and after drinking. The subjects of the experiment were five adult men and three adult women weighing 69-77 kg. In order to determine the influence of nonosmotic and nonvolumetric factors on vasopressin secretion, measurements were obtained of the following blood hematological indices: serum Na(+) content; serum K(+) content; osmolality; and hemoglobin. Measurements of hematocrit, plasma arginine vasopressin (AVP), aldosterone, and renin activity were also obtained. It is found that dehydration increased mean serum Na(+) content, osmolality,and AVP. No significant changes were observed in renin activity, hemoglobin, hematocrit, or plasma volume, while plasma aldosterone increased from 11.1 ng/dl after dehydration to 15.6 ng/dl between 30 and 60 min after drinking. A rapid fall of AVP content following rehydration occurred in the absence of changes in the primary regulators of AVP osmolality and plasma volume, with no change in blood pressure. On the basis of the experimental results, it is suggested that oropharyngeal factors may be the mechanism, for the observed decrease in AVP following rehydration. I.H.

A85-28618* *Management and Technical Services Co., Houston, Tex.*
SIMULATION OF CARDIOVASCULAR RESPONSE TO ACCELERATION STRESS FOLLOWING WEIGHTLESS EXPOSURE
R. SRINIVASAN and J. I. LEONARD (*Management and Technical* Services Co., Houston, TX) IN: Summer Computer Simulation Conference, 15th, Vancouver, Canada, July 11-13, 1983, Proceedings. Volume 1 . La Jolla, CA, Society for Computer Simulation, 1983, p. 598-603. refs
(Contract NAS9-15850)

Physiological adjustments taking place during space flight tend to reduce the tolerance of the crew to headward (+Gz) acceleration experienced during the reentry phase of the flight. This reduced tolerance to acceleration stress apparently arises from an adaptation to the microgravity environment of space, including a decrease in the total circulating blood volume. Countermeasures such as anti-g garments have long been known to improve the tolerance to headward g-force, but their effectiveness in space flight has not been fully evaluated. The simulation study presented in this paper is concerned with the response of the cardiovascular system to g-stress following cardiovascular deconditioning, resulting from exposure to weightlessness, or any of its ground-based experimental analogs. The results serve to demonstrate the utility of mathematical modeling and computer simulation for studying the causes of orthostatic intolerance and the remedial measures to lessen it. Author

A85-28619* Management and Technical Services Co., Houston, Tex.
CAUSES AND CONSEQUENCES OF REDUCED BLOOD VOLUME IN SPACE FLIGHT - A MULTI-DISCIPLINE MODELING STUDY
J. I. LEONARD (Management and Technical Services Co., Houston, TX) IN: Summer Computer Simulation Conference, 15th, Vancouver, Canada, July 11-13, 1983, Proceedings. Volume 1 . La Jolla, CA, Society for Computer Simulation, 1983, p. 604-609. refs
(Contract NAS9-14523; NAS9-15487; NAS9-16328)

A group of mathematical models of various physiological systems have been developed and applied to studying problems associated with adaptation to weightlessness. One biomedical issue which could be addressed by at least three of these models from varying perspectives was the reduction in blood volume that universally occurs in astronauts. Accordingly, models of fluid-electrolyte, erythropoiesis, and cardiovascular regulation were employed to study the causes and consequences of blood volume loss during space flight. This analysis confirms the notion that alterations of blood volume are central to an understanding of adaptation to prolonged space flight. More importantly, the modeling studies resulted in specific hypotheses accounting for plasma volume and red cell mass losses and testable predictions concerning the behavior of the circulatory system. Author

A85-29027
EFFECT OF HYPOXEMIA ON THE RENIN-ANGIOTENSIN-ALDOSTERONE SYSTEM IN HUMANS
G. L. COLICE (James A. Haley Veterans Hospital, Tampa, FL) and G. RAMIREZ (South Florida, University, Tampa, FL) Journal of Applied Physiology (ISSN 0161-7567), vol. 58, March 1985, p. 724-730. Research supported by the James A. Haley Veterans Hospital. refs

Hypoxemia was induced by breathing a hypoxic gas mixture in five subjects older than 40 years, and in five subjects younger than 35 years, in order to determine the effect of hypoxemia on the renin-angiotensin-aldosterone system. The fractional inspired O2 level of the gas mixture was regulated in order to decrease hemoglobin concentration to 90 percent in the group of subjects older than 35 yr. The pre-40-yr group of subjects had desaturation to 90 percent for 1 hr followed by desaturation to 80 percent for an additional hour. Plasma renin activity (PRA), angiotensin-converting enzyme activity (ACE), and plasma cortisol levels did not change during hypoxemia. Plasma aldosterone levels fell in both groups during the first hour of hypoxemia. Decreases were greatest during salt restriction, and were significant for the combined groups. Hepatic blood flow and the adrenal response to adrenocorticotropic hormone remained unchanged during hypoxemia in the pre-40-yr group. The results indicate that plasma aldosterone levels fall during hypoxemia despite unchanged PRA, ACE, hepatic blood flow, and adrenal function. I.H.

A85-29028
GLYCOGEN DEPLETION DURING PROLONGED EXERCISE - INFLUENCE OF GLUCOSE, FRUCTOSE, OR PLACEBO
V. A. KOIVISTO, M. HARKONEN, S.-L. KARONEN, P. H. GROOP, R. ELOVAINIO, E. FERRANNINI, L. SACCA, and R. A. DEFRONZO (Helsinki, University, Helsinki, Finland; CNR; Pisa, Universita, Pisa; Napoli, Universita, Naples, Italy; Yale University, New Haven, CT) Journal of Applied Physiology (ISSN 0161-7567), vol. 58, March 1985, p. 731-737. Research supported by the Finnish Ministry of Education, Nordisk Insulinfond and Yrjo Jahnsson Foundation. refs

The effects of fructose, glucose, and sweet placebo ingestion on fuel homeostasis and glycogen utilization during prolonged exercise are investigated experimentally. The sugars and the placebo were administered orally to eight healthy males 45 min before ergometer exercise performed for 2 hr at 55 percent of the maximal aerobic power. Following glucose ingestion, the rises in plasma glucose and insulin levels were found to be greater than for fructose ingestion by factors of 2.4, and 5.8, respectively. After 30 min of exercise following glucose ingestion, the plasma glucose concentration fell to a nadir of 3.9 + or - 0.3 mmol/1, and plasma insulin had returned to basal levels. The rates of endogenous glucose production and utilization both rose by a factor of 2.8 during exercise in the fructose group, and were 10 to 15 percent higher than in the placebo group. Muscle glycogen concentration in the quadriceps femoris fell in all three groups by 60-65 percent during exercise. The data indicate that fructose ingestion, though responsible for smaller perturbations in plasma glucose, insulin, and gastrointestinal polypeptide (GIP) levels than glucose ingestion, was no more effective than glucose or the placebo in sparing glycogen during exercise. I.H.

A85-29029
DIAPHRAGMATIC FATIGUE IN NORMOXIA AND HYPEROXIA
R. L. PARDY and P. T. P. BYE (McGill University Clinic; Royal Victoria Hospital; Montreal Chest Hospital, Montreal, Canada) Journal of Applied Physiology (ISSN 0161-7567), vol. 58, March 1985, p. 738-742. Research supported by the Medical Research Council of Canada. refs

Diaphragmatic fatigue was induced in six normal males in order to test whether O2 breathing affected the time-course of diaphragmatic fatigue and perceived effort (PE) when both minute ventilation and the rate of inspiratory muscle energy consumption were held constant. Fatigue was defined as an inability to continue to generate a target transdiaphragmatic pressure of 0.65-0.84 Pdi. Diaphragmatic electromyograms (EMGs) were obtained by esophageal electrodes, and PE was recorded using an open ended technique. Subjects were tested on an identical resistance inspiring air or pure O2 in random order on different days. Mean endurance time for air breathing was 4.1 + or - 1.4 min, and for O2 was 8.6 + or - 2.7 min. The increased endurance time for O2 was associated with a delay in the onset of EMG changes due to diaphragmatic fatigue, and with a decrease in PE. Arterial O2 saturation remained at a resting level of 99.0 + or - 0.2 percent in O2 and decreased by 2.8 percent from a resting level of 97.2 + or - 0.2 percent in air. The end-tidal fraction of CO2 increased to a similar degree during both air and O2 breathing. It is concluded that O2 breathing delays the onset of diaphragmatic fatigue when breathing pattern, minute ventilation, and Pdi are held constant during inspiratory resistive loading. I.H.

A85-29032
EFFECT OF ENDURANCE EXERCISE TRAINING ON VENTILATORY FUNCTION IN OLDER INDIVIDUALS
J. E. YERG, II, D. R. SEALS, J. M. HAGBERG, and J. O. HOLLOSZY (Washington University, St. Louis, MO) Journal of Applied Physiology (ISSN 0161-7567), vol. 58, March 1985, p. 791-794. refs
(Contract NIH-AG-03038; NIH-AG-00078)

A85-29036
EFFECT OF POSITIVE-PRESSURE BREATHING ON CARDIOVASCULAR AND THERMOREGULATORY RESPONSES TO EXERCISE
N. B. VROMAN, W. S. BECKETT, S. PERMUTT, and S. FORTNEY (Johns Hopkins Medical Institutions, Baltimore, MD) Journal of Applied Physiology (ISSN 0161-7567), vol. 58, March 1985, p. 876-881. refs
(Contract NIH-HL-10342; NIH-HL-07534)

A85-29037
EFFECT OF BETA-ADRENOCEPTOR BLOCKADE ON THERMOREGULATION DURING PROLONGED EXERCISE
N. F. GORDON, P. E. KRUEGER, J. P. VAN RENSBURG, A. VAN DER LINDE, A. J. KIELBLOCK, and J. F. CILLIERS (Military Hospital Cardiac Rehabilitation Center; Chamber of Mines of South Africa, Industrial Hygiene Branch, Johannesburg, Republic of South Africa) Journal of Applied Physiology (ISSN 0161-7567), vol. 58, March 1985, p. 899-906. Research supported by ICI. refs

A85-29039
METABOLIC AND VASOMOTOR INSULATIVE RESPONSES OCCURRING ON IMMERSION IN COLD WATER
L. H. STRONG, G. K. GEE, and R. F. GOLDMAN (U.S. Army, Research Institute of Environmental Medicine, Natick, MA) Journal of Applied Physiology (ISSN 0161-7567), vol. 58, March 1985, p. 964-977. refs

The metabolic and vasomotor insulative responses to immersion in cold water (20-36 C) was studied in twenty men. The subjects exhibited a range of body fat percentages from 7 to 23 percent, and weighed between 60 and 90 kg. Metabolic heat production was measured as a function of time, and water temperature was converted to explicit linear functions of core (T-re) and mean skin (T-bar sk) temperature for each immersion. The metabolic functions were used to define planes of thermogenic activity that showed a significantly steeper slope with respect to changes in T-bar sk for small lean subjects than for larger fatter subjects. Small lean males also showed steeper slopes with respect to changes in T-re than the heavier subjects. The time-course of T-bar sk and T-re was simulated for individual immersions with the aid of a time-dependent system of heat balance equations coupling different body compartments to the temperature of the immersion bath. It is shown that maximal internal insulation was achieved at higher bath temperatures in the small lean subjects than in the larger fatter subjects. A decline in insulation was observed above a critical metabolic level in the small-to-average size subjects. The complete anthropometric data are given in a table. I.H.

A85-29040
VENTILATION-PERFUSION INEQUALITY IN NORMAL HUMANS DURING EXERCISE AT SEA LEVEL AND SIMULATED ALTITUDE
G. E. GALE, J. R. TORRE-BUENO, R. E. MOON, H. A. SALTZMAN, and P. D. WAGNER (Duke University, Durham, NC; California, University, La Jolla, CA) Journal of Applied Physiology (ISSN 0161-7567), vol. 58, March 1985, p. 978-988. Research supported by the University of California. refs
(Contract NIH-HL-17731; NIH-HL-07896)

The relationship between ventilation and perfusion of O2 in nine males was studied at rest, and at three different levels of exercise on a bicycle ergometer. Altitude was simulated in a hypobaric chamber with measurements made at sea-level, and at simulated altitudes of 5,000, 10,000, and 15,000 ft. Ventilation/perfusion distributions were estimated using the multiple inert gas elimination technique. Dispersions of the distribution of blood flow and ventilation were evaluated using both log-e standard deviations, and three new dispersion indices derived directly from the inert gas data. All three methods indicated a broadening of the distributions with altitude. Exercise at high altitude, however, led to an increase in the dispersion of blood flow. It is shown that the increase in blood flow dispersion was associated with an increase in intraregional inhomogeneity that made up for the more uniform topographical distribution. Breathing pure O2 at 15,000 ft eliminated the dispersion. The anthropometric and pulmonary function data are given in a table. A detailed schematic drawing of the experimental setup is provided. I.H.

A85-29041
DIFFUSION LIMITATION IN NORMAL HUMANS DURING EXERCISE AT SEA LEVEL AND SIMULATED ALTITUDE
J. R. TORRE-BUENO, P. D. WAGNER, H. A. SALTZMAN, G. E. GALE, and R. E. MOON (Duke University, Durham, NC; California, University, La Jolla, CA) Journal of Applied Physiology (ISSN 0161-7567), vol. 58, March 1985, p. 989-995. Research supported by the University of California. refs
(Contract NIH-HL-17731; NIH-HL-07896)

Exercise by acclimatized or unacclimatized humans exposed to hypoxic atmospheres at high altitude reveals severely impaired aerobic performance as characterized by reduced maximum O2 uptake. The present investigation has the objective to determine the extent to which diffusion limitation impairs arterial oxygenation during exercise both at sea level and during acute exposure to hypobaric hypoxia. On the basis of the obtained results it is concluded that at sea level neither ventilation-perfusion inhomogeneity nor diffusion disequilibrium impose a significant interference to arterial oxygenation in healthy young men under the conditions of this study. G.R.

A85-29583
LOCALIZATION OF CATECHOLAMINES, SEROTONIN, HISTAMINE, AND ACETYLCHOLINESTERASE IN STRUCTURES OF HUMAN PERIPHERAL BLOOD [LOKALIZATSIIA KATEKHOLAMINOV, SEROTONINA, GISTAMINA I ATSETILKHOLINESTERAZY V STRUKTURAKH PERIFERICHESKOI KROVI CHELOVEKA]
V. V. TENIUKOV and D. S. GORDON (Chuvashskii Gosudarstvennyi Universitet, Cheboksary, USSR) Arkhiv Anatomii, Gistologii i Embriologii (ISSN 0004-1947), vol. 87, Nov. 1984, p. 78-81. In Russian. refs

A85-29584
CURRENT PROBLEMS IN THE GOAL-DIRECTED PROPHYLAXIS OF CARDIOVASCULAR DISEASES [AKTUAL'NYE VOPROSY TSELENAPRAVLENNOI PROFILAKTIKI SERDECHNO-SOSUDISTYKH ZABOLEVANII]
G. I. SIDORENKO (Ministerstvo Zdravookhraneniia Belorusskoi SSR, Belorusskii Nauchno-Issledovatel'skii Institut Kardiologii, Minsk, Belorussian SSR) Kardiologiia (ISSN 0022-9040), vol. 24, Nov. 1984, p. 5-10. In Russian. refs

A control-theoretical approach is taken to the goal-directed prophylaxis (GDP) of cardiovascular diseases, in which prophylaxis is considered as a system for the control of physiological functions. The general requirements of GDP include: a clear and determinate formulation of the goal, taking into account the desired biological modifications and social effects; a quantitative assessment of the controlled parameter; a timely comparison of values of the desired and current state of the body; predictability of load effect; and a minimum divergence of prophylactic measures from the usual processes of work and ordinary life. Details of the prophylaxis system are examined in relation to problems of hypokinesia, excessive body weight, and thermal adaptation. B.J.

A85-29585
THE INCIDENCE OF CORONARY HEART DISEASE AND THE MAIN RISK FACTORS AMONG MALES AGED 35-59 YEARS IN TALLIN [RASPROSTRANENNOST' ISHEMICHESKOI BOLEZNI SERDTSA I OSNOVNYE FAKTORY RISKA SREDI MUZHCHIN 35-59 LET V TALLINE]
O. I. VOLOZH, IU. KH. MUTSO, E. S. SOLODKAIA, T. I. KALIUSTE, V. M. PAUTS, G. S. ZHUKOVSKII, T. A. VARLAMOVA, A. M. OLFEREV, A. D. DEEV, and V. A. MOLCHANOV (Ministerstvo Zdravookhraneniia Estonskoi SSR, Institut Eksperimental'noi i Klinicheskoi Meditsiny, Tallin, Estonian SSR; Akademiia Meditsinskikh Nauk SSSR, Institut Profilakticheskoi Kardiologii, Moscow, USSR) Kardiologiia (ISSN 0022-9040), vol. 24, Nov. 1984, p. 20-24. In Russian. refs

A85-29586
THE MORTALITY OF MEN AGED 40-59 YEARS ACCORDING TO DATA FROM LIFE-TIME PURPOSEFUL SCREENING [SMERTNOST' POPULIATSII MUZHCHIN 40-59 LET PO DANNYM PRIZHIZNENNOGO TSELOVOGO SKRININGA]
B. M. LIPOVETSKII, D. B. SHESTOV, G. N. ILINA, V. O. KONSTANTINOV, and S. I. PLAVINSKAIA (AAkademiia Meditsinskikh Nauk SSSR, Nauchno-Issledovatel'skii Institut Eksperimental'noi Meditsiny, Leningrad, USSR) Kardiologiia (ISSN 0022-9040), vol. 24, Nov. 1984, p. 25-28. In Russian. refs

A85-29587
CHANGES IN THE REST EKG IN MALES WITH VARYING DEGREES OF IMPAIRED CARBOHYDRATE TOLERANCE IN THE ABSENCE OF CLINICAL SYMPTOMS OF CORONARY HEART DISEASE AND ARTERIAL HYPERTENSION [IZMENENIIA EKG POKOIA U MUZHCHIN S NARUSHENNOI TOLERANTNOST'IU K UGLEVODAM RAZLICHNOI VYRAZHENNOSTI PRI OTSUTSTVII KLINICHESKIKH PRIZNAKOV ISHEMICHESKOI BOLEZNI SERDTSA I ARTERIAL'NOI GIPERTONII]
T. P. OSTROVSKAIA, N. P. FILATOVA, A. V. NOVIKOV, and I. P. ILIUSHINA (Akademiia Meditsinskikh Nauk SSSR, Institut Profilakticheskoi Kardiologii, Moscow, SSR) Kardiologiia (ISSN 0022-9040), vol. 24, Nov. 1984, p. 44-46. In Russian. refs

A85-29588
EARLY DETECTION OF A CONNECTION BETWEEN THE LIPID SPECTRUM OF BLOOD SERUM AND HYPERTENSIVE RESPONSE OF THE BLOOD PRESSURE TO EXERCISE IN NORMAL YOUNG INDIVIDUALS [RANNEE VYIAVLENIE VZAIMOSVIAZI LIPIDNOGO SPEKTRA SYVOROTKI KROVI I GIPERTENZIVNOGO TIPA REAKTSII ARTERIAL'NOGO DAVLENIIA NA FIZICHESKUIU NAGRUZKU U ZDOROVYKH LITS MOLODOGO VOZRASTA]
E. V. EVDOKIMOVA and V. G. EVDOKIMOV (Cheliabinskii Meditsinskii Institut, Chelyabinsk, USSR) Kardiologiia (ISSN 0022-9040), vol. 24, Nov. 1984, p. 47-49. In Russian. refs

A85-29589
AGE, SEX AND MORTALITY DUE TO CORONARY HEART DISEASE (A FACTOR MODEL) [VOZRAST, POL I SMERTNOST' OT ISHEMICHESKOI BOLEZNI SERDTSA /FAKTORNIA MODEL'/]
V. P. VOITENKO (Akademiia Meditsinskikh Nauk SSSR, Institut Gerontologii, Kiev, Ukrainian SSR) Kardiologiia (ISSN 0022-9040), vol. 24, Nov. 1984, p. 57-61. In Russian. refs

A85-29590
THE MAINTENANCE OF OXYGEN SUPPLY IN PATIENTS WITH NEUROCIRCULATORY DYSTONIA DURING EXERCISE [KISLORODNOE OBESPECHENIE FIZICHESKOI NAGRUZKI U BOL'NYKH NEIROTSIRKULIATORNOI DISTONIEI]
V. I. MAKOLKIN, E. A. SOKOVA, and S. A. ABBAKUMOV (I Moskovskii Meditsinskii Institut, Moscow, USSR) Kardiologiia (ISSN 0022-9040), vol. 24, Nov. 1984, p. 71-75. In Russian. refs

A85-29592
PHOTOANGIOTENSIOTONOGRAPHY AS A METHOD FOR THE STUDY OF MICROCIRCULATION [FOTOANGIOTENZIOTONOGRAFIIA KAK METOD IZUCHENIIA MIKROTSIRKULIATSII]
A. I. KARPIK and A. A. POLYNSKII (Grodnenskii Meditsinskii Institut, Grodno, Belorussian SSR) Kardiologiia (ISSN 0022-9040), vol. 24, Nov. 1984, p. 120-122. In Russian. refs

The photoangiotensiotonographic (PATT) technique is described, and results relating to use of this technique to study the hemodynamic characteristics of microcirculation in healthy persons and in patients with arterial diseases are presented. It is concluded that the PATT technique can be effectively used to study blood circulation in microvessels in the case of various kinds of diseases. B.J.

A85-29593
MAIN ACHIEVEMENTS AND PROSPECTS OF DEVELOPMENT OF BIOMEDICAL MONITORING OF THE HEALTH AND FUNCTIONAL STATE OF HIGHLY QUALIFIED ATHLETES IN THE PROCESS OF PREPARATION CONTROL [OSNOVNYE DOSTIZHENIIA I PERSPEKTIVY RAZVITIIA MEDIKO-BIOLOGICHESKOGO KONTROLIA ZA SOSTOIANIEM ZDOROV'IA I FUNKTSIONAL'NYM SOSTOIANIEM VYSOKOKVALIFITSIROVANNYKH SPORTSMENOV V PROTSESSE UPRAVLENIIA PODGOTOVKOI]
F. A. IORDANSKAIA (Vsesoiuznyi Nauchno-Issledovatel'skii Institut Fizicheskoi Kul'tury, Moscow, USSR) Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), Nov. 1984, p. 16-18. In Russian.

A85-29595
GENETIC PRESUPPOSITIONS IN THE DEVELOPMENT OF HUMAN EQUILIBRIUM [GENETICHESKIE PREDPOSYLKI V RAZVITII RAVNOVESIIA CHELOVEKA]
L. P. SERGIENKO and S. F. RYBAKOV (Nikolaevskii Gosudarstvennyi Pedagogicheskii Institut, Nikolaev, Ukrainian SSR) Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), Nov. 1984, p. 26-28. In Russian. refs

The concordance of static and dynamic equilibrium was studied in monozygotic and dizygotic twins. Results indicate that the development of the human equilibrium function depends significantly on environmental factors (including factors of athletic training) but that factors of heredity also have a definite effect. It is concluded that the genetically related features of equilibrium development can be used to predict individual abilities in an athlete-selection program. B.J.

A85-29596
SIGNIFICANCE OF ADAPTIVE RESPONSES OF THE BODY IN THE ASSESSMENT OF THE EFFECTIVENESS OF COLD-ADAPTATION PROCEDURES [ZNACHENIE ADAPTATSIONNYKH REAKTSII ORGANIZMA DLIA OTSENKI VLIIANIIA KHOLODOVYKH ZAKALIVAIUSHCHIKH PROTSEDUR]
M. A. BUTOV (Riazanskii Meditsinskii Institut, Ryazan, USSR) Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), Nov. 1984, p. 30-32. In Russian. refs

It is shown that the method of Garkavi et al. (1979) for determining adaptive-response type can be used to determine the adequacy of cold and physical loads in persons carrying out cold-adaptation procedures. It is shown that adaptation to cold, especially winter bathing, can have a positive effect on health and can enhance the adaptive capacities of the body. However, a combination of intense physical and cold loads can also lead to overstrain and to a disturbance of adaptation mechanisms. B.J.

A85-29597
VARIANTS OF THE RS-T SEGMENT NORM OF THE EKG OF ATHLETES [VARIANTY NORMY SEGMENTA RS-T ELEKTROKARDIOGRAMMY SPORTSMENA]
L. A. BUTCHENKO and V. L. BUTCHENKO (Leningradskii Institut Usovershenstvovaniia Vrachei, Leningrad, USSR) Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), Nov. 1984, p. 40-42. In Russian. refs

A85-29598
STABILITY OF A SPECIALIZED FUNCTIONAL SYSTEM OF MOVEMENTS UNDER THE EFFECT OF ITS DISUSE [USTOICHIVOST' SPETSIALIZIROVANNOI FUNKTSIONAL'NOI SISTEMY DVIZHENII POD VLIIANIEM EE NEISPOL'ZOVANIIA]
A. V. IVOILOV, V. A. LEVCHUK, B. M. MAIZLIN, IU. G. SMIRNOV, M. N. STAROGORODSKII, and V. V. NESTERKOV (Volgogradskii Gosudarstvennyi Institut Fizicheskoi Kul'tury; Volgogradskii Oblastnoi Sovet Dinamo, Volgograd, USSR) Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), Nov. 1984, p. 52-54. In Russian. refs

The stability of a specialized system of movements (a man-goal system) under the effect of prolonged interruptions in its operation is evaluated for the example of highly qualified female basketball

players shooting at a basket. The system is shown to be deautomated in relation to goal-attaining accuracy (GAA) in the absence of systematic training. The resultant indices of GAA are found to decrease due to an overall reduction in the motor activity of the athlete (because of sickness) as well as due to a switchover to nonspecific motor activity during the general preparatory stage of the preparation period. B.J.

A85-29599
THE RENAL ENDOCRINE SYSTEM IN THE PRESENCE OF NEPHROGENIC ARTERIAL HYPERTENSION - A FUNCTIONAL-MORPHOLOGICAL ANALYSIS [ENDOKRINNAIA SISTEMA POCHEK PRI NEFROGENNOI ARTERIAL'NOI GIPERTENZII I FUNKTSIONAL'NO-MORFOLOGICHESKII ANALIZ]
V. V. SEROV (Moskovskii Meditsinskii Institut, Moscow, USSR) and M. A. PALTSEV Arkhiv Patologii (ISSN 0004-1955), vol. 46, no. 11, 1984, p. 5-16. In Russian. refs

A85-30015
THE EFFECT OF ACCELERATION (+GZ) ON THE BEHAVIOR OF SELECTED INDICES OF THE CIRCULATORY SYSTEMS OF PILOTS TESTED IN A WHIRLING ARM [WPLYW PRZYSPIESZENIA (+GZ) NA ZACHOWANIE SIE WYBRANYCH WSKAZNIKOW UKLADU KRAZENIA U PILOTOW BADANYCH W WIROWCE PRZECIAZENIOWEJ]
M. WOJTKOWIAK (Wojskowy Instytut Medycyny Lotniczej, Warsaw, Poland) Postepy Astronautyki (ISSN 0373-5982), vol. 17, no. 2, 1984, p. 63-81. In Polish. refs

Whirling arm tests involve accelerations that increase linearly at 0.1 G/s. The compensatory reactions of the circulatory system under these conditions are examined here with reference to test results obtained for a group of eighty young males. It is found that an increase in the heart rate, in systolic and diastolic blood pressures, and in the circulation rate prior to the start of the whirling arm and during the initial phase of acceleration affects the acceleration tolerance limit. V.L.

N85-20351*# National Aeronautics and Space Administration, Washington, D. C.
PHYSIOLOGICAL CONSIDERATIONS OF ARTIFICIAL GRAVITY
D. B. CRAMER *In* NASA. Marshall Space Flight Center Appl. of Tethers in Space, Vol. 1 13 p Mar. 1985
Avail: NTIS HC A13/MF A01 CSCL 06S

Reasons for the development of artificial gravity environments on spacecraft are outlined. The physiological effects of weightlessness on the human cardiovascular skeletal, and vestibular systems are enumerated. Design options for creating artificial gravity environments are shown. R.S.F.

N85-20358*# McDonnell-Douglas Corp., St. Louis, Mo.
SUMMARY PRESENTATION TO THE ARTIFICIAL GRAVITY PANEL
G. BUTLER *In* NASA. Marshall Space Flight Center Appl. of Tethers in Space, Vol. 1 11 p Mar. 1985
Avail: NTIS HC A13/MF A01 CSCL 06S

General requirements for artificial gravity under a wide range of circumstances are considered. Appropriate or feasible ways of filling these requirements are explored with the focus on using tethers. The orbiter itself does not appear to be a good platform for tether research and development. Therefore, tethers that would be attached to space stations are emphasized. However, orbiter demonstrations and external tank demonstrations might be useful in exploring and developing tether operations prior to the space station. The general recommendations include requirements of artificial gravity in medicine and physiology, technology, microgravity sciences, habitability, operations in space, and what artificial gravity would mean to operations in space. R.S.F.

N85-20365*# McDonnell-Douglas Corp., St. Louis, Mo.
REPORT OF THE ARTIFICIAL GRAVITY PANEL
G. BUTLER, B. FREITAG (NASA, Washington), D. DOXIADIS (Rockwell Corp.), D. R. CRISWELL (Calspace), C. TANG (JPL, California Inst. of Tech., Pasadena), D. FIELDER (NASA. Johnson Space Center), J. GILLE (Martin Marietta), P. PENZO (JPL, California Inst. of Tech., Pasadena), K. KROLL (NASA. Johnson Space Center), L. NAPOLITANO (Naples Univ., Italy) et al. *In* NASA. Marshall Space Flight Center Appl. of Tethers in Space, Vol. 2 36 p Mar. 1985
Avail: NTIS HC A14/MF A01 CSCL 06S

Tethers can be embodied into NASA's future space station development both as an experimental facility and as a technology for systems enhancement. Early action should be taken to ensure that the basic tether system be baselined into the initial space station architecture and that further concept studies be arranged to embody this basic capability. Space station tethered satellite operations would be continuous, subject to need and occasional association with local spacecraft operations in the proximity of the space station. The use of the tether principles would be further explored for attitude control and/or attitude stabilization damping, and proximity operations. For new tether uses, action should be taken to look at the tether for holding storage uses, proximity operations, and for extension of the capabilities of attached payloads systems. These applications should emphasize dynamic off-vertical tethers, rapid deployment, active-steered tethers, tether-boom combinations, and other concepts. B.G.

N85-20366*# National Aeronautics and Space Administration, Washington, D. C.
PHYSIOLOGICAL CONSIDERATIONS OF ARTIFICIAL GRAVITY
D. B. CRAMER *In* NASA. Marshall Space Flight Center Appl. of Tethers in Space, Vol. 2 20 p Mar. 1985
Avail: NTIS HC A14/MF A01 CSCL 06S

Weightlessness produces significant physiological changes. Whether these changes will stabilize or achieve medical significance is not clear. Artificial gravity is the physiological countermeasure, and the tether system represents an attractive approach to artificial gravity. The need for artificial gravity is examined. B.G.

N85-20629# Joint Publications Research Service, Arlington, Va.
FUNCTIONAL SYSTEM THEORY IN PRACTICE Abstract Only
A. S. SOSNOVSKIY *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-85-010) p 49-50 25 Feb. 1985 Transl. into ENGLISH from Usp. Fiz. Nauk (Moscow), v. 15, no. 4, Oct. - Dec. 1984 p 119-124
Avail: NTIS HC A05/MF A01

The isomorphism of functional system theory (FST) which resulted in the development of physiological cybernetics as a new branch of science is outlined. The FST has made it possible to analyze the integrated activity of individual neurons; exhibits on chemical and physical factors, as they affect neuronal function, were used to demonstrate the role of postsynaptic processes in the integration of signals converging on a single neutron. Laser studies demonstrated the relationship between neurotransmitter-mediated postsynaptic excitation and intracellular neurochemical processes. The systemic mechanisms of stability in the face of emotional stress, which are based on the biological theory of emotions is outlined. It includes information on the modeling of emotional stress in animals, which approximates socially induced stress in man. The essential model in these studies consists of conflict situations, which induce stress in man. The essential model in these studies consists of conflict situations, which induce psychosomatic pathology. Systemic quantification of behavior is illustrated by studies on expert marksmen. The devices shown are microelectronic radiotelemetry instruments, a device for measuring low-amplitude discharges from nerves, equipment for measuring angular acceleration in the joints of children, Adaptron OFS-1 instrument for studying intuitive learning in man, a pace setter for breathing exercises, electric tactile stimulator for diagnosis of musculo-skeletal disorders, a Kovyl apparatus for radio

and telephone transmission of EKG patterns to diagnostic centers, and a systems approach to evaluation of biotechnical electrocardio stimulators, and a computerized system for respiratory functional analysis. E.A.K.

N85-20630# Joint Publications Research Service, Arlington, Va.
CHARACTERISTICS OF HUMAN MASSETER UNDER CONDITIONS OF HYPOKINESIA Abstract Only
V. A. SOLOVYEV *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-85-010) p 50 25 Feb. 1985 Transl. into ENGLISH from Ark. Anat. Gistol. i Embriol. (Leningrad), no. 9, Sep. 1984 p 77-83
Avail: NTIS HC A05/MF A01

Human masseters were analyzed by quantitative methods. The bioptates of the masseter of males with normal bite were studied and after immobilization of jaw fractures. In 3 days after immobilization, intervals between some muscle bundles and fibers increased somewhat, indicating edema of the tissues while cisterns of the sacoplasmic network expanded. The level of pinocytic vesicles in endothelial blood vessel capillaries increased. In 12 days after immobilization in addition to unchanged fibers, fibers containing sections of decomposition and cytolysis appeared. In 24 days after immobilization, the mean area of cross section of muscle fibers was reduced to decrease of the percent of large myons, succinate dehydrogenase activity was much lower than that of the control figure, the percent of myons with low optical density increased while the percent with high succinate dehydrogenase activity decreased. Study of the dynamics of central moments of statistical distribution of succinate dehydrogenase activity after immobilization revealed the obvious enthalpic nature of changes of succinate dehydrogenase activity of the muscle tissue. The level of pinocytic vesicles in endotheliocytes of the capillaries changed and differed from control levels at all stages of the study. E.A.K.

N85-20632# Joint Publications Research Service, Arlington, Va.
PSYCHOLOGICAL ASPECTS OF PHENOMENON OF SPATIAL SYNCHRONIZATION OF EEG POTENTIAL Abstract Only
M. N. LIVANOV and N. Y. SVIDERSKAYA *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-85-010) p 51-52 25 Feb. 1985 Transl. into ENGLISH from Psikhologicheskiy Zh. (Moscow), v. 5, no. 5, Sep. - Oct. 1984 p 71-83
Avail: NTIS HC A05/MF A01

The electrophysiological components in mental processes were studied. One approach uses maximum registration of electric wave processes in comparison with certain normal and pathological states, while another uses data of spatial and temporal bioelectric processes to support theories about isolabile nerve center factors and the synchronism of bioelectric activity in organizing brain functions. The forms, degrees and limits of such correlations were examined. The EEG's were recorded to determine the general level of synchronization, cross-correlational fields in individual sections of the cortex, and a coefficient of asymmetry in brain function. It is indicated that the focus of maximum synchronization and specific types of personal behavior were functionally related. Feelings of self-worth had a positive correlation to EEG synchronization, and inter and intrahemispheral correlations were related to individual behavioral characteristics. Both basal and specific activity EEG patterns showed that spatial synchronization of biopotential can serve as an index of general activational shifts. The degree of intensity of nonspecific general synchronization reflected the difficulty of intellectual tasks being performed, and a multichannel EEG was the most effective device for measuring this potential. E.A.K.

N85-20633# Joint Publications Research Service, Arlington, Va.
TOPOGRAPHY OF HUMAN BRAIN ELECTRIC POTENTIALS AND DOMINANCE Abstract Only
V. A. DOROSHENKO *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-85-010) p 52 25 Feb. 1985 Transl. into ENGLISH from Fiz. Zh. (Leningrad), no. 10, Oct. 1984 p 1361-1365
Avail: NTIS HC A05/MF A01

A method to show differences in topography of slow negative wave components recorded in associative regions of the cortex during uniform structure of activity of subjects performing different tasks is presented. Subjects performed two sensorimotor tasks which involved reaction time and stimulus recognition with registration of the contingent negative variation. Differences in amplitude of early and late slow negative waves in lobal-central obductions are shown during task performance. Factoral analysis reveals latent mechanisms of development and changes of early and late negative waves during task performance. E.A.K.

N85-20634# Joint Publications Research Service, Arlington, Va.
FUNCTIONAL SIGNIFICANCE OF SOME EEG PARAMETERS AND DOMINANT PRINCIPLE Abstract Only
I. Y. KANUNIKOV and A. R. SHARIPOV *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-85-010) p 53 25 Feb. 1985 Transl. into ENGLISH from Fiz. Zh. (Leningrad), no. 10, 1984 p 1366-1373
Avail: NTIS HC A05/MF A01

Contingent negative variation concerning dominance was analyzed. Subjects performed four different tasks involving intention, expectation, prediction and observation. The EEG readings were taken from the frontal, temporal and central sections of the brain. It is shown that contingent negative variation has a complete, uneven temporal-spatial organization and can be adequately described by four relatively independent components, differing in topography, time of development and sensitivity to variation of experimental variables which are monitored. Problems concerning physiological mechanism for and functional significance of these factors for dominance is discussed. E.A.K.

N85-20635# Joint Publications Research Service, Arlington, Va.
EFFECTS OF TASKS ON RESPONSES OF HUMAN SKIN MECHANORECEPTORS Abstract Only
K. SOININEN, T. YARVILEKHTO, Y. I. ALEKSANDROV, and V. B. SHVYRKOV *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-85-010) p 53 25 Feb. 1985 Transl. into ENGLISH from Psikhologicheskiy Zh. (Moscow), v. 5, no. 5, Sep. - Oct. 1984 p 104-110
Avail: NTIS HC A05/MF A01

Activity in the efferent peripheral nervous system reflects the physical properties of stimuli and does not often depend on the behavioral situation or performance task. Attempts to modify responses of skin receptors by various ways of directing the attention of subjects were reported. Four subjects were attached to gunsten electrodes and given 1 to 8 tests involving light and vibration, while reactions of nerve fibers were recorded. The subjects performed the tasks of either estimating the magnitude of the stimulus, or identifying exceptional sound stimuli in a group. It is indicated that the tasks caused the responses of skin mechanoreceptors to vary, with the function of determining vibration magnitude resulting in lower thresholds, more responses and shorter latent periods. The central effects were related to direct somatic or sympathetic connections to the receptors or changes in mechanical properties of the skin. It is shown that mechanoreceptors do not simply transmit in formation on physical properties, but respond to central mood effects and external influences. E.A.K.

N85-20636# Joint Publications Research Service, Arlington, Va.
EFFECTS OF HYPOTHERMIA ON BRAIN METABOLISM Abstract Only
E. Z. EMIRBEKOV, S. P. LVOVA, and R. A. ABDULLAEV *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-85-010) p 54 25 Feb. 1985 Transl. into ENGLISH from Usp. Fiz. Nauk (Moscow), v. 15, no. 4, Oct. - Dec. 1984 p 85-99 Original language doc. was announced in IAA as A85-14875
Avail: NTIS HC A05/MF A01

The published literature concerning the effect of general hypothermia on the energy, nitrogen-protein, and lipid metabolism in the brains of warm-blooded animals is reviewed along with original experimental results. A theory is developed according to which the neurochemical mechanisms underlying the effect of hypothermia are expressed in the disturbance of microcirculation: a reduction in the utilization of macroergic substances; low-temperature blocking of polysynaptic neuronal pathways; the disturbance of membrane-synaptic transmission; the disturbance of membranes by the peroxidation of lipids; the discoordination of enzyme activity; and changes in the ratios of hydrocarbon-phosphor and nitrogen metabolites. L.M. (IAA)

N85-20637# Joint Publications Research Service, Arlington, Va.
EFFECT OF PROLONGED HUNGER DURING EXPERIMENTAL HIKES Abstract Only
V. RADZHABLI *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-85-010) p 54 25 Feb. 1985 Transl. into ENGLISH from Sov. Rossiya (Moscow), 2 Oct. 1984 p 6
Avail: NTIS HC A05/MF A01

Reactions and physiological changes in persons taking long hikes or canoe trips while fasting were studied to develop a model of behavior of tourist groups without food in an emergency in a remote area. The first stage of the experiment involved a 15 day trip of 537 kilometers by experienced hikers and five novices, including 2 women, participated in the second stage of the experiment. It was found that hunger itself does not decrease the capacity of persons to endure psychological and physiological stress but increases it. Personal interactions of members of the experimental group also helped to produce a positive physiological and psychological effect. E.A.K.

N85-20638*# National Aeronautics and Space Administration, Washington, D. C.
RADIATION SAFETY OF CREW AND PASSENGERS OF AIR TRANSPORTATION IN CIVIL AVIATION. PROVISIONAL STANDARDS
A. F. AKSENOV and A. I. BURNAZYAN Mar. 1985 17 p Transl. into ENGLISH of "Radiatsionnoy Bezopasnosti Letnogo Personala i Passazhirov Vozdushnogo Transporta Grazhdanskoy Aviatsii, Vremennyye Normy" rept. VNRBGA-75, Moscow 1975 17 p Transl. by Scientific Translation Service, Santa Barbara, Calif. Original document prepared by Ministry of Health, Moscow
(Contract NASW-4004)
(NASA-TM-77610; NAS 1.15:77610; VNRBGA-75) Avail: NTIS HC A02/MF A01 CSCL 06R

The purpose and application of the provisional standards for radiation safety of crew and passengers in civil aviation are given. The radiation effect of cosmic radiation in flight on civil aviation air transport is described. Standard levels of radiation and conditions of radiation safety are discussed. E.A.K.

N85-20639*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
PHOTOREFRACTOR OCULAR SCREENING SYSTEM Patent Application
J. H. KERR (Electro-Optics Consultants, Inc.) and J. R. RICHARDSON, inventors (to NASA) 28 Sep. 1984 25 p
(NASA-CASE-MFS-26011-1SB; NAS 1.71:MFS-26011-1SB; US-PATENT-APPL-SN-655605) Avail: NTIS HC A02/MF A01 CSCL 06B

A method and apparatus for detecting human eye defects, particularly detection of refractive error is presented. Eye reflex is recorded on color film when the eyes are exposed to a flash of light. The photographs are compared with predetermined standards, to detect eye defects. NASA

N85-20640# Centre d'Etudes et de Recherches de Medecine Aerospatiale, Paris (France). Div. Histopathologie Aeronautique.
PATHOPHYSIOLOGICAL STUDY OF POISONING DUE TO THERMAL DEGRADATION OF MATERIALS
C. NOGUES, C. FOUET, and M. J. ARMAND Jun. 1984 36 p refs In FRENCH; ENGLISH summary
(Contract DRET-82.1073)
(CERMA-84-15) Avail: NTIS HC A03/MF A01

Fire toxicity of aircraft seats and components was investigated in controlled thermal degradation of polyurethane foam and/or wool compounds whose inhalation causes respiratory distress. The injury substrate is pulmonary edema with protein loss. The severity of injuries varies with the type of material and the concentration of the main toxic compounds such as carbon monoxide, nitrogen oxides, and cyanhydric acid. Author (ESA)

N85-20641# Centre d'Etudes et de Recherches de Medecine Aerospatiale, Paris (France). Div. de Biochimie-Toxicologie.
MATERIAL THERMOLYSIS PRODUCT TOXICITY: DEFINITION OF A HAZARD EVALUATION METHODOLOGY
J. P. DELCROIX, P. PICART, and M. GUERBET Mar. 1984 214 p refs In FRENCH; ENGLISH summary
(Contract DRET-80.1038)
(CERMA-84-08) Avail: NTIS HC A10/MF A01

A methodology for the evaluation of material thermal degradation product toxicity for hypertacute alveolar toxicity under controlled ventilation, and behavioral toxicity under spontaneous ventilation was developed. Biological tests were performed. The thermolysis method was sample exposure to various temperature increase rates. The results led to a hazard classification of seven materials - by decreasing order: wool, rigid and flexible polyurethanes, plywood, PVC, poplar, and polycarbonate.
Author (ESA)

N85-20642# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
MOTION SICKNESS: MECHANISMS, PREDICTION, PREVENTION AND TREATMENT
Loughton, England Nov. 1984 174 p refs In ENGLISH and FRENCH Symp. held in Williamsburg, Va., 3-4 May 1984
(AGARD-CP-372; ISBN-92-835-0369-4) Avail: NTIS HC A08/MF A01

Motion sickness continues to be a significant operational problem in the armed forces of the NATO countries. Space motion sickness has emerged as a major operational concern in the short duration space shuttle flights, with nearly 50% of all crew members experiencing some symptoms. Recent developments in understanding etiological factors contributing to air, sea, car, simulator and space sickness are reported. Neurological mechanisms mediating motion sickness are identified, predictive tests of susceptibility are discussed, and the prevention and treatment of motion sickness are addressed. Laboratory findings are identified which can be incorporated into programs for alleviating motion sickness under operational conditions.

N85-20643# Rockefeller Univ., New York.
NEUROPHYSIOLOGICAL CORRELATES OF MOTION SICKNESS: ROLE OF VESTIBULOCEREBELLUM AND 'VOMITING CENTER' REANALYZED
A. D. MILLER and V. J. WILSON *In* AGARD Motion Sickness: Mechanisms, Prediction, Prevention and Treatment 5 p Nov. 1984 refs
Avail: NTIS HC A08/MF A01

Unexpected findings were obtained regarding the role of the nodulus and uvula of the vestibulocerebellum in vestibular-induced vomiting and the existence of a readily identifiable, discretely localized vomiting center. Sinusoidal electrical stimulation of the vestibular labyrinths of decerebrate cats could produce vomiting and related activity similar to that observed during motion sickness.

These symptoms occurred in animals with lesions of the posterior cerebellar vermis that included the nodulus and uvual, indicating, by analogy, that these structures are not essential for the development of many symptoms of motion sickness in intact animals. Electrical stimulation of the brainstem was used in an attempt to localize a vomiting center to a restricted anatomical region. Vomiting proved difficult to produce; a vomiting center, stimulation of which evoked readily reproducible results, could not be identified. R.S.F.

N85-20644# Brandeis Univ., Waltham, Mass. Spatial Orientation Lab.

INFLUENCE OF GRAVITOINERTIAL FORCE LEVEL ON APPARENT MAGNITUDE OF CORIOLIS CROSS-COUPLED ANGULAR ACCELERATIONS AND MOTION SICKNESS

J. R. LACKNER and A. GRAYBIEL *In* AGARD Motion Sickness: Mechanisms, Prediction, Prevention and Treatment 7 p Nov. 1984 refs Prepared in cooperation with Naval Air Station, Pensacola, Fla.

Avail: NTIS HC A08/MF A09

The Skylab astronauts showed a great decrease in susceptibility to motion sickness during exposure to Coriolis cross-coupled angular accelerations when tested in orbital flight. In order to determine whether this decreased susceptibility is related entirely to adaptation or in part to changes in vestibular and function, subjects were tested in the free fall and high force phases of parabolic flight maneuvers. Susceptibility to motion sickness during Coriolis stimulation as a function of force level and the perceived intensity of Coriolis cross-coupled angular accelerations as a function of force level were measured. Subjects exhibited fewer and less severe symptoms of motion sickness when tested in free fall than they did for the same Coriolis stimulation in 1G. They exhibited much earlier and more severe symptoms when tested in 2G. They exhibited much earlier and more severe symptoms when tested in 2G. It is concluded that part of the Skylab astronauts' inflight decrease in susceptibility to Coriolis stimulation was related to alterations in vestibular and sensorimotor control that occur immediately during exposure to microgravity force levels. R.S.F.

N85-20645# University Hospital, Copenhagen (Denmark).

VESTIBULAR AND OCULOMOTOR FUNCTION DURING GZ VARIATIONS

S. VESTERHAUGE, A. MANSSON, and T. S. JOHANSEN *In* AGARD Motion Sickness: Mechanisms, Prediction, Prevention and Treatment 5 p Nov. 1984 refs

Avail: NTIS HC A08/MF A01

Ten normal subjects were exposed to G-force variations during parabolic flights and turns in a SAAB Supporter aircraft. A vertical head drift accompanied by a vertical eye drift was recorded in all subjects. The eye drift was most prominent during the hyper-G phase of the parabolic manoeuvres. Compensatory eye movements were induced by horizontal head rotations. No statistical significant changes could be demonstrated in this reflex. Horizontal oculomotor saccades were induced with a visual distance of + or 10 deg. A significant increase of the latency time could be demonstrated during the weightless phase of the parabolas. It is concluded that spontaneous eye and head drift and disturbances in voluntary eye movements might contribute to the development of motion sickness during combat maneuvers and space flight. R.S.F.

N85-20646*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

PREDICTION OF THE SPACE ADAPTATION SYNDROME

M. F. RESCHKE, J. L. HOMICK, P. RYAN, and E. C. MOSELEY *In* AGARD Motion Sickness: Mechanisms, Prediction, Prevention and Treatment 19 p Nov. 1984 refs

Avail: NTIS HC A08/MF A01

The univariate and multivariate relationships of provocative measures used to produce motion sickness symptoms were described. Normative subjects were used to develop and cross-validate sets of linear equations that optimally predict motion sickness in parabolic flights. The possibility of reducing the number of measurements required for prediction was assessed. After describing the variables verbally and statistically for 159 subjects, a factor analysis of 27 variables was completed to improve understanding of the relationships between variables and to reduce the number of measures for prediction purposes. The results of this analysis show that none of variables are significantly related to the responses to parabolic flights. A set of variables was selected to predict responses to KC-135 flights. A series of discriminant analyses were completed. Results indicate that low, moderate, or severe susceptibility could be correctly predicted 64 percent and 53 percent of the time on original and cross-validation samples, respectively. Both the factor analysis and the discriminant analysis provided no basis for reducing the number of tests. R.S.F.

N85-20647# Institute for Perception RVO-TNO, Soesterberg (Netherlands).

PREDICTION OF SEASICKNESS SUSCEPTIBILITY

W. BLES, H. A. A. DEJONG (Academic Medical Centre, Amsterdam), and W. J. OOSTERVELD (Academic Medical Centre, Amsterdam) *In* AGARD Motion Sickness: Mechanisms, Prediction, Prevention and Treatment 6 p Nov. 1984 refs

Avail: NTIS HC A08/MF A01

Thirty-nine subjects, suffering from chronic seasickness, and 21 controls were submitted to several tests in order to find parameters for the prediction of seasickness susceptibility. Routine electronystagmography examination revealed a labyrinthine predominance of more than 30% with caloric irrigation in about 15% of the seasickness susceptibles, suggesting a higher incidence of chronic motion sickness susceptibility in subjects with a labyrinthine imbalance than in normals. Cupulometry revealed identical slopes of the sensation cupulogram for both groups. No difference in slope was found for the nystagmus cupulogram either. The time constant of the 'velocity storage mechanism' also covered the same range for both groups. Stabilometry performed in a tilting room suggested that seasickness susceptibles are more visually oriented than the controls as revealed by the visually induced postural instability. R.S.F.

N85-20648# Naval Aerospace Medical Research Lab., Pensacola, Fla.

LABORATORY TESTS OF MOTION SICKNESS SUSCEPTIBILITY

J. M. LENTZ *In* AGARD Motion Sickness: Mechanisms, Prediction, Prevention and Treatment 9 p Nov. 1984 refs

Avail: NTIS HC A08/MF A01

Five laboratory tests of motion sickness susceptibility that were evaluated over the years at the Naval Aerospace Medical Research laboratory in Pensacola are reviewed. These tests, involving Coriolis stimuli, off-vertical rotation, visual/vestibular interactions, were developed with the objective of predicting individual susceptibility to airsickness and space sickness. Individual tests which are discussed include: brief vestibular disorientation test, coriolis sickness susceptibility test, sudden-stop vestibulovisual test, tilted-axis rotation test, and the visual/vestibular interaction test. B.G.

N85-20649# Naval Aerospace Medical Research Lab., Pensacola, Fla.

RESULTS OF A LONGITUDINAL STUDY OF AIRSICKNESS INCIDENCE DURING NAVAL FLIGHT OFFICER TRAINING

W. C. HIXSON, F. E. GUEDRY, JR., and J. M. LENTZ *In* AGARD Motion Sickness: Mechanisms, Prediction, Prevention and Treatment 13 p Nov. 1984 refs

Avail: NTIS HC A08/MF A01

The results of a longitudinal study of airsickness in a large sample population of Naval Flight Officers (NFOs) being trained to perform various nonpilot flighty duties prior to assignment to operational fleet squadrons are outlined. The acquisition of airsickness data on an individual student basis was stressed as training progressed from the basic/primary level through the advanced/secondary level to the fleet readiness squadron phase for each of the major NFO training pipelines. The primary objectives

were to define the incidence of airsickness in each of the training squadrons and to identify differences in the motion stress exposure associated with the different pipelines that can affect decisions on the initial selection and assignment of NFO candidates. A secondary objective was to relate the inflight airsickness data to the results of several short tests of motion reactivity given to a segment of the study population prior to their beginning flight training. Author

N85-20651# Laboratoire de Medecine Aerospatiale, Bretigny-sur-Orge (France).
SUSCEPTABILITY TO KINETOSES AND THE AMPLITUDE PERCEIVED FROM SENSORY ILLUSIONS [SUSCEPTIBILITE AUX CINETOSES ET AMPLITUDE PERCUE DES ILLUSIONS SENSORIELLES]
A. LEGER *In* AGARD Motion Sickness: Mechanisms, Prediction, Prevention and Treatment 10 p Nov. 1984 refs In FRENCH
Avail: NTIS HC A08/MF A01

Coriolis accelerations provoked by the starting and stopping of a centrifuge entail a strong illusory sensation of angular displacement. The amplitude of these sensations was studied in two groups of subjects who were either receptive or nonreceptive to motion sickness. The axes of application of the load factor was varied with respect to the head. Considerable differences of amplitude were noticed between the two groups for the series of protocols studied. The orientation of the load factor strongly influences the appearance of the kinetosis syndrome.
Transl. by A.R.H.

N85-20652# Defence and Civil Inst. of Environmental Medicine, Downsview (Ontario).
PREFLIGHT AND POSTFLIGHT MOTION SICKNESS TESTING OF THE SPACELAB 1 CREW
K. E. MONEY, D. G. WATT (McGill Univ., Montreal, Quebec), and C. M. OMAN (Massachusetts Inst. of Tech., Cambridge) *In* AGARD Motion Sickness: Mechanisms, Prediction, Prevention and Treatment 8 p Nov. 1984 refs
Avail: NTIS HC A08/MF A01

The Four Spacelab 1 payload crew members, as experimental subjects, were exposed to a variety of motion sickness tests. Contrary to expectation, the crew member who was most susceptible to these tests was the least susceptible to space motion sickness, and the crew member who was most susceptible to space motion sickness was one of the least susceptible to these tests. On the third day after returning from the mission, one of the preflight tests (KC 135) was repeated, and all of the crew members were found to be non-susceptible. Statements of generalities will have to wait for the accumulation of more experimental subjects. Author

N85-20653# Essex Corp., Orlando, Fla.
SIMULATOR SICKNESS: REACTION TO A TRANSFORMED PERCEPTUAL WORLD. 6: PRELIMINARY SITE SURVEYS
R. S. KENNEDY, A. C. BITTNER, JR. (Naval Biodynamics Lab., New Orleans, La.), L. H. FRANK (Naval Training Equipment Center, Orlando, Fla), R. W. HOOT, M. E. MCCAULEY, and T. A. BINKS (Marine Corps Air Station, Jacksonville, N.C.) *In* AGARD Motion Sickness: Mechanisms, Prediction, Prevention and Treatment 11 p Nov. 1984 refs
Avail: NTIS HC A08/MF A01

There were numerous recent documented and anecdotal reports of aircrews experiencing psychophysiological disturbances, visual illusions and sickness following the use of flight simulators. Symptoms of simulator sickness occur not only during flight, but in some individuals, have lasted up to several hours post exposure. Furthermore, simulator aftereffects may be delayed; some aircrews report symptom onset as late as eight to ten hours post utilization. Incidents of simulator sickness were documented in fighter, attack, patrol and helicopter simulators. These occurrences were reported in both motion-base and fixed-base simulators, to pilots and other aircrewmen, as well as instructors. Simulator sickness represents a major obstacle to obtaining the full training potential from the vast inventory of flight simulators currently in use and under development. Data on pilot experience and exposure factors, symptomatology, scores on postural disequilibrium tests, video-game performance and engineering design aspects in two different Navy helicopter simulators are presented, along with a brief review of past simulator sickness studies. B.G.

N85-20654# Massachusetts Inst. of Tech., Cambridge. Dept. of Aeronautics and Astronautics.
SPACE MOTION SICKNESS MONITORING EXPERIMENT: SPACELAB 1
C. M. OMAN, B. K. LICHTENBERG, and K. E. MONEY (Defence and Civil Inst. of Environmental Medicine, Downsview, Ontario) *In* AGARD Motion Sickness: Mechanisms, Prediction, Prevention and Treatment 21 p Nov. 1984 refs
Avail: NTIS HC A08/MF A01

Symptoms and signs of space motion sickness and fluid shift were observed by 4 specially trained crewmembers on the physically demanding 10 day flight of Space Shuttle/Spacelab 1 launched on 11/28/83. Anonymous but detailed firsthand reports are presented. Three crewmen experienced persistent overall disccomfort, and vomited repeatedly. Symptom pattern was generally similar to that seen in the individuals preflight, except that: prodromal nausea was brief or absent in some cases; facial pallor and cold swetating were usually absent; one subject experienced uncomfortable stomach elevation. However, symptoms were clearly modulated by head movement, were exacerbated by unfamiliar visual cues, and could be reduced by physical restraint providing contact cues around the body. Drugs known to be effective in preventing motion sickness were judged helpful in limiting symptoms, including vomiting. Results support the view that space sickness is a form of motion sickness. Author

N85-20655*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
SPACE ADAPTATION SYNDROME: INCIDENCE AND OPERATIONAL IMPLICATIONS FOR THE SPACE TRANSPORTATION SYSTEM PROGRAM
J. L. HOMICK, M. F. RESCHKE, and J. M. VANDERPLOEG *In* AGARD Motion Sickness: Mechanisms, Prediction, Prevention and Treatment 6 p Nov. 1984 refs
Avail: NTIS HC A08/MF A01

Better methods for the prediction, prevention, and treatment of the space adaptation syndome (SAS) were developed. A systematic, long range program of operationally oriented data collection on all individuals flying space shuttle missions was initiated. Preflight activities include the use of a motion experience questionnaire, laboratory tests of susceptibility to motion sickness induced by Coriolis stimuli and determinations of antimotion sickness drug efficacy and side effects. During flight, each crewmember is required to provide a daily report of symptom status, use of medications, and other vestibular related sensations. Additional data are obtained postflight. During the first nine shuttle missions, the reported incidence of SAS has been48%. Self-induced head motions and unusual visual orientation attitudes appear to be the principal triggering stimuli. Antimotion sickness medication, was of limited therapeutic value. Complete recovery from symptoms occurred by mission day three or four. Also of relevance is the lack of a statistically significant correlation between the ground based Coriolis test and SAS. The episodes of SAS have resulted in no impact to shuttle mission objectives and, no significant impact to mission timelines. E.A.K.

N85-20656# Naval Biodynamics Lab., New Orleans, La.
ANALYSIS OF HEAD MOTION DURING SIMULATED, ROUGH WATER OPERATION OF A 2200 TON SURFACE EFFECT SHIP
W. R. ANDERSON, G. C. WILLEMS, and J. C. GUIGNARD *In* AGARD Motion Sickness: Mechanisms, Prediction, Prevention and Treatment 14 p Nov. 1984 refs
Avail: NTIS HC A08/MF A01

Nineteen Navy volunteers were exposed, for periods up to 48 hours, to simulated motion environments predicted for a 2,000,000 Kg surface effect ship. Surface effect ships, which are supported by a cushion of air, operate at high speeds and produce motion

strongly influenced by the dynamics of the air cushion. The motions of both the environment and the head of each volunteer were measured during scheduled 5 minute intervals and the relationship of head motion to impending emesis was investigated. The time series data and the frequency spectra were examined to identify variability in head response resulting from: repetitions with the same subject, repetitions with different subjects, repetitions with a subject in different position, repetitions simulating different ship operating conditions, repetitions with and without pitch and roll motions, differences between well and sick subjects, fatigue, and progression to emesis. Heave, pitch and roll motions in the range of 0.05 to 1.5 Hz were simulated. It is indicated that a correlation between spontaneous head motion and motion sickness exist. The utility of studying the effects of motion in a controlled laboratory environment was demonstrated. E.A.K.

N85-20657# Institute of Aviation Medicine, Farnborough (England).
A DOUBLE BLIND COMPARATIVE TRIAL OF POWDERED GINGER ROOT, HYOSINE HYDROBROMIDE, AND CINNARIZINE IN THE PROPHYLAXIS OF MOTION SICKNESS INDUCED BY CROSS COUPLED STIMULATION
J. R. R. STOTT, M. P. HUBBLE, and M. B. SPENCER *In* AGARD Motion Sickness: Mechanisms, Prediction, Prevention and Treatment 6 p Nov. 1984 refs
Avail: NTIS HC A08/MF A01

The relative effectiveness of powdered ginger root (1G), hyoscine (0.6 mg), cinnarizine (15 mg) and a placebo increase of the tolerance of subjects to the development of motion sickness symptoms induced by cross coupled stimulation. In order to assess the effect of each drug on performance, a range of tests was carried out in the period between 90 minutes and 2 hours after taking the drug. The effectiveness of hyoscine in delaying the onset of motion sickness symptoms is confirmed and cinnarizine is shown to be similarly effective. The study failed to substantiate a previous report that powderd root ginger is of value in the prophylaxis of motion sickness. Significant differences in the results of performance tests were found only after the administration of hyoscine, which produced a small decrease in subjective alertness and a reduction in the velocity of saccadic eye movements. E.A.K.

N85-20658# Institute of Aviation Medicine, Farnborough (England).
THE CURRENT STATUS OF THE RAF PROGRAMME OF DENSENSITISATION FOR MOTION SICK AIRCREW
J. R. R. STOTT and M. BAGSHAW *In* AGARD Motion Sickness: Mechanisms, Prediction, Prevention and Treatment 9 p Nov. 1984 refs
Avail: NTIS HC A08/MF A01

The desensitization to motion sickness program consists of a ground phase and a flying phase. Additional motion stimuli were incorporated into the ground phase of treatment and the flying phase is carried out in the high performance Hunter T7 aircraft. Comparison of the results of follow up for the period 1981 to 1983 with those for 1974 to 1980 indicates an improvement in overall success rate and shows a significant increse in the number of pilots who progress to fly in the demanding motion environment of fast jets. E.A.K.

N85-20659# Institute of Aviation Medicine, Fuerstenfeldbruck (West Germany). Dept. 6 Aviation Psychology.
PSYCHOLOGICAL COMPONENTS IN THE DEVELOPMENT AND PREVENTION OF AIR SICKNESS
R. W. KEMMLER *In* AGARD Motion Sickness: Mechanisms, Prediction, Prevention and Treatment 8 p Nov. 1984 refs
Avail: NTIS HC A08/MF A01

The behavior of motion sick aircrew members was analyzed from 23 case studies. Situational context variables and their interaction with individual dispositions, behavior regulation patterns, coping mechanisms and self control techniques are discussed. It seems that sensitivity to motion is not the only criterion in the development of motion sickness. Countermeasures and their effects are described. Daily exercise of various of behavior regulation to build up successive adaptation to motion stress should enable persons to cope with motion sickness-producing situations in flight. E.A.K.

N85-20660# Aerospace Medical Div., Brooks AFB, Tex.
BIOFEEDBACK TREATMENT OF AIRSICKNESS: A REVIEW
D. R. JONES and B. O. HARTMAN *In* AGARD Motion Sickness: Mechanisms, Prediction, Prevention and Treatment 4 p Nov. 1984 refs
Avail: NTIS HC A08/MF A01

Biofeedback as a treatment for air sickness is reviewed. Recognition of early symptoms of motion sickness and the use of relaxation techniques are outlined. The subjects are taught how to control the symptoms when they occur. It is found that the use of biofeedback modalities in the dynamic Coriolis chair environment is more effective in returning fliers to operational flying than relaxation training and desensitization alone. E.A.K.

N85-20661# Joint Publications Research Service, Arlington, Va.
CHINA REPORT: SCIENCE AND TECHNOLOGY
6 Nov. 1984 58 p Transl. into ENGLISH from various Chinese articles
(JPRS-CST-84-036) Avail: NTIS HC A04/MF A01

Progress in Science and technology in the Peoples' Republic of China is reported. Topics discussed include: applied sciences in environment pollution caused by coal mines, and the life sciences in military aerospace medicine.

N85-20662# Joint Publications Research Service, Arlington, Va.
AVIATION MEDICINE'S ROLE IN MODERN AIRFORCE DISCUSSED
X. WEIPU *In its* China Rept.: Sci. and Technol. (JPRS-CST-84-036) p 41-47 6 Nov. 1984 Transl. into ENGLISH from Jiefangjun Yixue Zazhi (Beijing), no. 2, 20 Apr. 1984 p 143-144
Avail: NTIS HC A04/MF A01

Progress in military aviation medicine is discussed. The characteristics of military aviation are summarized as follows: (1) high performance military aircraft; (2) cockpit space restriction and stress; and (3) good physical condition of pilot. The different topics examined include: aerospace environment physiology; biodynamics; psychology and work efficiency; flight work hygiene; clinical aviation medicine; and logistic air force health services. E.A.K.

N85-20663# Joint Publications Research Service, Arlington, Va.
SYMPOSIUM ON MILITARY AVIATION MEDICINE SUMMARIZED
X. WEIPU *In its* China Rept.: Sci. and Technol. (JPRS-CST-84-036) p 48-55 6 Nov. 1984 Transl. into ENGLISH from Jiefangjun Yixue Zaxhi (Beijing), no. 2, 20 Apr. 1984 p 148-150
Avail: NTIS HC A04/MF A01

Military aviation in China is discussed. Topics presented include: (1) aviation physiology and onflight protective life support; (2) examination of cardiovascular systems in flight personnel; (3) vestibular functioning, otological and opthalmological examination and its clinical treatment; and (4) flight health safequards. E.A.K.

N85-21932# Joint Publications Research Service, Arlington, Va.
EXTERNAL RESPIRATION, GAS EXCHANGE AND ENERGY EXPENDITURES OF MAN IN WEIGHTLESSNESS
I. I. KASYAN and G. F. MAKAROV *In its* USSR Rept: Space Biol. and Aerospace Med., Vol. 18, No. 6, Nov. - Dec. 1984 (JPRS-USB-85-002) p 1-9 21 Feb. 1985 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 6, Nov. - Dec. 1984 p 4-9
Avail: NTIS HC A08

Data on external respiration and energy expenditures of men exposed to zero-g for 185 days and to 1/6 g on the lunar surface as reported by Soviet and foreign authors is summarized. Also discussed are factors that may be responsible for a higher level of gas exchange processes at reduced g. Author

N85-21933# Joint Publications Research Service, Arlington, Va.
BLOOD AMINO ACIDS OF COSMONAUTS BEFORE AND AFTER 211-DAY SPACEFLIGHT
I. G. POPOV and A. A. LATSKEVICH *In its* USSR Rept: Space Biol. and Aerospace Med., vol. 18, no. 6, Nov. - Dec. 1984 (JPRS-USB-85-002) p 11-17 21 Feb. 1985 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 6, Nov. - Dec. 1984 p 10-15
Avail: NTIS HC A08

The plasma content of 17 free amino acids of the Commander and Flight-Engineer of Salyut-1-Soyuz-T was examined before flight and on postflight days 1 and 7. The amino acids were measured in an automatic amino acid analyzer Hitachi KLA-3B. Both cosmonauts showed a decrease of most amino acids, particularly essential amino acids. On postflight day 7 the content of most amino acids did not yet return to the preflight level. It can therefore be concluded that the preflight diet should be supplemented with methionine and aspartic acid, and the flight and postflight diets with 7 essential amino acids plus cystine, arginine, proline and aspartic acid. Author

N85-21934# Joint Publications Research Service, Arlington, Va.
CIRCADIAN RHYTHM OF HUMAN BODY TEMPERATURE DURING SPACEFLIGHTS
L. LHAGWA *In its* USSR Rept: Space Biol. and Aerospace Med., Vol. 18, No. 6, Nov. - Dec. 1984 (JPRS-USB-85-002) p 18-22 21 Feb. 1985 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 6, Nov. - Dec. 1984 p 15-18
Avail: NTIS HC A08

The auxiliary temperature of the Mongolian Salyut-6 crewmember was measured in the daytime before, during and after flight. The temperature was recorded immediately after awakening to going to sleep every 2 hours: a month prelaunch in the Cosmonauts' Training Center during 5 days, a week prelaunch at the Baikonur launch site during 3 days, inflight from the middle of mission day 2 to the middle of mission day 7 every day, and postflight at Baikonur during 4 days. It was found that inflight the auxiliary temperature decreased significantly by 0.44 C as compared to the data obtained in the Cosmonauts' Training Center and by 0.22 C as compared to the data obtained at the launch site. There were also some changes in the pattern of acrophases on the time scale. It is recommended to continue thermal regulation measurements in space flight. Author

N85-21935# Joint Publications Research Service, Arlington, Va.
BIOCHEMICAL STATUS OF ADRENOCORTICAL DYSFUNCTION FOLLOWING SPACEFLIGHT
R. A. TIGRANYAN, L. I. VORONIN, and N. F. KALITA *In its* USSR Rept: Space Biol. and Aerospace Med., Vol. 18, No. 6, Nov. - Dec. 1984 (JPRS-USB-85-002) p 23-27 21 Feb. 1985 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 6, Nov. - Dec.. 1984 p 18-22
Avail: NTIS HC A08

Renal excretion of 17-HOCS and aldosterone as well as the ratio of excreted glucocorticoids and their precursors was investigated in the Soyuz-31 Commander before and after his 7-day flight. Renal excretion of total 17-HOCS remained unchanged while hydroxylation in positions 11 and 17 in the course of corticosteroid synthesis was relatively deficient. Author

N85-21936# Joint Publications Research Service, Arlington, Va.
COMPARATIVE ANALYSIS OF EFFECTS OF WEIGHTLESSNESS AND ITS MODELS ON VELOCITY AND STRENGTH PROPERTIES AND TONE OF HUMAN SKELETAL MUSCLES
I. R. KOZLOVSKAYA, L. S. GRIGORYEVA, and G. I. GEVLICH *In its* USSR Rept: Space Biol. and Aerospace Med., Vol. 18, No. 6, Nov. - Dec. 1984 (JPRS-USB-85-002) p 28-33 21 Feb. 1985 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 6, Nov. - Dec. 1984 p 22-26
Avail: NTIS HC A08

The effect of various types of support elimination (actual zero-g, water immersion and head-down tilt) on the strength-velocity properties and tone of leg muscles was investigated. With all the exposures used, there was a high correlation between the tone decrease and the strength potential of antigravitational muscles, as well as the degree of support elimination (immersion and bed rest). This suggests that the tonic changes associated with the decrease of the support in input are the major factor responsible for motor disorders during short-term exposures to zero-g.
Author

N85-21937# Joint Publications Research Service, Arlington, Va.
COSMONAUTS' BLOOD PLASMA FREE AMINO ACID LEVELS DURING PREFLIGHT TRAINING
T. F. VLASOVA, Y. B. MIROSHNIKOVA, I. N. BELOZEROVA, and A. S. USHAKOV *In its* USSR Rept: Space Biol. and Aerospace Med., Vol. 18, No. 6, Nov. - Dec. 1984 (JPRS-USB-85-002) p 34-37 21 Feb. 1985 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 6, Nov. - Oct. 1984 p 26-28
Avail: NTIS HC A08

Taking into consideration metabolic specificities of cosmonauts, the data on their amino acid composition during preflight training were summarized. Seasonal variations produced no effect on the content of free amino acids of plasma. The analysis yielded a physiological norm for this population which can be used to identify more reliably changes in the amino acid composition of plasma after space flight. Author

N85-21939# Joint Publications Research Service, Arlington, Va.
MAIN COMPONENT METHOD USED TO STUDY VARIATIONS OF CARDIOVASCULAR PARAMETERS
A. D. VOSKRESENSKIY, N. I. VIKHROV, A. P. VARNASHENKO, V. G. DOROSHEV, Z. A. KIRILLOVA, M. A. MATROSOVA, and S. L. CHEKANOVA *In its* USSR Rept: Space Biol. and Aerospace Med., Vol. 18, No. 6, Nov. - Dec. 1984 (JPRS-USB-85-002) p 45-50 21 Feb. 1985 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 6, Nov. - Dec. 1984 p 33-37
Avail: NTIS HC A08

The main component method was used to analyze measurements of cardiovascular parameters taken in 14 healthy operators at rest. Each observation was characterized by the deviation of heart rate, mean blood pressure and stroke volume from individual data points. The latter were individual mean values of the above parameters recorded during the Valsalva maneuver. The first two main components were responsible for over 77% of total variance of signs. Visual analysis of observation distribution with respect to the components revealed small group and single data points situated peripherally at a distance from the major constellation of data points. Two thirds of data points in the stressed groups are associated with the subjects who show a weak reaction to the Valsalva maneuver and one third corresponds to the true stressed state. Taking into account the Valsalva maneuver, the deviations from individual data points can be used to identify the stressed state of the cardiovascular system in healthy men at rest. Author

N85-21941# Joint Publications Research Service, Arlington, Va.
HUMAN LUNG FLUID CONTENT DURING 7-DAY HEAD-DOWN TILT
E. M. NIKOLAYENKO, V. Y. KATKOW, S. V. GVOZDEV, V. V. CHESTUKHIN, M. I. VOLKOVA, M. I. BERKOVSKAYA, and T. G. KEDIYA *In its* USSR Rept: Space Biol. and Aerospace Med., Vol. 18, No. 6, Nov. - Dec. 1984 (JPRS-USB-85-002) p 55-60 21 Feb. 1985 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 6, Nov. - Dec. 1984 p 40-44
Avail: NTIS HC A08

The time course variation of the water content of the lungs of seven males were examined during 7 day head down tilt. Compared to the horizontal subjects, the tilted subjects showed a significant increase in the water content from 557-19 m to 612-63 m by the seventh hour of the tilt. Later on the parameter gradually declined and on tilt day 7 almost returned to the pretest level, 567-46 m. The increase in the water content during the first hours of the exposure is attributed to the hydrostatic factors: higher pulmonary artery pressure and higher cardiac output. The increase in the water content on tilt days 3 to 7 is associated with changes in the permeability of lung capillaries, drainage function of the lymphatic system of the lungs and colloidal osmotic pressure in the perivascular space of the lungs. E.A.K.

N85-21945# Joint Publications Research Service, Arlington, Va.
PREVENTIVE EFFECT OF ACUTE HEAT FACTORS DURING HYPOKINESIA
V. I. SOBOLEVSKIY and V. P. PRAVOSUDOV *In its* USSR Rept: Space Biol. and Aerospace Med., Vol. 18, No. 6, Nov. - Dec. 1984 (JPRS-USB-85-002) p 83-88 21 Feb. 1985 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 6, Nov. - Dec. 1984 p 58-62
Avail: NTIS HC A08

Rat experiments showed that adaptation to acute thermal effects increases the functional ability of the heart and blood circulation. This results in an increased thermal tolerance and hypoxic resistance of the myocardium. The prophylactic effect of acute thermal exposures during hypokinesia is related to a significant reduction of the level of metabolic and functional changes in the heart and skeletal muscles during diminished motor activity. E.A.K.

N85-21948# Joint Publications Research Service, Arlington, Va.
EFFECT OF HIGH AMMONIA CONTENT IN CLOSED ENVIRONMENT ON SOME PARAMETERS OF HUMAN NITROGEN AND CARBOHYDRATE METABOLISM AGAINST BACKGROUND OF A CONTROLLED DIET
A. K. SIVUK, L. I. MOSYAKINA, N. A. MALEVSKAYA-MALEVICH, I. A. ULYANOVA, Y. A. SEDOVA, and A. N. KRAVCHUK *In its* USSR Rept: Space Biol. and Aerospace Med., Vol. 18, No. 6, Nov. - Dec. 1984 (JPRS-USB-85-002) p 100-105 21 Feb. 1985 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 6, Nov. - Dec. 1984 p 69-73
Avail: NTIS HC A08

Data on nitrogen and carbohydrate metabolism in men kept in an enclosed environment with a high ammonium content combined with a high temperature and humidity are presented. The toxic environmental effect manifests itself when the ammonium concentration increases up to 5 mg/cu m in combination with a high temperature and humidity level. During this period protein catabolism and negative nitrogen balance enhance. It is recommended that vitamins should be added to the diet used under the above conditions. E.A.K.

N85-21951# Joint Publications Research Service, Arlington, Va.
PARAMETERS OF CARBOHYDRATE METABOLISM AND BLOOD SERUM ENZYME ACTIVITY AFTER SHORT-TERM SPACEFLIGHTS
I. A. POPOVA, T. Y. DROZDOVA, and Y. G. VETROVA *In its* USSR Rept: Space Biol. and Aerospace Med., Vol. 18, No. 6, Nov. - Dec. 1984 (JPRS-USB-85-002) p 116-118 21 Feb. 1985 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 6, Nov. - Dec. 1984 p 78-79
Avail: NTIS HC A08

The preliminary results of biochemical tests made after each spaceflight constitute a complex picture of diverse and sometimes contradictory changes in most biochemical parameters of blood and urine, as compared to preflight values. The distinctive individual reactions of cosmonauts play some part in this. The patterns of reactions to brief weightlessness were assessed from statistical data attained from visiting missions (VM) of the Salyut-6 scientific space complex. B.W.

N85-21952# Joint Publications Research Service, Arlington, Va.
RESULTS OF SANITARY-MICROBIOLOGICAL STUDIES ABOARD COSMOS-1129 BIOSATELLITES
V. I. KOROLKOV, A. N. VIKTOROV, L. N. PETROVA, V. M. KNYAZEV, and K. V. STELINGOVSKIY *In its* USSR Rept: Space Biol. and Aerospace Med., Vol. 18, No. 6, Nov. - Dec. 1984 (JPRS-USB-85-002) p 119-122 21 Feb. 1985 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 6, Nov. - Dec. 1984 p 79-81
Avail: NTIS HC A08

The studies conducted aboard biological satellites of the Cosmos series were oriented toward investigation of mechanisms of changes in physiological functions of experimental animals under the effect of spaceflight factors. It is important to rule out any factors affecting the quality of these experiments, including the microbial one. For this reason, studies were made of the automicroflora of the integument of experimental animals (Wistar rats) and microflora of the environment aboard Cosmos-936 and Cosmos-1129 biosatellites, as well as mockups in order to obtain base data for development of special epidemic-control measure to assure the purity and accuracy of biological and physiological experiments. Information about the microbiological status of experimental animals is also necessary for a fuller evaluation of their functional state under spaceflight conditions. B.W.

N85-21953# Joint Publications Research Service, Arlington, Va.
DYNAMICS OF QUANTITATIVE AND QUALITATIVE CHANGES IN CONDITIONALLY PATHOGENIC MICROFLORA OF THE HUMAN INTESTINE DURING LONG-TERM HYPOKINESIA
N. A. POLIKARPOV and V. M. SHILOV *In its* USSR Rept: Space Biol. and Aerospace Med., Vol. 18, No. 6, Nov. - Dec. 1984 (JPRS-USB-85-002) p 123-126 21 Feb. 1985 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 6, Nov. - Dec. 1984 p 81-83
Avail: NTIS HC A08

It is known that spaceflight conditions could lead to change in both nonspecific resistance to infection and specific immunological reactivity. They can disrupt relative equilibrium in the composition of the human microbial cenosis. Conditional enterobacteria play an important part in the etiology of infectious diseases of man. The conditionally pathogenic microflora of the human intestine under antiorthostatic (head-down tilt) and long-term hypokinetic conditions were investigated. The results of studies are submitted of quantitative and species composition of conditionally pathogenic microflora of the intestine of subjects submitted to antiorthostatic hypokinesia (AOH) for 182 days. B.W.

N85-21955# Joint Publications Research Service, Arlington, Va.
EFFECT OF LONG-TERM REPEATED EXPOSURE TO HIGH-INTENSITY STATIONARY MAGNETIC FIELD ON ADRENOMEDULLARY ACTIVITY
L. V. KOKOREVA *In its* USSR Rept: Space Biol. and Aerospace Med., Vol. 18, No. 6, Nov. - Dec. 1984 (JPRS-USB-85-002) p 132-135 21 Feb. 1985 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 6, Nov. - Dec. 1984 p 86-87
Avail: NTIS HC A08

In the last few decades there has been noticeable expansion of the area of application of magnetic units, which has led to increase in number of workers who are regularly exposed to stationary magnetic fields (SMF) of medium and even high intensity. For this reason, it is necessary to investigate the distinctions of reactions, primarily of the body's adaptive systems, to regular exposure to SMF. There are indications in the literature of change in activity of the adrenosympathetic system and some morphological changes in the adrenal medulla under the effect of SMF. The dynamics of changes in catecholamine (CA) content of blood plasma and adrenal tissue during long-term regular exposure to SMF with induction of 1.6 T were investigated. B.W.

N85-21956# Joint Publications Research Service, Arlington, Va.
EFFECT OF STATIONARY MAGNETIC FIELD ON BLEEDING TIME
E. GORCHINSKAYA *In its* USSR Rept: Space Biol. and Aerospace Med., Vol. 18, No. 6, Nov. - Dec. 1984 (JPRS-USB-85-002) p 136-139 21 Feb. 1985 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 6, Nov. - Dec. 1984 p 87-89
Avail: NTIS HC A08

The geomagnetic field, being one of the basic physical environmental factors, determines the course and activity of physiological processes in man and animals. Modern industry generates zones of increased magnetic field intensity, in which it may be necessary for man to spend some time. The results of numerous experiments have proven that prolonged exposure to an exogenous magnetic field elicits hemostatic disturbances. The effect of a stationary magnetic field on bleeding time in guinea pigs was studied and the role of biological rhythms was assessed. B.W.

N85-21957# Joint Publications Research Service, Arlington, Va.
REVIEW OF US MANUAL OF CLINICAL AVIATION MEDICINE
A. A. GYURDZHIAN and V. F. TOKAREV *In its* USSR Rept: Space Biol. and Aerospace Med., Vol. 18, No. 6, Nov. - Dec. 1984 (JPRS-USB-85-002) p 140-145 21 Feb. 1985 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 6, Nov. - Dec. 1984 p 89-92
Avail: NTIS HC A08

The most frequent diseases of flight personnel that the aviation physician encounters are discussed. The effect of these diseases on flight work is investigated. The physician's tactics with regard to treatment and permission to fly in the light of the latest medical advances are reviewed. Data are submitted on diseases specific to flight personnel and course of different diseases in aviators as related to the distinctions of their work. There is a special place for questions of effects of different drugs and therapeutic methods on flight work. Appropriate recommendations are offered in each case. A brief history of clinical aviation medicine is given. B.W.

N85-21958# Joint Publications Research Service, Arlington, Va.
REVIEW OF US GUIDE ON MEDICATION AND FLYING
E. M. PANOVA and V. F. TOKAREV *In its* USSR Rept: Space Biol. and Aerospace Med., Vol. 18, No. 6, Nov. - Dec. 1984 (JPRS-USB-85-002) p 146-148 21 Feb. 1985 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 6, Nov. - Dec. 1984 p 92-93
Avail: NTIS HC A08

This guide is one of the first on pharmacotherapy for flight personnel and aviation physicians. Recommendations on questions of safety of intake of various drugs by pilots are provided. Basic information about more than 200 drugs that are either dispensed by prescription or without it is provided. The agents are classified according to their effects on inflight performance. The book lists agents (giving generic and patented names), describes the marked side-effects of each of them, lists indications for intake of agents and time required for their elimination. B.W.

N85-21959* National Aeronautics and Space Administration, Washington, D. C.
AEROSPACE MEDICINE AND BIOLOGY: A CONTINUING BIBLIOGRAPHY WITH INDEXES, SUPPLEMENT 267, JANUARY 1985
Jan. 1985 323 p
(NASA-SP-7011(267); NAS 1.21:7011(267)) Avail: NTIS HC $12.00 CSCL 06E

This publication is a cumulative index to the abstracts contained in the Supplements 255 through 266 of Aerospace Medicine and Biology: A Continuing Bibliography. It includes seven indexes--subject, personal author, corporate source, foreign technology, contract number, report number, and accession number. Author

N85-21960# Toronto Univ. (Ontario). Inst. for Aerospace Studies.
SOME INDIVIDUAL DIFFERENCES IN HUMAN RESPONSE TO INFRASOUND
D. S. NUSSBAUM and S. REINIS Jan. 1985 69 p refs
(UTIAS-282; ISSN-0082-5255) Avail: NTIS HC A04/MF A01

A review of literature describing the effects of very low frequency sound on humans revealed a controversy between authors claiming that infrasound is very harmful to humans and those claiming that infrasound cannot engender any subjective or objective symptoms. It is shown that these discrepancies may be explained by individual variability in response to low frequency sound. An experiment was performed to determine whether some individuals are uniquely sensitive to infrasound. Three acoustic conditions were employed. These consisted of a control (amplifier hum) condition and two 8 Hz infrasound conditions: a high distortion signal and a low distortion signal. Subjects were grouped by their subjective responses. No control subjects exposed to amplifier hum reported any adverse responses. The distribution of symptoms (headache and fatigue vs dizziness and nausea) between the high and low distortion groups was significantly different. In persons reporting symptoms, the higher level of harmonics was primarily associated with headache and fatigue, while reduction of harmonics primarily resulted in diziness and nausea. B.W.

N85-21961# Little (Arthur D.), Inc., Cambridge, Mass.
DETERMINATION OF TOXICITY OF COMBUSTION PRODUCTS OF HABITABILITY FOAMS CONCURRENTLY WITH FLAMMABILITY STUDIES OF THESE MATERIALS Final Report
Jun. 1984 71 p
(Contract N00167-84-C-0018)
(AD-A149647; DTNSRDC/SME-CR-19-84) Avail: NTIS HC A04/MF A01 CSCL 06T

A method for the quantitative evaluation of fire behavior including toxicity in a single apparatus was developed and subjected to preliminary evaluation. Using four test materials identified by the U.S. Navy, conditions of decomposition process were varied by changing the heat flux (20 kW/sq m and 80 kW/sq m), sample area, sample material, fire ventilation and total dilution of fire products . Toxicity was measured by bioassay using death as the animal response. Toxicity data were compared to test data obtained in the University of Pittsburgh test apparatus. Several possible indicators of toxicity were identified. These were fuel vapor concentration, dilution factor and concentration of pyrolyzate and CO. These might prove useful in material comparisons as well as in fire modeling developed for hazard evaluation. Order at relative potency for the four test materials was similar for each ranking system examined. Author (GRA)

N85-21962# Air Force Occupational and Environmental Health Lab., Brooks AFB, Tex.
THE MEDICAL RESULTS OF HUMAN EXPOSURES TO RADIO FREQUENCY RADIATION Summary Report
R. B. GRAHAM Dec. 1984 21 p
(AD-A149718; OEHL-85-029CV111ARA) Avail: NTIS HC A02/MF A01 CSCL 06E

This report is a summary of the USAF Air Force experience in the realm of accidental overexposures to radiofrequency radiation (RFR). It contains a brief history of the Air Force RFR protection program, some examples of accidents that have occurred, and an overview of the medical implications of those overexposures as we understand them today. GRA

N85-21963# School of Aerospace Medicine, Brooks AFB, Tex.
SECOND GENERATION USAFSAM (UNITED STATES AIR FORCE SCHOOL OF AEROSPACE MEDICINE) MICROPROCESSOR AUDIOMETER Final Report, 1 Oct. 1982 - 30 Jun. 1984
H. C. SUTHERLAND, JR. and R. DANFORD, JR. Nov. 1984 13 p
(Contract DA PROJ. 775-5)
(AD-A149938; USAFSAM-TR-84-40) Avail: NTIS HC A02/MF A01 CSCL 06E

Pure-tone air conduction thresholds obtained with the USAF School of Aerospace Medicine second generation microprocessor audiometer (MPA) were compared to those obtained using conventional manual audiometric technique. The MPA results are considered a suitable substitute for manual testing even though small significant differences did appear. The MPA was able to accept preliminary information including reference hearing levels from a keyboard or magnetic strip card, to calculate threshold shift and its significance, print a hard copy of results, store results on a magnetic strip card, and store results on magnetic tape in a cassette for transmittal to a central registry. Several troublesome malfunctions occurred that seemed to be inherent in fabricating dedicated hardware. Conclusions are that MPA audiometry could be of great value in a hearing conservation program, but it now appears that using off-the-shelf hardware would be a better approach than manufacturing dedicated equipment. GRA

N85-21964# State Univ. of New York, Buffalo. Dept. of Physiology.
HIGH PRESSURE ENVIRONMENTAL CONDITIONING SYSTEMS AND CHAMBER REHABILITATION Final Report, 1 Nov. 1975 - 1 Mar. 1983
H. RAHN and C. LUNDGREN 15 Nov. 1984 23 p
(Contract N00014-76-C-0472)
(AD-A150039) Avail: NTIS HC A02/MF A01 CSCL 06S

The physiological research performed under the Contract ranged from cellular function and membrane function to the performance of whole organisms under conditions relevant to the diver's situation. A study of ionic currents in the voltage-clamped squid axon exposed to helium pressures of up to 204 atmospheres has been performed. One study addressed the effects of pressure perse on sodium transport and ATPase activity in human erythrocytes. A major area of research initiated under this Contract is related to the effects of hydrostatic pressure differences on the chest and lungs of a diver. Several studies addressed pulmonary gas exchange related to gas-phase diffusivity and gas flow resistance. High Pressure Environmental Conditioning Systems and Chamber Rehabilitation were also studied. GRA

N85-21965# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md. Applied Physics Lab.
A STUDY OF LOW-LEVEL LASER RETINAL DAMAGE Annual Progress Report, 1 Jan. - 31 Dec. 1984
B. F. HOCHHEIMER 15 Jan. 1985 78 p
(Contract N00024-83-C-5301)
(AD-A150046; JHU/APL/RC-RCS-044) Avail: NTIS HC A05/MF A01 CSCL 06R

The general objective of this program is to determine the retinal reflectivity of the retina. The diffuse retinal reflectivity of 25 animals has been measured from a wide variety of species. An artificial eye, with a Kodak White Reflectance Standard as an artificial retina, is used as a reference. The artificial eye has a focal length of 25 mm. This white surface has known reflectance characteristics, almost 100%, and is claimed to be perfectly diffuse. The energy from the animal retina is divided by the energy from the artificial retina (at the same wavelength) to remove spectral variation in light level, instrument transmission, and detector sensitivity. GRA

N85-21966# Oak Ridge National Lab., Tenn. Biology Div.
CHEMICAL CHARACTERIZATION AND TOXICOLOGIC EVALUATION OF AIRBORNE MIXTURES. INHALATION TOXICOLOGY OF DIESEL FUEL OBSCURANT AEROSOL IN SPRAGUE-DAWLEY RATS. PHASE 3. SUBCHRONIC EXPOSURES Final Report, 1979 - 1983
S. LOCK, W. DALBEY, R. SCHMOYER, and R. GRIESEMER May 1984 85 p Sponsored in part by Army Medical Research and Development Command
(AD-A150100; ORNL/TM-9403) Avail: NTIS HC A05/MF A01 CSCL 06T

Inhalation exposures were performed twice per week, for 13 weeks, to determine whether there was any potential toxicity to rats of comparatively low concentrations of a condensation aerosol from diesel fuel. Animals were divided into 4 groups (24 per sex in each group) and exposed to aerosol concentrations of 0, 0.25, 0.75 and 1.50 mg diesel fuel aerosol/L for 4 hours per day. A fifth group (12 per sex) was used as vivarium controls. Body weight and food consumption were measured weekly for duration of the exposure and also during a two month recovery period. Changes in breathing frequency and the response of animals to a loud sharp sound (startle response) were measured in selected animals prior to the start of the exposures, at various time points during the thirteen week exposure period, and at monthly intervals during the recovery period. Assays were performed on selected animals at the end of the exposure period, and again after the two month recovery period. Endpoints included pulmonary function tests, numbers of alveolar free cells, clinical chemistry, hematology, organ weights and histopathology. No mortalities were recorded during the exposure or recovery periods. GRA

N85-21967# Northeastern Univ., Boston, Mass. Dept. of Electrical Engineering.
APPLICATION OF THE SYSTEM IDENTIFICATION TECHNIQUE TO GOAL-DIRECTED SACCADES Final Report, 1 Jun. 1983 - 31 May 1984
J. D. ENDERLE 30 Jul. 1984 95 p
(Contract AF-AFOSR-0187-83)
(AD-A150132; AFOSR-84-1212TR) Avail: NTIS HC A05/MF A01 CSCL 06P

Saccadic eye movements are among the fastest voluntary muscle movements the human body is capable of producing and are characterized by a rapid shift of gaze from one point of fixation to another. Although the purpose for such an eye movement is obvious (that is, to quickly redirect the eyeball to the target), the neuronal control strategy is not. The present investigation utilizes system identification techniques to estimate muscle forces during horizontal saccadic eye movements in order to better understand the neuronal control strategy. The lateral and medial rectus muscle of each eye was modeled as a parallel combination of an active state tension generator with a viscosity and elastic element, connected to a series elastic element. The eyeball was modeled as a sphere connected to a viscosity and elastic element. The predictions of the model were shown to be in good agreement with the data. The results of extensive analysis did not support the existence of a postulated continuous-time external feedback control mechanism. Analysis of the data, however, did support a time optimal control strategy, a strategy which directs the eyeball to its destination in minimum time for saccades of all sizes. GRA

N85-21968# Research Inst. of National Defence, Stockholm (Sweden). Human Studies Dept.
BIOLOGICAL EFFECTS OF BLAST AND IMPACT WAVES
B. SCHANTZ Sep. 1984 79 p refs In SWEDISH; ENGLISH summary Proc. of Res. Meeting, 3-4 Jan. 1984
(FOA-C-52006-H4-D7; ISSN-0347-7665) Avail: NTIS HC A05/MF A01

Blast wave and impact physics, and effects on exposed tissues and organs are discussed. Lungs, central nervous, and gastrointestinal systems; and effect of impact waves on isolated cell structures were studied. Results of an experimental study on pigs exposed to blast waves from different sources are reported and the causes of death are analyzed. Author (ESA)

N85-21969# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
THE CLINICAL AND BIOMEDICAL EVALUATION OF TRAUMA AND FATALITIES ASSOCIATED WITH AIRCREW EJECTION AND CRASH. A WORKING GROUP REPORT
D. J. ANTON, ed. (Royal Air Force, Farnborough, England) Loughton, England Dec. 1984 79 p refs
(AGARD-AR-194; ISBN-92-835-1483-1) Avail: NTIS HC A05/MF A01

Topics covered include aerospace medicine, aircraft ejection and crash, head and neck injuries, radiological assessment of cervical injury; post mortem procedures; and clinical and biological evaluations of trauma and fatalities.

N85-21970# Royal Air Force, London (England).
INTRODUCTION: THE CLINICAL AND BIOMEDICAL EVALUATION FOR TRAUMA AND FATALITIES ASSOCIATED WITH AIRCREW EJECTION AND CRASH
In AGARD Rept. on the Working Group on the Clinical and Biomedical Evaluation of Trauma and Fatalities Associated with Aircrew Ejection and Crash p 1-2 Dec. 1984 refs
Avail: NTIS HC A05/MF A01

Existing records suffer from major sources of error that make them unreliable for the generation of useful statistical ejection injury information. There is little reliable evidence to suggest that head and neck injury is a significant hazard of within envelope ejections on modern escape systems. Some evidence exists to suggest that failure to ensure adequate man/seat separation and optimal parachute alignment is responsible for a significant proportion of the severe and fatal injuries that have occurred. A prospective study on two areas was suggested: protocols on clinical and radiological information and post mortem procedures. B.G.

N85-21971# French Air Force, Paris.
STATISTICS OF FRENCH ARMEE DE L'AIR EJECTIONS 1970 - 1980
In AGARD Rept. on the Working Group on the Clinical and Biomedical Evaluation of Trauma and Fatalities Associated with Aircrew Ejection and Crash p 3-5 Dec. 1984 refs
Avail: NTIS HC A05/MF A01

A statistical analysis of aircraft ejections classified by airspeed and altitude is presented. Fatalities are listed by aircraft type, flight status, altitude, airspeed, helmet status, and sequence of ejection. B.G.

N85-21972# German Air Force, Fuerstenfeldbruk (West Germany).
LIST OF HEAD/NECK INJURY ON EJECTION IN THE GERMAN ARMED FORCES FROM 1972-1981
In AGARD Rept. on the Working Group on the Clinical and Biomedical Evaluation of Trauma and Fatalities Associated with Aircrew Ejection and Crash p 6-10 Dec. 1984 refs
Avail: NTIS HC A05/MF A01

Injuries and fatalities are listed according to date, aircraft type, ejection seat type, handle (upper/lower), head/neck injuries, other injuries, and injury cause. The two fatalities are discussed in detail to understand the mechanisms involved. B.G.

N85-21973# Department of the Navy, Washington, D. C.
A REVIEW OF NECK INJURY AND IMPAIRED CONSCIOUSNESS ASSOCIATED WITH US NAVY EJECTIONS 1 JANUARY 1969 - 31 DECEMBER 1979
In AGARD Rept. on the Working Group on the Clinical and Biomedical Evaluation of Trauma and Fatalities Associated with Aircrew Ejection and Crash p 11-16 Dec. 1984
Avail: NTIS HC A05/MF A01

Over the past decade major attention was focused on developing information concerning the casual mechanisms of injuries reported sustained by ejectees. Of particular interest was injury to the head, neck, and cervical spine. Injury to either of these parts and the resulting impairment of physical function and/or consciousness can sometimes result in death directly or contribute to a fatal outcome as result of the ejectee's inability to assist in his survival. In order to establish the scope of the problem, US Navy ejection data covering the period 1 January 1969 through 31 December 1979 were reviewed. Author

N85-21974# Department of the Air Force, Washington, D.C.
A REVIEW OF FATALITY, IMPAIRMENT OF CONSCIOUSNESS, AND HEAD/NECK INJURY ON USAF EJECTIONS 1971 - JULY 1983
In AGARD Rept. of the Working Group on the Clinical and Biomedical Evaluation of Trauma and Fatalities Associated with Aircrew Ejection and Crash p 17-21 Dec. 1984
Avail: NTIS HC A05/MF A01

With the increasing speed of USAF high performance aircraft (HPA) and the ever more complex maneuvering environment, a great deal of attention is now being paid to the improvement of escape systems. Of special interest was injury to the head, neck and cervical spine. Nine hundred and fifty ejections from USAF aircraft that occurred during the period 1 January 1971 to mid-July 1983 are reviewed. The purpose is to present the USAF data in a form similar to that presented by the Royal Air Force (RAF) in AEG Report No. 476. Author

N85-21975# Royal Air Force, London (England).
A REVIEW OF FATALITY, IMPAIRMENT OF CONSCIOUSNESS AND HEAD AND NECK INJURY ON ROYAL AIR FORCE EJECTIONS 1968-1981
In AGARD Rept. on the Working Group on the Clinical and Biomedical Evaluation of Trauma and Fatalities Associated with Aircrew Ejection and Crash p 22-33 Dec. 1984 refs
Avail: NTIS HC A05/MF A01

With the increasing refinement of escape systems, heightened attention was paid to the problems of incapacitation and head and neck injury on ejection. Two hundred and thirty seven peacetime, voluntarily initiated, ejections on Martin Baker escape systems, that occurred during the period 1 January 1968 to 31 December 1981 are reviewed. All ejections proceeded to full parachute deployment. Eight fatalities occurred; seven over water and one over land. Six cases of impairment of consciousness were reported and three cases of neck injury. Author

N85-21976# French Air Force, Paris.
THE CLINICAL AND RADIOLOGICAL ASSESSMENT OF CERVICAL INJURY, ANNEX A
In AGARD Rept. on the Working Group on the Clinical and Biomedical Evaluation of Trauma and Fatalities Associated with Aircrew Ejection and Crash p 34-66 Dec. 1984 refs
Avail: NTIS HC A05/MF A01

The cervical spine is the most mobile portion of the spine. During trauma, this mobility is compounded by inertia forces at the skull and the presence of the spinal cord, which is less well protected here than in other portions of the spine. Injuries following ejection would seem to be unusual, but when they do occur may take a variety of forms: fracture dislocations, dislocations, severe strains. If these lesions are unstable, dramatic neurological complications may occur immediately or after some delay. The task of identifying factors of instability of a cervical lesion falls to the radiological examination. It should be recalled that radiological exploration of the whole spine, segment by segment, of any

survivors is obligatory in the Armee de l'Air Francaise (French Air Force), following ejection or any accident involving the flight deck. The radiological examination of the cervical spine is difficult; it is based on the findings of the clinical examination of the subject and the plates are difficult to interpret. The initial radiological methods and incidences used (routine plates, tomograms and sometimes dynamic radiography) are considered. The more demanding secondary examinations, such as the scanner, myelogram or angiogram are not discussed. Author

N85-21977# German Air Force, Fuerstenfeldbruk (West Germany).
HEAD/NECK INJURY: POST MORTEM PROCEDURES, ANNEX B
In AGARD Rept. on the Working Group on the Clinical and Biomedical Evaluation of Trauma and Fatalities Associated with Aircrew Ejection and Crash p 67-68 Dec. 1984 refs
Avail: NTIS HC A05/MF A01

Post mortem procedures discussed include: (1) field investigation after fatal ejection; (2) autopsy; and (3) histological examination. B.G.

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BEHAVIORAL SCIENCES

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

A85-26432#
A VISUAL CUEING MODEL FOR TERRAIN-FOLLOWING APPLICATIONS
G. L. ZACHARIAS, A. K. CAGLAYAN (Charles River Analytics, Inc., Cambridge, MA), and J. B. SINACORI (John B. Sinacori Associates, Hollister, CA) (Flight Simulation Technologies Conference, Niagara Falls, NY, June 13-15, 1983, Collection of Technical Papers, p. 35-43) Journal of Guidance, Control, and Dynamics (ISSN 0731-5090), vol. 8, Mar.-Apr. 1985, p. 201-207. Previously cited in issue 16, p. 2401, Accession no. A83-36208. refs
(Contract F33615-81-C-0515)

A85-26672
THE EFFECTS OF TASK PERFORMANCE ON OCULAR ACCOMMODATION AND PERCEIVED SIZE
V. J. GAWRON (Calspan Advanced Technology Center, Buffalo, NY), K. R. PAAP (New Mexico State University, Las Cruces, NM), and F. V. MALMSTROM (Boeing Aerospace Co., Seattle, WA) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 56, March 1985, p. 225-232. refs
(Contract AF-AFOSR-80-0024)

Experimental investigations were conducted to test the hypothesis that the performance of cognitive tasks tends to induce outward shifts in ocular accommodation and changes in perceived size. In the first study, 12 subjects performed a memory task while running, at rest, and with visual or auditory stimuli. In each test condition four size judgments were made and their mean accommodation was measured with an infrared optometer. In the second test, the accomodative states of 10 subjects were examined during 4 min of bed rest and during a backward-counting task. No reliable differences were found among the four test conditions in the first test, or between pre-experiment and post-experiment dark focus accommodation measurements. The difference observed in the second test between the mean accommodative state during the last minute of rest and task performance was found to approach statistical reliability. It is concluded that outward shifts in accommodation may be associated with the performance of tasks involving distant targets, such as predicting the positions of intruder aircraft. I.H.

A85-26673
PSYCHOLOGICAL DIFFERENCES NOTED IN AIRCREWMEMBERS UNDERGOING SYSTEMATIC DESENSITIZATION AND THEIR SUBSEQUENT FUNCTIONING
J. W. BENSON (U.S. Navy, Repatriated Prisoner of War Data Analysis Div., Pensacola, FL) and J. R. AITKEN (U.S. Navy, Naval Regional Medical Center, Camp Le Jeune, NC) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 56, March 1985, p. 238-241. refs

A85-27360
PHASE EFFECTS FOR A SINE WAVE MASKED BY REPRODUCIBLE NOISE
T. E. HANNA (Harvard University, Cambridge, MA; Indiana University, Bloomington, IN) and D. E. ROBINSON (Indiana University, Bloomington, IN) Acoustical Society of America, Journal (ISSN 0001-4966), vol. 77, March 1985, p. 1129-1140. refs
(Contract NSF BNS-77-17308)

A study which uses reproducible samples of noise to examine the effect of signal phase is discussed. In the first of two experiments, ten 150-ms samples of noise are used as maskers. The method of adjustment is used to measure the threshold of a 500-Hz tone which is either 20 or 100 ms in duration. The 100-ms signal is centered temporally in the noise burst while the 20-ms signal occurs at the beginning, center, or end of the noise burst. The starting phase of the signal varies from 0-315 deg in steps of 45 deg. The general form of the phase effect and the thresholds for particular samples of noise are predicted by an energy model. A vector description of the data reveals an invariant property of the noise, which is called the noise vector. It is shown that narrow-band filtering by the auditory system produces overlap and that temporal interactions due to overlap influence the observed phase effects. Bandwidth estimates from the energy model are 36, 36, and 52 Hz for three subjects. In the second experiment, a 32-ms masker is used and the signal is 20 ms in duration. The noise vectors measured differ from those obtained in the first experiment and are better predicted by the energy model. M.D.

A85-27361
STEPS IN LOUDNESS SUMMATION
B. E. MULLIGAN, M. L. FAUPEL (Georgia, University, Athens, GA), L. S. GOODMAN (U.S. Naval Aerospace Medical Center, Aerospace Medical Research Laboratory, Pensacola, FL), and D. P. GLEISNER (U.S. Navy, Human Factors Laboratory, Warminster, PA) Acoustical Society of America, Journal (ISSN 0001-4966), vol. 77, March 1985, p. 1141-1154. Research supported by the Essex Corporation, Eagle Technology, Inc., University of Georgia, and U.S. Navy. refs

Using a loudness-matching procedure in a series of experiments, the dependence of binaural loudness summation of the interaural phase of tones ranging between 250 and 1400 Hz is investigated. Loudnesses of monaural-binaural and binaural-binaural alternating tone pairs of the same frequency are matched by adjusting the amplitude of one of the two. The interaural phase angle of the binaural tone is varied over the range + or - 177 deg. A 3-dB step in loudness summation for each tone frequency is obtained in the vicinity of a constant value of the phase angle which depends on the Hornbostel-Wertheimer constant. Spatial interactions between tonal images are observed as the amplitude of the adjustable tone is varied. It is shown that the interactions covary with relative loudness in a complex manner, but exhibit qualitative changes in the vicinity of the phase angle. M.D.

A85-27522
COLOR VISION [TSVETOVOE ZRENIE]
E. N. SOKOLOV and CH. A. IZMAILOV Moscow, Izdatel'stvo Moskovskogo Universiteta, 1984, 176 p. In Russian. refs

A psychophysiological approach to the study of color perception is proposed. The approach incorporates the mathematical technique of multidimensional scaling in order to analyze the structure of subliminal differences between visual stimuli. The design principles of detection and information encoding components in a sensory analyzer are discussed within the

framework of mechanical models of color perception. The psychophysiological approach is used to study some specific problems of color perception, including the problem of discrimination between achromatic and chromatic signals in subjects with normal and abnormal color vision. I.H.

A85-27992*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
VISUAL SCANNING BEHAVIOR
R. L. HARRIS, SR. and A. A. SPADY, JR. (NASA, Langley Research Center, Hampton, VA) Institute of Electrical and Electronics Engineers, National Aerospace and Electronics Conference, Dayton, OH, May 20-24, 1985, Paper. 9 p. refs

This report summarizes the results and knowledge of scan behavior gained in various simulation and laboratory studies. Results were obtained through various analysis techniques such as real-time viewing of the pilot's scanning behavior and quantitative analysis of scan behavior performance parameters (average dwell time, dwell percentages, instrument transition paths, dwell histograms, and entropy rate measures). Pilot scan behavior is discussed in the following areas; scanning is a subconscious conditioned activity, scanning is situation dependent, pilots' scanning pattern is centered around a home base. Scanning behavior data have been shown to be useful in determining pilot's workload, evaluating pilot's strategy and role, determining the rate of information transfer of various displays, and aiding in pilot training. Author

A85-28024
BASIC PRINCIPLES OF THE DEVELOPMENT AND EXECUTION OF A SYSTEM FOR THE PSYCHOLOGICAL SELECTION OF MILITARY PERSONNEL [OSNOVNYE PRINTSIPY RAZRABOTKI SISTEMY PROFESSIONAL'NOGO PSIKHOLOGICHESKOGO OTBORA VOENNOSLUZHASHCHIKH I EGO PROVEDENIIA]
V. A. BODROV Voenno-Meditsinskii Zhurnal (ISSN 0026-9050), Sept. 1984, p. 41-43. In Russian.

A85-28620
THE USE OF FLIGHT SIMULATION TO ASSESS PILOT PERFORAMNCE AND MEASURED WORKLOAD
J. T. REHMANN (FAA, Washington, DC) IN: Summer Computer Simulation Conference, 15th, Vancouver, Canada, July 11-13, 1983, Proceedings. Volume 1 . La Jolla, CA, Society for Computer Simulation, 1983, p. 795-798.

The purpose of the research described in this paper is to assess pilot performance and measure workload under varying conditions associated with the use of four navigation systems. The systems under investigation were very high frequency omni-directional range (VOR), a VOR with distance measuring equipment (VOR/DME), a single waypoint storage area navigation (RNAV) system, and a multiple waypoint storage RNAV system. Eight multiengine-rated pilots, with an average flight time of 180 hours, flew with each type of equipment on two different routes, for a total of eight flights per pilot. All flights were conducted in the Federal Aviation Administration (FAA) Technical Center General Aviation Trainer Flight Simulation Facility. The cockpit of the simulator was configured as a Cessna 421 twin engine aircraft. The experimental design was a 2 by 4 factorial with repeated measures designed to minimize the effect of learning on the experimental factors by varying the order in which routes and navigation equipment were seen by the subjects. During the evaluation, both subjective and objective data were collected. Subjective data included pilots' assessment of their workload, an inflight performance evaluation by a flight observer, and a pilot postflight questionnaire. Objective measures collected included crosstrack error and workload rating delay. Data were subjected to an analysis of variance where appropriate and significant findings are discussed. Author

A85-29122
JUDGMENTS OF SIZE AND DISTANCE WITH IMAGING DISPLAYS
S. N. ROSCOE (New Mexico State University, Las Cruces, NM) Human Factors (ISSN 0018-7208), vol. 26, Dec. 1984, p. 617-629. Navy-supported research. refs

The application of computer-animated imagery analogous to a contact view from an airplane calls for a better understanding of the essential visual cues for spatial orientation. Such systems have application both as contact analog flight displays and as outside visual scenes for flight simulators. In either case, systematic errors in distance judgments are encountered that can be compensated for by magnifying objects in the animated scenes. Results of an experimental investigation of biased distance judgments with a projection periscope accounted for, but did not explain, a portion of the systematic error. The findings are discussed in relation to other unexplained experimental facts associated with size and distance judgments, including various optical illusions and the 'projection' of afterimages. Author

A85-29594
THE PROBLEM OF MONOTONY IN ATHLETICS AND ITS TREATMENT BY FUNCTIONAL MUSIC [PROBLEMA MONOTONNOSTI V SPORTE I EE PROFILAKTIKA SREDSTVAMI FUNKTSIONAL'NOI MUZYKI]
IU. G. KODZHASPIROV (Moskovskii Aviatsionnyi Institut, Moscow, USSR) Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), Nov. 1984, p. 23-25. In Russian. refs

A85-30150
LOWER THRESHOLDS OF MOTION FOR GRATINGS AS A FUNCTION OF ECCENTRICITY AND CONTRAST
A. JOHNSTON and M. J. WRIGHT (Brunel University, Uxbridge, Middx., England) Vision Research (ISSN 0042-6989), vol. 25, no. 2, 1985, p. 179-185. Sponsorship: Medical Research Council. refs
(Contract MRC-G979/1106/N)

The lower threshold for motion (LTM) of gratings was investigated as a function of position in the visual field, spatial frequency and contrast, and motion thresholds for sine wave and square wave luminance profiles were compared. For contrasts below 0.05, the lower threshold for motion was raised; the increase in threshold being dependent upon spatial frequency. At contrast levels above 0.05, LTM was found to be a constant velocity at any given spatial location but increased with eccentricity of view. Raised threshold for motion at eccentric locations could be compensated by increasing the size of eccentric gratings in proportion to 1/M, where M is the cortical magnification factor, a procedure which standardizes the cortical representation at differing eccentricities. Thus LTM could be expressed as a constant cortical velocity for grating contrasts above 0.05 at all stimulus locations investigated. The data are interpreted as support for a ratio model of velocity coding. Author

N85-20664# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
A METHOD FOR REDUCTION OF AMBIGUITY IN SEGMENTATION OF IMAGES M.S. Thesis - Aug. 1984 [UM METODO PARA REDUCAO DE AMBIGUIDADE EM SEGMENTACAO DE IMAGENS]
F. A. A. MOTA Jan. 1985 110 p refs In PORTUGUESE; ENGLISH summary
(INPE-3394-TDL/186) Avail: NTIS HC A06/MF A01

Nowadays, in the development of automatic systems of visual perception, a set of phases that characterize the computational modelling of the perceptive process are distinguished. During the segmentation and interpretation phases, besides the compromise regarding the elimination of inconsistencies, there appears the ambiguity problem. An approach is proposed to deal with those questions, in the level of the identification of the object, using the semantic relationships and iterated parallel operations (relaxation operations) upon a discrete model that labels segments (labelled graphs). It is intended to reduce to the maximum the ambiguity

through a single process of successive elimination, instead of a process for each possible segmentation. The work is based mainly in the algebraic characterization of the relaxation operator and in the formal treatment, through discrete algebra, which puts into evidence its computational validity. R.J.F.

N85-20665# Air Force Human Resources Lab., Brooks AFB, Tex.
CLOSE AIR SUPPORT MISSION: DEVELOPMENT OF A UNITARY MEASURE OF PILOT PERFORMANCE Interim Report, Feb. - Jul. 1984
G. S. THOMAS Nov. 1984 22 p
(Contract AF PROJ. 1123)
(AD-A149285; AFHRL-TR-84-39) Avail: NTIS HC A02/MF A01 CSCL 05I

This effort demonstrated the feasibility of combining components of the Close Air Support (CAS) mission in a valid composite measure of pilot performance. Combat-ready, A-10 aircraft pilots judged overall mission performance from outcomes typical of those obtained in the Advanced Simulator for Pilot Training (ASPT) based on pilot survival and the number and type of targets destroyed. A linear regression analysis of the judgments resulted in a mathematical formula that assigned differential values to the mission components. The formula was cross-validated using a separate group of A-10 pilots who judged performance for a different set of CAS mission outcomes. To test the sensitivity of the scoring algorithm to CAS training, data from a previous study on pilots trained in ASPT were reanalyzed using the formula. CAS performance, as calculated by the algorithm, improved significantly across training trials. This procedure for developing a unitary performance metric may be useful in other training research and development when a composite measure is desirable for evaluation purpose. GRA

N85-21938# Joint Publications Research Service, Arlington, Va.
LBNP TRAINING OF CREW MEMBERS ON MAIN MISSIONS ABOARD SALYUT-6 ORBITAL STATION
V. M. MIKHAYLOV, Y. D. POMETOV, and V. A. ANDRETSOV *In its* USSR Rept: Space Biol. and Aerospace Med., Vol. 18, No. 6, Nov. - Dec. 1984 (JPRS-USB-85-002) p 38-44 21 Feb. 1985 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 6, Nov. - Dec. 1984 p 29-33
Avail: NTIS HC A08

The protcols of LBNP training of five prime crews that flew onboard Salyut-6 are described. LBNP is one of the major constituents of countermeasures that must be performed inflight. LBNP may help adapt to weightlessness-induced blood redistribution and predict the level of postflight orthostatic tolerance. Author

N85-21940# Joint Publications Research Service, Arlington, Va.
ROLE OF MENTAL WORK IN HUMAN TOLERANCE IN TOTAL-BODY VIBRATION
Y. N. KAMENSKIY *In its* USSR Rept: Space Biol. and Aerospace Med., Vol. 18, No. 6, Nov. - Dec. 1984 (JPRS-USB-85-002) p 51-54 21 Feb. 1985 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 6, Nov. - Dec. 1984 p 37-40
Avail: NTIS HC A08

The connection between mental work and human reaction to vibration was investigated. Phasic changes of psychophysiological parameters developed in response to vibration of 10 Hz and acceleration of 1 m/s squared for 1 h. All psychophysiological parameters significantly decreased. Circulation parameters tended to decline during exposure. The psychophysiological changes were less expressed in the test subjects normally involved in mental work. It is suggested that workers who perform mental work have a higher tolerance to vibration effects. E.A.K.

N85-21978# Advanced Research Resources Organization, Bethesda, Md.
TEAM DIMENSIONS: THEIR IDENTITY, THEIR MEASUREMENT AND THEIR RELATIONSHIPS Final Research Note
V. F. NIEVA, E. A. FLEISHMAN, and A. RIECK Jan. 1985 101 p
(Contract DAHC19-78-C-0001)
(AD-A149662; ARI-RN-85-12) Avail: NTIS HC A06/MF A01 CSCL 05J

This report represents the initial phase of a programmatic effort aimed at answering basic questions about the nature of team performance and the factors affecting it. An extensive literature review on the relationships between various team or group characteristics and collective performance was conducted, and a summary of propositions derived from this literature is presented. In addition, a new conceptualization of team performance is proposed, and a provisional taxonomy of team performance dimensions consistent with this conceptualization is presented. GRA

N85-21979# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
CHOICE REACTION TIME AND COLOR: AN ANNOTATED BIBLIOGRAPHY Technical Report, Jan. 1983 - Jan. 1984
S. KELLY Aug. 1984 92 p
(AD-A149722; AFAMRL-TR-84-022) Avail: NTIS HC A05/MF A01 CSCL 05J

This bibliography includes abstracts of 59 studies and review articles which are related to the effect of color coding on choice reaction time. As color displays become more widely used for information gathering and decision-making tasks, the effect of color coding on these tasks and their components will become increasingly important design considerations. Choice reaction time, the time required to make a binary choice, affects the total execution time of many decision-making and information gathering tasks, and seems to be a particularly relevant measure of effectiveness of color coding. This bibliography draws together much of the current literature, for reference by human factors researchers and systems designers. Two techniques lend themselves to measurement of choice reaction time: the Sternberg paradigm and the Within-Task Subtractive Method. GRA

N85-21980# Carnegie-Mellon Univ., Pittsburgh, Pa. Robotics Inst.
HUMAN ASSEMBLY TIME VERSUS LEVELS OF VISUAL AND TACTILE SENSORY INPUT: EXPERIMENTAL RESULTS FOR FIVE DEVICES Interim Report
S. M. MILLER Sep. 1984 78 p
(AD-A149982; CMU-RI-TR-84-22) Avail: NTIS HC A05/MF A01 CSCL 06P

Results are reported of laboratory experiments where levels of visual and tactile sensory input of human subjects are controlled and time required to assemble several types of devices is measured. There is an inverse relationship between the time to assemble a device and the amount of sensory input available to the subject. The results indicate that different types of assembly tasks require different types and amounts off sensory information processing. Another result is that the impact of a change in the level of tactile sensory input on assembly time depends on the available level of visual sensory input, and the nature of the interaction between visual and tactile information varies across the different assembly tasks. An analysis of the extent to which elemental manipulative subtasks (as categorized by the Methods Time Measurement System) are affected by changes in the level of visual and tactile sensory information is presented. Results are also reported of experiments where the levels of visual input and manipulative capability of human subjects are controlled. Originator-supplied key words include: Experimental design. GRA

N85-21981# New York Academy of Sciences, N. Y.
ANNALS OF THE NEW YORK ACADEMY OF SCIENCES, VOLUME 423
J. GIBBON and L. ALLAN 13 May 1984 661 p Presented at the Timing and Time Perception Conf., New York, 10-13 May 1983
(Contract N00014-84-G-0130)
(AD-A150031) Avail: NTIS HC A99/MF A01 CSCL 05J

This volume is the result of a conference on Timing and Time Perception, held on May 10-13 1983, by the New York Academy of Sciences. Major topics include: Time Perception; Timing of Motor Programs and Temporal Patterns; Timing in Cognitive Processing and Memory; Rhythmic Patterns and Music; and The Internal Clock. GRA

N85-21982# Federal Aviation Administration, Washington, D.C. Office of Aviation Safety.
PROCEEDINGS OF THE 6TH HUMAN FACTORS WORKSHOP ON AVIATION
May 1982 229 p Proc. held in Oklahoma City, 7-9 Jul. 1981
(AD-A150043; FAA-ASF-81-8; DOT-TSC-FAA-81-21) Avail: NTIS HC A11/MF A01 CSCL 05E

The human elements discussed must be factored into the aviation maintenance assumptions and operators programs. All too often in the past when the probable cause of an accident or incident was identified as a human error in maintenance, that was the end of it. In the next two days, we'd like to take it a step further, not necessarily by coming up with any answer or drawing any fixations on any conclusions, but to try to identify the central issues that relate to the human factor in aviation maintenance. GRA

N85-21983# Research Inst. of National Defence, Stockholm (Sweden). Dept. 2.
THE ACCURACY IN CALCULATIONS OF INTERVISIBILITY WITH DIGITAL TERRAIN MODELS
A. WELLVING and L. ERIKSSON Oct. 1984 37 p refs In SWEDISH; ENGLISH summary
(FOA-C-20557-D8(E1); ISSN-0347-3694) Avail: NTIS HC A03/MF A01

Two computation models for measuring target exposure distances and line-of-sight on the battlefield were compared. One model stores elevation and forest height in a regular 50 m grid net. The other includes more details for describing the vegetation, and therefore the computation requires more time. Comparison with field surveys shows that both models have an unsatisfactory accuracy in the calculation of exposure distances, but the latter is significantly better than the former. The lines-of-sight are however calculated with acceptable accuracy in both models. The terrain was a mixture of open flat areas and hills with forest. Author (ESA)

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MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

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

A85-26669
THE EFFECT OF THE UK AIRCREW CHEMICAL DEFENCE ASSEMBLY ON THERMAL STRAIN
R. THORNTON (Ministry of Defence /Army/, Army Air Corps Centre, Stockbridge; RAF, Institute of Aviation Medicine, Farnborough, Hants., England), G. A. BROWN, and P. J. REDMAN (RAF, Institute of Aviation Medicine, Farnborough, Hants., England) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 56, March 1985, p. 208-211. refs

The thermal strain imposed on helicopter air crews by chemical protective clothing (NBC) in summer has been determined experimentally. The environmental conditions used in the experiment consisted of a dry bulb temperature of 35 C, and a wet bulb temperature of 19 C. The wind speed was 2.0 meters/sec. It is found that the NBC equipment imposed a significant thermal strain on the crewman when compared with standard summer flying clothing, but not on the pilot whose tasks involve lower energy expenditures. Deep body temperature exceeded 37.6 C and a significant degree of dehydration (1 percent of body weight) was also observed. It is recommended on the basis of the experimental data that the only practical way of preventing thermal strain in helicopter crewmen in NBC clothing is to provide personal air conditioning systems. I.H.

A85-26674* Texas Univ., Houston.
DEHYDROHALOGENATION OF ATMOSPHERIC CONTAMINANTS IN THE SPACE CABIN
M. A. SPAIN (Texas, University, Houston, TX), B. S. MIDDLEDITCH, D. A. BAFUS, and T. GALEN (Northrop Services, Inc., Houston, TX) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 56, March 1985, p. 262-264. NASA-supported research. refs

A total of nine chlorinated ethanes and ethenes were circulated over lithium hydroxide in a laboratory scale closed system simulator. System volume and lithium hydroxide temperature were varied from that intended to maximize possible reactions to conditions approximating those of a space cabin environment. Of the nine compounds tested, seven were found to be dehydrohalogenated (viz., loss of hydrogen chloride) in the course of one or more experimental treatments. Of particular significance was the conversion of 1,2-dichloroethane to chloroethene, a known carcinogen, and of trichloroethene to dichloroethyne, a highly toxic substance. It is therefore concluded that a potentially hazardous situation exists for the inhabitants of closed ecological systems such as spacecraft, one for which precautions must continue to be taken. Author

A85-26799
COLORGRAPHICS/TOUCH PANEL ATE OPERATOR INTERFACE
T. CONQUEST (Rockwell International Corp., Government Avionics Div., Cedar Rapids, IA) IN: AUTOTESTCON '83; Proceedings of the Conference, Fort Worth, TX, November 1-3, 1983 . New York, Institute of Electrical and Electronics Engineers, Inc., 1983, p. 182-185.

The advantages provided by the use of the combination of a color graphic display with a touch panel overlay as the human interface in automatic test systems are examined. These include increased operator-machine communication effectiveness, lower operator error rates, and lower required operator skill levels. The softkey concept allows operators to input data by pointing a finger, eliminating keyboards as a source of error in operator input. Application programming is simplified to automatically position

instructions and softkeys to predetermined areas of the display. Several testing applications make this type of operator interface an effective and versatile component in many automatic test systems. V.L.

A85-27180
THE HYGIENIC ASPECTS OF FORCE LOADS AND RECOMMENDATIONS FOR THEIR OPTIMIZATION IN THE DESIGN OF HAND-HELD POWER TOOLS [GIGIENICHESKAIA ZHACHIMOST' SILOVYKH NAGRUZOK I REKOMENDATSII PO IKH OPTIMIZATSII PRI PROEKTIROVANII RUCHNYKH MASHIN]
G. A. SUVOROV, E. I. DENISOV, E. S. ZIATIKOV, and V. G. OVAKIMOV (Akademiia Meditsinskikh Nauk SSSR, Institut Gigieny Truda i Profzabolevanii, Moscow, USSR) Gigiena Truda i Professional'nye Zabolevaniia (ISSN 0016-9919), Nov. 1984, p. 4-7. In Russian. refs

A85-27663
FACTORS AFFECTING HUMAN TOLERANCE TO SUSTAINED ACCELERATION
L. HREBIEN (U.S. Navy, Naval Air Development Center, Warminster, PA) and E. HENDLER (Human Factors Applications, Inc., Warminster, PA) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 56, Jan. 1985, p. 19-26. Navy-supported research.

Linear increases in G tolerance with increases in anti-G suit (AGS) bladder inflation pressure occurred when relaxed subjects were exposed to acceleration plateaus while riding a centrifuge and were either seated upright, (15 deg seat back angle or SBA) or supine (60 deg SBA). Supine G tolerance with AGS bladder inflation decreased as G onset time was increased by factors of two and four. Changing the mode of operation of a new servo-controlled anti-G valve regulating AGS bladder pressure had no effect on G tolerance nor on AGS comfort scores. Comfort was unaffected by G onset time and reduced with high AGS bladder pressures. Results support the hypotheses that G protection provided by simultaneously applied anti-G techniques is additive and that the simple hydrostatic model of the circulatory system can adequately account for AGS bladder pressure changes required for G protection when body position is changed. Author

A85-27664
MODELS TO PREDICT OPERATIONAL LOADS OF FLIGHT SCHEDULES
H. M. WEGMANN, S. HASENCLEVER, C. MICHEL, and S. TRUMBACH (Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Institut fuer Flugmedizin, Cologne, West Germany) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 56, Jan. 1985, p. 27-32. refs

Several concepts have been presented in the literature which have the potential to predict the operational load on aircrews during long-distance flights. They are briefly described and applied to a flight duty pattern actually scheduled for an airline route. For each model relative and absolute difficulty grades for the different segments of the pattern are evaluated and compared. Relative ranking results in an excellent agreement between the various models. Absolute classification into 'normal', 'heavy', and 'definitely severe' segments reveals less conformity. From our observations on this route, it is concluded that the index of Mohler's model reflects the most realistic load estimates. Finally, a new approach is introduced which considers duty period, night flying, number of transits, preceding layover time, and preceding time-zone transitions as those elements constituting a computable and essential part of the operational load. Author

A85-27665
THE EFFECTS OF MOISTURE ON MOLECULAR SIEVE OXYGEN CONCENTRATORS
K. G. IKELS and C. F. THEIS (USAF, School of Aerospace Medicine, Brooks AFB, TX) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 56, Jan. 1985, p. 33-36. refs

Molecular sieve oxygen generating systems are receiving extensive laboratory and flight evaluation. Assessment of the molecular system has generally been conducted in the laboratory using clean dry air. In aircraft, however, the molecular sieve generator is supplied with engine bleed air which may not always be totally free of contaminants and water. Recent studies using bed washout technics have shown that the molecular sieve units, with 50 percent of the beds deactivated with water, still function normally with respect to product gas flow and O2 concentration. By utilizing the technics described in this paper, the moisture content or state of hydration of the molecular sieve can readily be determined. Author

A85-27667
THE FLIGHT ACCEPTABILITY OF SOFT CONTACT LENSES - AN ENVIRONMENTAL TRIAL
D. H. BRENNAN and J. K. GIRVIN (Royal Air Force Institute of Aviation Medicine, Farnborough, Hants., England) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 56, Jan. 1985, p. 43-48.

Seventeen officer aircrew, wearing soft contact lenses, were subjected to adverse conditions likely to be encountered in military aviation. The stresses included hypoxia, rapid decompression, pressure breathing, vibration, climatic extremes, G forces, and the prolonged wearing of an aircrew respirator. Their visual performance wearing contact lenses under stress did not differ significantly from the control values; either when wearing corrective flying spectacles or contact lenses when not under stress. It is considered that from the environmental standpoint soft contact lenses are suitable for aircrew. As contact lenses may not be tolerated by all, and may cause undesirable side-effects in some, their use should be restricted to the aircrew to whom they offer the maximum advantages. The group most likely to benefit are young, well motivated myopes flying fast jets. Author

A85-27668
THE INFLUENCE OF CLOTHING ON HUMAN INTRATHORACIC PRESSURE DURING AIRBLAST
A. J. YOUNG, J. J. JAEGER, Y. Y. PHILLIPS, J. T. YELVERTON, and D. R. RICHMOND (U.S. Army, Walter Reed Army Institute of Research, Washington, DC; Lovelace Biomedical Environmental Research Institute, Albuquerque, NM) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 56, Jan. 1985, p. 49-53. refs

Exposure to airblast can result in injury to gas-containing organs including the ears and lungs. A number of factors have been identified which may be related to the occurrence and degree of airblast lung injury. Clemedson et al. (1971) have studied the influence of some protective devices on intrathoracic pressure (ITP) during airblast exposure. They found that while rigid protective devices (steel and lucite) covering the thorax reduced ITP and lessened lung injury, soft protective devices actually raised ITP and increased lung injury. The present study has the objective to evaluate the effect of four clothing ensembles on ITP in humans exposed to low-level short duration airblast. It was found that the field jacket, woven ballistic vest, ceramic vest, and a combination of the ballistic and ceramic vest do not lower the intrathoracic pressure of men exposed to simulated muzzle blast as compared to military fatigues alone. G.R.

A85-27977
ADVANCED VISUAL STIMULATION DEVICE USING MINIATURE TV RECEIVER
I. SAITO (Research Foundation on Traffic Medicine, Tokyo, Japan), K. MIZUMOTO, and M. ONO (Japan Air Self Defence Force, Tokyo, Japan) (International Astronautical Federation, International Astronautical Congress, 34th, Budapest, Hungary, Oct. 9-15, 1983) Japanese Journal of Aerospace and Environmental Medicine (ISSN 0387-0723), vol. 21, June 1984, p. 11-17. In Japanese, with abstract in English. refs

Four male subjects equipped with helmets supporting miniature television receivers placed in front of either eye were exposed to patterns while seated in a spatial orientation flight training simulator. The simulator was capable of rotating at 15 rpm in either direction and included a dark canopy which prevented the subjects from receiving external stimuli. Three types of patterns were projected: static lines and stripes moving L-R or R-L at a rate corresponding to motion at 15 rpm. All possible combinations of movement were examined and eye motions were monitored. Conflict between bodily and visual motion direction stimuli failed to lead to dizziness, disorientation and nausea observed by other experimenters, although variations in both phase and amplitude of the nystagmus were elicited. The data are concluded insufficient for confirming that optokinetic effects can stimulate motion sickness. M.S.K.

A85-28795
AN EXTENDED MODEL OF THE HUMAN VISUAL SYSTEM FOR THE SEGMENTATION OF IMAGE PRESENTATIONS AND THEIR CLASSIFICATION WITH THE AID OF LINEAR DISCRIMINANT FUNCTIONS [EIN ERWEITERTES MODELL DES VISUELLEN SYSTEMS DES MENSCHEN ZUR SEGMENTATION VON BILDVORLAGEN UND DEREN KLASSIFIKATION MIT HILFE LINEARER TRENNFUNKTIONEN]
M. WEGENER Hamburg, Hochschule der Bundeswehr, Fachbereich Elektrotechnik, Dr.-Ing. Dissertation, 1984, 220 p. In German. refs

Holla (1932) has considered complementary colors as two-dimensional characteristic in the case of a model of the first stages of the human visual system for the preprocessing of color image data. The present investigation is concerned with an extension of Holla's model on the basis of texture information processing. Two bandpass filters with different local frequency regions are employed to withdraw the texture information from the luminance extraction obtained as a result of the preprocessing of an image with Holla's model. In the two images generated with this procedure, the energy is calculated in the vicinity of each image point. The energy data together with color information are utilized for the segmentation and classification of the image objects. The color aerial photographs used in the studies contain the object classes open land, woodland, cultivated areas, and water resources. With one exception, the individual object classes can be distinguished on the basis of energy data. In the remaining case, a separation is possible with the aid of color information. G.R.

A85-29031
HEAT EXCHANGES IN WET SUITS
A. H. WOLFF, S. R. K. COLESHAW, C. G. NEWSTEAD, and W. R. KEATINGE (London Hospital Medical College, London, England) Journal of Applied Physiology (ISSN 0161-7567), vol. 58, March 1985, p. 770-777. Research supported by the Science and Engineering Research Council of England. refs

Flow of water under foam neoprene wet suits could halve insulation that the suits provided, even at rest in cold water. On the trunk conductance of this flow was about 6.6 at rest and 11.4 W/sq m C exercising; on the limbs, it was only 3.4 at rest and 5.8 W/sq m C exercising; but during vasoconstriction in the cold, skin temperatures on distal parts of limbs were lower than were those of the trunk, allowing adequate metabolic responses. In warm water, minor postural changes and movement made flow under suits much higher, about 60 on trunk and 30 W/sq m C on limbs, both at rest and at work. These changes in flow allowed for a wide range of water temperatures at which people could stabilize body temperature in any given suit, neither overheating when exercising nor cooling below 35 C when still. Even thin people with 4- or 7-mm suits covering the whole body could stabilize their body temperatures in water near 10 C in spite of cold vasodilatation. Equations to predict limits of water temperature for stability with various suits and fat thicknesses are given. Author

A85-29038
EVALUATION OF VAPOR PERMEATION THROUGH GARMENTS DURING EXERCISE
R. R. GONZALEZ (U.S. Army, Research Institute of Environmental Medicine, Natick; Harvard University, Boston, MA; Yale University, New Haven, CT) and K. CENA (McMaster University, Hamilton, Ontario, Canada; Yale University, New Haven, CT) Journal of Applied Physiology (ISSN 0161-7567), vol. 58, March 1985, p. 928-935. refs
(Contract PHS-OH-00836)

The utility of dew point sensors for measurements of vapor permeation efficacy in different types of clothing during exercise has been evaluated experimentally. In the experiments, male subjects performed cycle ergometer exercise at 31 percent of the maximal aerobic capacity wearing different combinations of athletic clothing. Esophageal temperature and skin temperature were measured at eight different sites, and heart rate was recorded continuously. Dew point sensors were used to record temperatures underneath the garments at ambient chest sites and at miscapular sites. The average effective water vapor permeation for the different combinations of clothing was calculated as a function of evaporative heat loss and local skin wetness. It is shown that the direct dew point recordings provide a more reliable estimate of true water vapor permeation than the method of Homer and Elnas (1981). The different recorded values for effective vapor permeation for the different combinations of garments are given in a table. I.H.

A85-29123
A VARIABLE-MEMORY MODEL OF VISUAL SEARCH
T. ARANI, M. H. KARWAN, and C. G. DRURY (New York, State University, Amherst, NY) Human Factors (ISSN 0018-7208), vol. 26, Dec. 1984, p. 631-639. refs

Previous models of visual search have hypothesized either a random search or a repeated systematic search strategy. Although both models reproduce well the cumulative search time distribution, F(t), neither fully accords with eye movement data. A new model is proposed in which search is intended to be systematic but suffers from imperfect memory. Systematic search is then a special case in which the memory is perfect, and random search a special case in which the memory is totally lacking. The model was derived for single and multiple occurrences of a single fault (or target) type. Where the model could be proved to be insoluble, a simulation model was used. Simulation results were compared with the previous calculations of Morawski, Drury, and Karwan (1980) and were shown to give identical results for pure random and pure systematic search. As the parameters of the memory model were varied, a family of curves between these extremes was produced. Author

A85-29865
POSSIBLE APPLICATIONS OF SIMULATORS IN VARIOUS AREAS [VALIDITA UZITI TRENAZERU V RUZNYCH OBORECH]
J. STIKAR and J. HOSKOVEC (Karcova Univerzita, Prague, Czechoslovakia) Zpravodaj VZLU (ISSN 0044-5355), no. 6, 1984, p. 357-360. In Czech.

The possibilities afforded by simulators for improving the efficiency of training in various areas are discussed, and various types of systems for simulating simple and complex skills are examined. It is noted that the use of simulators is particularly effective in areas where acquiring the necessary skills during actual operation is too dangerous, expensive, or difficult. Methods for evaluating the efficiency of simulators and assessing the acquired skills are presented. V.L.

N85-20666*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
ELBOW AND KNEE JOINT FOR HARD SPACE SUITS AND THE LIKE Patent Application
H. C. VYKUKAL, inventor (to NASA) 20 Dec. 1984 22 p
(NASA-CASE-ARC-11610-1; NAS 1.71:ARC-11610-1;
US-PATENT-APPL-SN-684190) Avail: NTIS HC A02/MF A01
CSCL 06K

An elbow or knee joint for a hard space suit or similar usage is formed of three serially-connected rigid sections which have truncated spherical configurations. The ends of each section form solid geometric angles, and the sections are interconnected by hermetically-sealed ball bearings. The outer two sections are fixed together for rotation in a direction opposite to rotation of the center section. A preferred means to make the outer sections track each other in rotation comprises a rotatable continuous bead chain which engages sockets circumferentially spaced on the facing sides of the outer races of the bearings. The joint has a single pivot point and the bearing axes are always contained in a single plane for any articulation of the joint. Thus flexure of the joint simulates the coplanar flexure of the knee or eblow and is not susceptible to lockup. NASA

N85-20667# Clarke Ambrose, Inc., Knoxville, Tenn.
MAN/MACHINE INTERFACE FOR A NUCLEAR CASK REMOTE HANDLING CONTROL STATION: SYSTEM DESIGN REQUIREMENTS
M. M. CLARKE, J. G. KREIFELDT, and J. V. DRAPER 9 Jul. 1984 91 p refs
(Contract DE-AC06-76FF-02170)
(DE85-000256; HEDL-7465; TTC-0499) Avail: NTIS HC A05/MF A01

Design requirements are presented for a control station of a proposed semi-automated facility for remote handling of nuclear waste casks. Functional and operational man/machine interface include controls, displays, software format, station architecture, and work environment. In addition, some input is given to the design of remote sensing systems in the cask handling areas. DOE

N85-21984 Department of the Air Force, Washington, D.C.
WINDBLAST ARM PROTECTOR ASSEMBLY Patent
R. J. CUMMINGS, inventor (to Air Force) 13 Nov. 1984 5 p
Supersedes AD-D009886
(AD-D011512; US-PATENT-4,482,112;
US-PATENT-APPL-SN-418952; US-PATENT-CLASS-244-122)
Avail: US Patent and Trademark Office CSCL 06G

A windblast arm protector assembly for use by an occupant of an open-type ejection seat of an aircraft is described. The assembly includes, for each arm of the seat occupant, a full length fabric sleeve member which is independent of any garment body, which is a part of the seat's restraint system (rather than an item of personal protective equipment), and which is shaped and dimensioned from the shoulder area to its wrist area in the form of a flexed (i.e., bent) arm. During ejection of the seat and occupant together, the sleeve member is pulled forwardly and adjacent to the occupant's sides by associated co-acting components of the assembly, such that the arm is not extended into the windblast and is protected from it. Unlike the prior art, this arm protector assembly restrains the wrist area of the seat occupant's arm near the seat ejection handle, while the arm is restrained over its entire length. As a result, the windblast load is uniformly applied, and the restrained arm is protected from injury. GRA

N85-21985*# University of Central Florida, Orlando. Dept. of Industrial Engineering.
NASA: MODEL DEVELOPMENT FOR HUMAN FACTORS INTERFACING Final Report, 15 Nov. 1984 - 15 Jul. 1984
L. L. SMITH 15 Sep. 1984 116 p refs
(Contract NAG10-0010)
(NASA-CR-175584; NAS 1.26:175584) Avail: NTIS HC A06/MF A01 CSCL 05H

The results of an intensive literature review in the general topics of human error analysis, stress and job performance, and accident and safety analysis revealed no usable techniques or approaches for analyzing human error in ground or space operations tasks. A task review model is described and proposed to be developed in order to reduce the degree of labor intensiveness in ground and space operations tasks. An extensive number of annotated references are provided. Author

N85-21986*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
SHOULDER AND HIP JOINT FOR HARD SPACE SUITS AND THE LIKE Patent Application
H. C. VYKUKAL, inventor (to NASA) 20 Dec. 1984 21 p
(NASA-CASE-ARC-11543-1; NAS 1.71:ARC-11543-1;
US-PATENT-APPL-SN-684192) Avail: NTIS HC A02/MF A01
CSCL 06K

Shoulder and hip joints for hard space suits are disclosed which comprising three serially connected truncated spherical sections, the ends of which converge. Ball bearings between the sections permit relative rotation. The proximal end of the first section is connected to the torso covering by a ball bearing and the distal end of the outermost section is connected to the elbow or thigh covering by a ball bearing. The sections are equi-angular and this alleviates lockup, the condition where the distal end of the joint leaves the plane in which the user is attempting to flex. The axes of rotation of the bearings and the bearing mid-planes are arranged to intersect in a particular manner that provides the joint with a minimum envelope. In one embodiment, the races of the bearing between the innermost section and the second section is partially within the inner race of the bearing between the torso and the innermost spherical section further to reduce bulk. NASA

N85-21987*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
TORSO SIZING RING CONSTRUCTION FOR HARD SPACE SUIT Patent Application
H. C. VYKUKAL, inventor (to NASA) 20 Dec. 1984 15 p
(NASA-CASE-ARC-11616-1; NAS 1.71:ARC-11616-1;
US-PATENT-APPL-SN-684193) Avail: NTIS HC A02/MF A01
CSCL 06Q

A hard suit for use in space or diving applications has an adjustable length torso covering that will fit a large variety of wearers. The upper and lower sections of the covering interconnect so that the covering will fit wearers with short torsos. One or more sizing rings may be inserted between sections to accommodate larger torso sizes as required. Since access of the astronaut to the torso covering is preferably through an opening in the back of the upper section (which is closed off by the backpack), the rings slant upward-forward from the lower edge of the opening. The lower edge of the upper covering section has a coupler which slants upward-forward from the lower edge of the back opening. The lower section has a similarly slanted coupler which may interfit with the upper section coupler to accommodate the smallest torso size. Each ring has an upper coupler which may interfit with the upper section coupler and a lower coupler which may interfit with the lower section coupler. NASA

N85-21988# Naval Submarine Medical Research Lab., Groton, Conn.
THE BODY BURDEN OF ORGANIC VAPORS IN ARTIFICIAL AIR TRIAL MEASUREMENTS ABOARD A MOORED SUBMARINE
D. R. KNIGHT, H. J. ONEILL, S. M. GORDON, E. H. LUEBCKE, and J. S. BOWMAN 19 Dec. 1984 33 p
(AD-A149698; NSMRL-MEMO-84-4) Avail: NTIS HC A03/MF A01 CSCL 13J

The success of the submarine atmosphere control program has depended solely upon periodic identification of contaminants in the ship's atmosphere. Substances found to exceed safeguard concentrations are controlled by restricting their use aboard ship or scrubbing them from the atmosphere. But, this approach tends to ignore the human host. Advancements in technology now enable biomedical scientists to identify organic gases absorbed by the human body during exposures to industrial environments. We evaluated the potential application of computer-assisted gas chromatography mass spectrometry (GC/MS/COMP) to measuring of volatile organic compounds (VOC's) absorbed by submarine crewmembers. Expired breath samples were collected from watchstanders stationed in the forward space, torpedo room, forward engine space, and engineering space of a fast-attack submarine. Thirteen of the 17 highest concentrations of VOC's were acyclic, C7-C11 alkanes. Assuming that most of the expired VOC's were derived from the submarine, the hydrocarbon composition of the atmosphere was more concentrated and complex than in residential dwellings. This indicates that crewmembers absorb atmospheric VOC's during patrol and desorb the contaminants at home. GRA

N85-21989# Carnegie-Mellon Univ., Pittsburgh, Pa. Robotics Inst.
THE MAN-MACHINE INTERFACE Interim Report
R. U. AYRES Dec. 1984 31 p
(AD-A149971; CMU-RI-TR-84-26) Avail: NTIS HC A03/MF A01 CSCL 05H

Our basic objective was to define a composite measure of human capabilities that could also be used to measure the skill requirements of various manufacturing tasks. In the course of our research, however, we have come to the conclusion that most human workers (at least in the semiskilled categories) are not employed for their manual skills, or dexterity, but for a different purpose. Although our basic objective remains unchanged, our research focus has shifted to the emerging competition between human workers as machine process controllers in certain highly engineered environments, and the use of sensor-based, computerized systems for the same purpose. Origingator-supplied keywords: Automation, Precision control, Computer applications, Machines, Mechanization are included. Author (GRA)

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PLANETARY BIOLOGY

Includes exobiology; and extraterrestrial life.

A85-28003* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
COMMENTS ON THE BLAG MODEL - THE CARBONATE-SILICATE GEOCHEMICAL CYCLE AND ITS EFFECT ON ATMOSPHERIC CARBON DIOXIDE OVER THE PAST 100 MILLION YEARS
J. F. KASTING (NASA, Ames Research Center, Space Science Div., Moffett Field, CA) American Journal of Science (ISSN 0002-9599), vol. 284, Dec. 1984, p. 1175-1182.

A self-consistent method of determining initial conditions for the model presented by Berner, Lasaga, and Garrels (1983) (henceforth, the BLAG model) is derived, based on the assumption that the CO2 geochemical cycle was in steady state at t = -100 m.y. (million years). This initialization procedure leads to a dissolved magnesium concentration higher than that calculated by Berner, Lasaga, and Garrels and to a low ratio of dissolved calcium to bicarbonate prior to 60 m.y. ago. The latter prediction conflicts with the geologic record of evaporite deposits, which requires that this ratio remain greater than 0.5. The contradiction is probably caused by oversimplifications in the BLAG model, such as the neglect of the cycles of organic carbon and sulfur. Author

A85-29403
CHEMICAL ORGANIZATION IN TIME AND SPACE
R. J. FIELD (Montana, University, Missoula, MT) American Scientist (ISSN 0003-0996), vol. 73, Mar.-Apr. 1985, p. 142-150. refs

The characteristics of an organized chemical system are described and their pertinence to the evolution of life is considered. The importance of distance from equilibrium, of the kinetics which governs diffusion in a chemical system, and of the driving force toward equilibrium is addressed. The Belousov-Zhabotinsky (BZ) reaction is discussed as an example of a chemical reaction exhibiting nonequilibrium chemical organization, emphasizing bifurcations and oscillations in the reaction. Stationary chemical organization is examined, and the possible significance of hypercycles - groups of self-replicating macromolecules that contain information - and their reactions to the evolution of biological macromolecules is considered. C.D.

A85-29670#
THE TRACK OF EXTRATERRESTRIAL LIFE GROWS WARMER
C. PONNAMPERUMA (Maryland, University, College Park, MD) Aerospace America (ISSN 0740-722X), vol. 23, April 1985, p. 62-65.

An assessment is made of the most suggestive evidence gathered to date for the existence of extraterrestrial life, with emphasis on the possibility that biologically significant molecules, such as the components of nucleic acids and proteins, may have formed elsewhere in the universe. Recent analysis of the Murchison carbonaceous chondrite meteorite has revealed the presence of several amino acids, and of the five bases that constitute genetic code structures. Meteorites gathered in Antarctica have also yielded evidence of biologically significant organic molecules. Deep space studies employing radio astronomy and microwave spectroscopy have identified about 50 compounds which may be intermediate in the synthesis of biological compounds. O.C.

AEROSPACE MEDICINE AND BIOLOGY / *A Continuing Bibliography (Supplement 273)* JULY 1985

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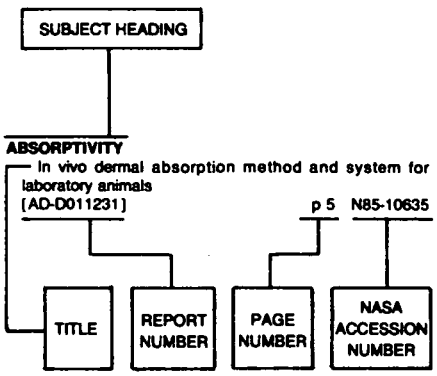

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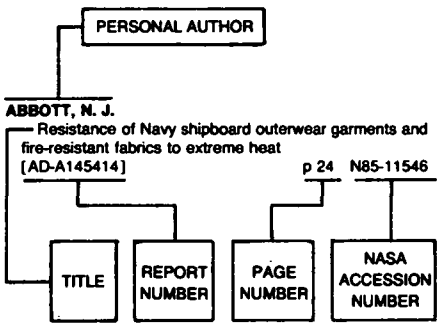

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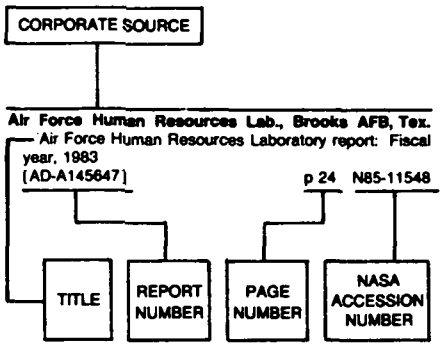

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Advanced Research Resources Organization, Bethesda, Md.
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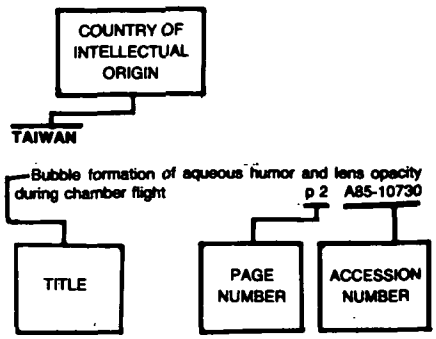

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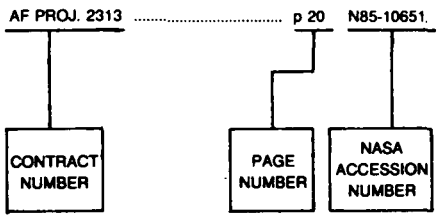

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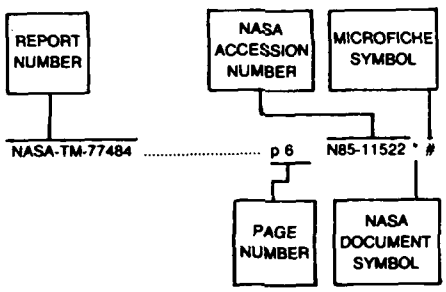

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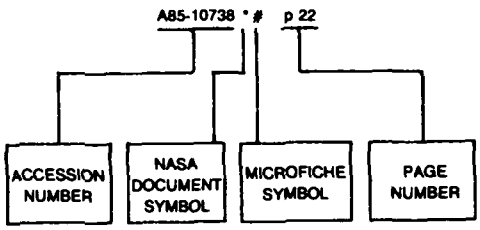

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Iowa City, IA 52242
(319) 353-3318

UNIVERSITY OF KANSAS
Doc. Collect—Spencer Lib.
Lawrence, KS 66045
(913) 864-4662

UNIV. OF KENTUCKY LIBRARIES
Govt. Pub. Department
Lexington, KY 40506
(606) 257-3139

LOUISIANA STATE UNIVERSITY
Middleton Library
Govt. Docs. Dept.
Baton Rouge, LA 70803
(504) 388-2570

LOUISIANA TECHNICAL UNIV. LIBRARY
Documents Department
Ruston, LA 71272
(318) 257-4962

UNIVERSITY OF MAINE
Raymond H. Fogler Library
Tri-State Regional Documents Depository
Orono, ME 04469
(207) 581-1680

UNIVERSITY OF MARYLAND
McKeldin Lib.—Doc. Div.
College Park, MD 20742
(301) 454-3034

BOSTON PUBLIC LIBRARY
Government Docs. Dept.
Boston, MA 02117
(617) 536-5400 ext. 226

DETROIT PUBLIC LIBRARY
Sociology Department
5201 Woodward Avenue
Detroit, MI 48202
(313) 833-1409

MICHIGAN STATE LIBRARY
P.O. Box 30007
Lansing, MI 48909
(517) 373-0640

UNIVERSITY OF MINNESOTA
Government Pubs. Division
409 Wilson Library
309 19th Avenue South
Minneapolis, MN 55455
(612) 373-7813

UNIV. OF MISSISSIPPI LIB.
Documents Department
University, MS 38677
(601) 232-5857

UNIV. OF MONTANA
Mansfield Library
Documents Division
Missoula, MT 59812
(406) 243-6700

NEBRASKA LIBRARY COMM.
Federal Documents
1420 P Street
Lincoln, NE 68508
(402) 471-2045
In cooperation with University of Nebraska-Lincoln

UNIVERSITY OF NEVADA LIB.
Govt. Pub. Department
Reno, NV 89557
(702) 784-6579

NEWARK PUBLIC LIBRARY
5 Washington Street
Newark, NJ 07101
(201) 733-7812

UNIVERSITY OF NEW MEXICO
Zimmerman Library
Government Pub. Dept.
Albuquerque, NM 87131
(505) 277-5441

NEW MEXICO STATE LIBRARY
Reference Department
325 Don Gaspar Avenue
Santa Fe, NM 87501
(505) 827-2033, ext. 22

NEW YORK STATE LIBRARY
Empire State Plaza
Albany, NY 12230
(518) 474-5563

UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL
Wilson Library
BA/SS Documents Division
Chapel Hill, NC 27515
(919) 962-1321

UNIVERSITY OF NORTH DAKOTA
Chester Fritz Library
Documents Department
Grand Forks, ND 58202
(701) 777-2617, ext. 27
(In cooperation with North Dakota State Univ. Library)

STATE LIBRARY OF OHIO
Documents Department
65 South Front Street
Columbus, OH 43215
(614) 462-7051

OKLAHOMA DEPT. OF LIB.
Government Documents
200 NE 18th Street
Oklahoma City, OK 73105
(405) 521-2502

OKLAHOMA STATE UNIV. LIB.
Documents Department
Stillwater, OK 74078
(405) 624-6546

PORTLAND STATE UNIV. LIB.
Documents Department
P.O. Box 1151
Portland, OR 97207
(503) 229-3673

STATE LIBRARY OF PENN.
Government Pub. Section
P.O. Box 1601
Harrisburg, PA 17105
(717) 787-3752

TEXAS STATE LIBRARY
Public Services Department
P.O. Box 12927—Cap. Sta.
Austin, TX 78753
(512) 471-2996

TEXAS TECH UNIV. LIBRARY
Govt. Documents Department
Lubbock, TX 79409
(806) 742-2268

UTAH STATE UNIVERSITY
Merrill Library, U.M.C. 30
Logan, UT 84322
(801) 750-2682

UNIVERSITY OF VIRGINIA
Alderman Lib.—Public Doc.
Charlottesville, VA 22901
(804) 924-3133

WASHINGTON STATE LIBRARY
Documents Section
Olympia, WA 98504
(206) 753-4027

WEST VIRGINIA UNIV. LIB.
Documents Department
Morgantown, WV 26506
(304) 293-3640

MILWAUKEE PUBLIC LIBRARY
814 West Wisconsin Avenue
Milwaukee, WI 53233
(414) 278-3000

ST. HIST LIB. OF WISCONSIN
Government Pub. Section
816 State Street
Madison, WI 53706
(608) 262-4347

WYOMING STATE LIBRARY
Supreme Ct. & Library Bld.
Cheyenne, WY 82002
(307) 777-6344