NASA SP-7011(243)

NASA

Aerospace Medicine and Biology
A Continuing Bibliography with Indexes

NASA SP-7011(243)
March 1983

National Aeronautics and Space Administration

Aerospace Medicine & Biology

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ACCESSION NUMBER RANGES

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

STAR (N-10000 Series)	N83-12038 - N83-14060
IAA (A-10000 Series)	A83-13111 - A83-16453

NASA SP-7011(243)

AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES

(Supplement 243)

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in February 1983 in

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

NASA Scientific and Technical Information Branch 1983
National Aeronautics and Space Administration
Washington, DC

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INTRODUCTION

This Supplement to *Aerospace Medicine and Biology* lists 282 reports, articles and other documents announced during February 1983 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.

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

An annual index will be prepared at the end of the calendar year covering all documents listed in the 1983 Supplements.

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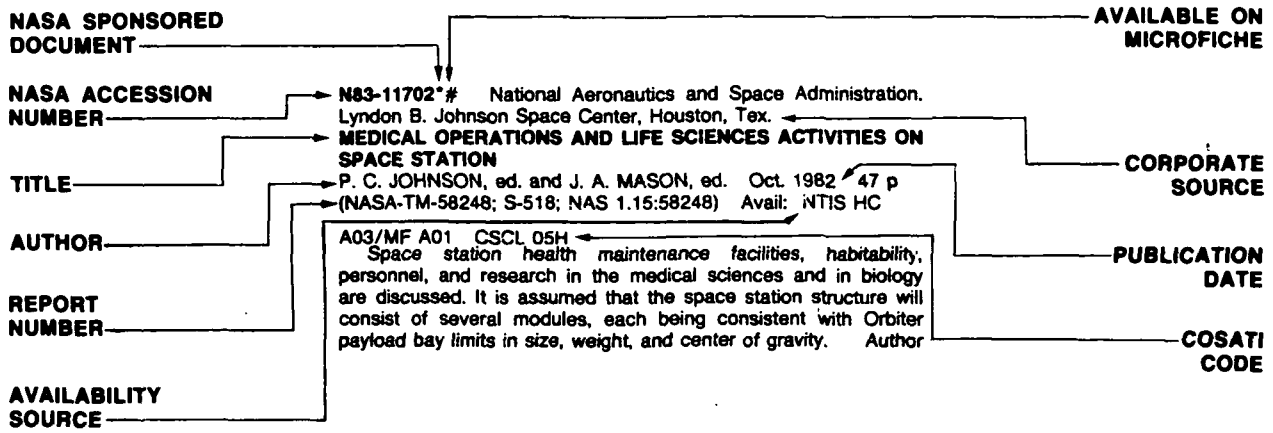

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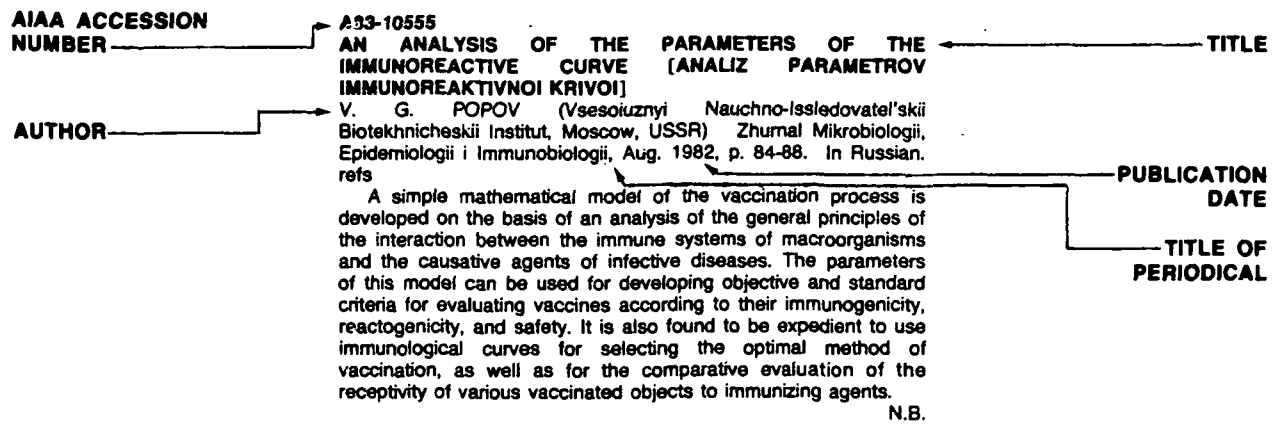

AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 243)

MARCH 1983

51

LIFE SCIENCES (GENERAL)

Includes genetics.

A83-13288
ASPECTS OF DISCUSSION CONCERNING THE PSYCHOLOGY AND PHYSIOLOGY OF VISION [DISKUSSIONNYE ASPEKTY PSIKHOLOGII I FIZIOLOGII ZRENIIA]
A. A. MITKIN Psikhologicheskii Zhurnal, vol. 3, Jan.-Feb. 1982, p. 31-42. In Russian. refs

It is pointed out that the history of professional contacts between physiologists and psychologists regarding their approach to the analysis of psychological nature in general and the cognitive processes in particular contains many examples of conflicting situations. Discussions related to different views can be found also in scientific publications of recent origin. The present investigation is concerned with the reasons for the existing differences of opionion, taking into account also the question regarding an existence of 'purely' physiological and 'purely' psychological principles. Three principal reasons are found to be related to a certain attitude of the neurophysiologists, an underestimation of the significance of the factor of motion, and the linear, unidirectional character of applied logical schemes. The reasons for the complexity of an analysis of the complete visual process are also discussed. G.R.

A83-13289
THE SELF-PURIFICATION OF WATER DEPENDING ON THE PHYSIOLOGICAL PECULIARITIES OF HIGHER AQUATIC PLANTS [SAMOOCHISHCHENIE VOD V ZARISIMOSTI OT FIZIOLOGICHESKIKH OSOBENNOSTEI VYSSHIKH VODNYKH RASTENII]
K. B. IAKUBOVSKII and A. I. MEREZHKO (Akademiia Nauk Ukrainskoi SSR, Institut Gidrobiologii, Kiev, Ukrainian SSR) Gidrobiologicheskii Zhurnal, vol. 18, no. 2, 1982, p. 62-68. In Russian. refs

A83-13291
AN EXPERIMENT ON OXYGEN PERMEABILITY THROUGH CORNEAL TISSUE [PRONITSAEMOST' KISLORODA CHEREZ TKAN' ROGOVITSY V EKSPERIMENTE]
D. F. IVANOV and A. IA. KARPOVICH (Zaporozhskii Meditsinskii Institut, Zaporozhe, Ukrainian SSR) Oftal'mologicheskii Zhurnal, vol. 37, no. 1, 1982, p. 50-52. In Russian. refs

The possibility of a direct supply of oxygen to the eye by means of diffusion through the cornea is studied in an experiment involving the irrigation of the anterior surface of the eye with an oxygen-glucose-protein-vitamin mixture. Polarigraphic measurements of oxygen tension were made in the aqueous humor of the anterior chamber and in the tissue of the iris of chinchilla rabbits during irrigation of the anterior surface of the eye in the mixture for periods of 10, 20 and 30 minutes and the inspiration of oxygen-saturated air. Oxygen partial pressure is found to rise quickly and stabilize at levels 57.7% and 54.3% above initial levels in the aqueous humor and iris, respectively, during irrigation, and to rise by 10.0% in the iris only upon the inspiration of oxygen-rich air. Results thus demonstrate the high permeability of oxygen through the cornea and into the media and tissues of the eye, and indicate the potential clinical applicability of ocular irrigation in situations where ocular pathology is related to tissue and cell hypoxia. A.L.W.

A83-13292
CHANGES IN THE ORGAN OF VISION UNDER THE EFFECT OF VIBRATION [IZMENENIIA ORGANA ZRENIIA PRI VOZDEISTVII VIBRATSII]
V. P. MOZHERENKOV and A. B. CHEMNYI (Moskovskii Oblastnoi Nauchno-Issledovatel'skii Klinicheskii Institut, Moscow, USSR) Oftal'mologicheskii Zhurnal, vol. 37, no. 3, 1982, p. 180-183. In Russian. refs

A review is presented of research concerning the effects of vibration on the eye in humans. It is shown that the visual analyzer is extremely sensitive to both local and general vibrations within a wide range, which occur during many industrial processes. Vascular disruptions of the eye and the associated functional changes in the organ of vision are manifestations of the general angiodystonic syndrome in individuals who are subjected to vibration. The functional and organic changes in the organ of vision in individuals suffering from vibration sickness and in those subjected to vibration without the appearance of pathological symptoms are found to exhibit a similar character. The differences are determined to consist only in the degree and frequency of these changes. N.B.

A83-13597
POSTSTRESS ACTIVATION OF THE SYNTHESIS OF NUCLEIC ACIDS AND PROTEINS, AND ITS ROLE IN ADAPTIVE REACTIONS OF THE BODY [POSTSTRESSORNAIA AKTIVATSIIA SINTEZA NUKLEINOVYKH KISLOT I BELKOV I EE ROL' V ADAPTATSIONNYKH REAKTSIIAKH ORGANIZMA]
F. Z. MEERSON, V. I. PAVLOVA, G. T. SUKHIKH, M. G. PSHENNIKOVA, G. P. EFIMENKO, V. V. SOLOMATIN, B. A. FROLOV, and E. IA. VORONTSOVA (Akademiia Meditsinskikh Nauk SSSR, Moscow; Cheliabinskii Gosudarstvennyi Pedagogicheskii Institut, Cheliabinsk; Orenburgskii Meditsinskii Institut, Orenburg, USSR) Patologicheskaia Fiziologiia i Eksperimental'naia Terapiia, Sept.-Oct. 1982, p. 3-14. In Russian. refs

The paper examines the hypothesis that, under conditions of a single stress stimulus, the catabolic phase is followed by the anabolic phase, i.e., by a generalized activation of the synthesis of nucleic acids and proteins. This latter phase can potentiate the achievement of an interrelationship between function and genetic apparatus, and thus the formation of a structural trace in systems specifically responsible for adaptation to specific environmental factors. The validity of this hypothesis is examined in the light of facts that make it possible to: (1) quantitatively assess the decay of nucleic acids and proteins in the initial (catabolic) phase of heavy emotional-pain stress; (2) show the generalized poststress activation of the synthesis of nucleic acids and proteins; and (3) demonstrate the potentiating effect of the anabolic phase of the nonspecific stress reaction on the formation of such different specific adaptive reactions as primary immune response and conditioned defense reflex. B.J.

A83-13598
AUGMENTATION OF THE RESISTANCE OF THE MYOCARDIUM TO PITUITRIN DAMAGE VIA ADAPTATION TO HYPOXIA [POVYSHENIE REZISTENTNOSTI MIOKARDA K PITUITRINOVOMU POVREZHDENIIU PUTEM ADAPTATSII K GIPOKSII]
E. E. ZVERKOVA (Akademiia Nauk Kazakhskoi SSR, Institut Fiziologii, Alma-Ata, Kazakh SSR) Patologicheskaia Fiziologiia i Eksperimental'naia Terapiia, Sept.-Oct. 1982, p. 42-44. In Russian. refs

A83-13599
STRUCTURE OF THE SLEEP-WAKEFULNESS CYCLE DURING EXPERIMENTAL INSUFFICIENCY OF CEREBRAL CIRCULATION [STRUKTURA TSIKLA SON-BODRSTVOVANIE PRI EKSPERIMENTAL'NOI NEDOSTATOCHNOSTI MOZGOVOGO KROVOOBRASHCHENIIA]
P. V. VOLOSHIN, D. A. ROMANOV, A. IA. MOGILEVSKII, I. A. METIBOVSKII, and I.-V. RUBETS (Ministerstvo Zdravookhraneniia Ukrainskoi SSR, Nauchno-Issledovatel'skii Institut Nevrologii i Psikhiatrii, Kharkov, Ukrainian SSR) Patologicheskaia Fiziologiia i Eksperimental'naia Terapiia, Sept.-Oct. 1982, p. 69-71. In Russian. refs

Marked shifts were detected in the structure parameters of the sleep-wakefulness cycle in cats as a result of the unilateral ligation of the carotid artery. The shifts were mainly associated with changes in the paradoxical stage of the cycle; fluctuations of the duration of this stage and the number of exits into it increased significantly. In addition, there was a significant increase of the period between the occurrence of paradoxical sleep and the beginning of the cycle, and the mean number of transitions between the slow-wave stages before paradoxical sleep. The important role of quick-sleep mechanisms in the postischemic reconstruction of the entire system of regulation of the sleep-wakefulness cycle was confirmed by factorial analysis of the cycle structure. B.J.

A83-13601
PERSPECTIVES ON THE USE OF STIMULATING LASER THERAPY IN OPHTHALMOLOGY [PERSPEKTIVY ISPOL'ZOVANIIA STIMULIRUIUSHCHEI LAZERNOI TERAPII V OFTAL'MOLOGII]
L. A. LINNIK, N. I. USOV, P. P. CHECHIN, and O. S. PELEPCHUK (Odesskii Nauchno-Issledovatel'skii Institut Glaznykh Boleznei i Tkanevoi Terapii, Odessa, Ukrainian SSR) Oftal'mologicheskii Zhurnal, vol. 37, no. 4, 1982, p. 193-197. In Russian. refs

Clinical observations and experimental studies of the effects of low-level laser irradiation, at energies not inducing visible disturbances, are discussed in light of possible clinical applications. Observations include elevations in visual acuity following laser coagulation treatments, and increases in proliferative and synthetic activity following the irradiation of cells in culture and in vivo, which are indicative of a stimulatory effect. The reaction of retinal cells over a large area to a locally applied stimulus is also noted, along with the absence of any uncharacteristic processes in ocular tissue. It is shown that, in addition to its present use in the treatment of dystrophic lesions in the region of the macula retinae, stimulatory laser irradiation may be used to treat a variety of pathological conditions, including burns of various severities and epithelial-endothelial dystrophies of the cornea, and to prevent toxic cataracts. The congruency of the effects induced by low-energy laser irradiation with the normal functioning of ocular cells is emphasized as evidence of the safety of the procedure and its potential applicability. A.L.W.

A83-13610
THE EFFECT OF HELIUM-NEON LASER IRRADIATION ON THE MEMBRANES OF THE RETINA [DEISTVIE IZLUCHENII GELII-NEONOVOGO LAZERA NA MEMBRANY SETCHATOI OBOLOCHKI]
N. F. LEUS, I. P. METELITSYNA, V. F. PCHELIAKOV, and A. P. PRIVALOV (Odesskii Nauchno-Issledovatel'skii Institut Glaznykh Boleznei i Tranevoi Terapii, Odessa, Ukrainian SSR) Oftal'mologicheskii Zhurnal, vol. 37, no. 4, 1982, p. 242-245. In Russian. refs

A83-13626
A COMPARATIVE ANALYSIS OF SEVERAL BEHAVIORAL, NEUROCHEMICAL, AND VEGETROPIC EFFECTS OF MEBICAR AND DIAZEPAM [SRAVNITEL'NYI ANALIZ NEKOTORYKH POVEDENCHESKIKH, NEIROKHIMICHESKIKH I VEGETOTROPNYKH EFFEKTOV MEBIKARA I DIAZEPAMA]
I. E. ZIMAKOVA, S. V. KIRSHIN, and R. A. KAMBURG (Kazanskii Meditsinskii Institut, Kazan, USSR) Farmakologiia i Toksikologiia, vol. 45, Sept.-Oct. 1982, p. 23-26. In Russian. refs

It is found that the tranquilizers diazepam and mebicar (a derivative of bicyclic bis-ureas) produce unidirectional inhibitions of the production of the conditioned reflex of active avoidance, as well as the open-field motor activity, in white rats. In addition, both tranquilizers normalize the changes in the concentration of neuroactive amino acids in the brains of the rats that arise during the production of the conditioned reflex of active avoidance. However, diazepam increases the level of asparagine and glutamic acid, while mebicar raises the concentration of gamma-butyric acid. No interrelationship was found between the psychotropic and vegetropic effects of the tranquilizers. It is concluded that the conditioned reflex of active avoidance can serve as a model of emotional stress. N.B.

A83-13627
THE EFFECTS OF MORPHINE AND PROMEDOL ON OXYGEN METABOLISM IN SKELETAL MUSCLES DURING DIFFERENT FUNCTIONAL STATES [VLIIANIE MORFINA I PROMEDOLA NA KISLORODNYI OBMEN V SKLETNYKH MYSHTSAKH PRI IKH RAZLICHNOM FUNKTSIONAL'NOM SOSTOIANII]
K. I. BENDER and E. V. PANCHENKO (Saratovskii Meditsinskii Institut, Saratov, USSR) Farmakologiia i Toksikologiia, vol. 45, Sept.-Oct. 1982, p. 38-42. In Russian. refs

A83-13628
THE EFFECTS OF NONACHLAZINE ON THE ENERGY SUPPLY OF THE HEART CONTRACTILE ACTIVITY DURING EXPERIMENTAL MYOCARDIAL INFARCTION [VLIIANIE NONAKLAZINA NA ENERGETICHESKOE OBESPECHENIE SOKRATITEL'NOI DEIATEL'NOSTI SERDTSA PRI EKSPERIMENTAL'NOM INFARKTE MIOKARDA]
K. M. REZNIKOV, P. P. PROVOTOROVA, and V. I. SIDELNIKOVA (Voronezhskii Meditsinskii Institut, Voronezh, USSR) Farmakologiia i Toksikologiia, vol. 45, Sept.-Oct. 1982, p. 52-57. In Russian. refs

It was found that the prolonged administration of nonaclazine produces an improvement in the heart contractile activity in rabbits and white rats during microfocal myocardial infarction, due to the shortening of the systolic and the lengthening of the diastolic phases of the heart cycle. In addition, nonachlazine increased the rate of oxidative phosphorylation in the heart mitochondria, which was indicated by the inhibition of succinate dehydrogenase and the switching of oxidation from succinate to NAD-dependent substrates. N.B.

A83-13629
THE EFFECT OF CORDIAMINE AND MESATONE ON THE EKG UNDER CONDITIONS OF ACUTE MICROWAVE IRRADIATION [VLIIANIE KORDIAMINA I MEZATONA NA EKG V USLOVIIAKH OSTROGO MIKROVOLNOVOGO OBLUCHENIIA]
V. M. KOLDAEV (Vladivostokskii Meditsinskii Institut, Vladivostok, USSR) Farmakologiia i Toksikologiia, vol. 45, Sept.-Oct. 1982, p. 57-59. In Russian. refs

The effect of cordiamine and mesatone on the activity of the heart was studied in white rats of both sexes following irradiation with varying doses of microwaves. Results show that cordiamine (100 mg/kg) or mesatone (10 mg/kg) injected intraperitoneally immediately following microwave irradiation in doses of 55.8 and 75 joule/sq cm at a wavelength of 12.6 cm normalizes the duration of the atrium complex (PQ) and the immobility phase (TP) of the heart cycle in the animals. N.B.

A83-13630
THE ANTIARRHYTHMIC EFFECT OF INTRAMUSCULAR AND ENTERAL INJECTIONS OF TRIMECAIN [PROTIVOARITMICHESKOE DEISTVIE TRIMEKAINA PRI VNUTRIMYSHECHNOM I ENTERAL'NOM SPOSOBAKH VVEDENIIA]
G. I. PUZANOV, A. P. TSYBUSOV, and E. I. GENDENSHTEIN (Mordovskii Gosudarstvennyi Universitet, Saransk, USSR) Farmakologiia i Toksikologiia, vol. 45, Sept.-Oct. 1982, p. 59-62. In Russian. refs

The effects of intramuscular and enternal injections of trimecain, an anesthetic drug, were studied using 49 dogs. Results show that intramuscular and enteral injections of trimecain show pronounced antiarrhythmic effects during ventricular arrhythmia which was induced by the occlusion of the descending branch of the coronary artery. In addition, intramuscular and enteral injections of the drug exert a more prolonged and steady antiarrhythmic effect than that produced by intravenous injections. N.B.

A83-13632
THE CHANGES IN THE HEMOPOIETIC SYSTEM AND THE SMALL INTESTINE MUCOSA DURING THE BREATHING OF PURE OXYGEN UNDER ATMOSPHERIC PRESSURE [IZMENENIIA KROVETVORNOI SISTEMY I SLIZISTOI TONKOI KISHKI PRI DYKHANII CHISTYM KISLORODOM V USLOVIIAKH NORMAL'NOGO ATMOSFERNOGO DAVLENIIA]
M. V. VASIN, T. S. LVOVA, N. N. DOBROV, L. V. KOROLEVA, and L. A. SEMENOVA Farmakologiia i Toksikologiia, vol. 45, Sept.-Oct. 1982, p. 71-73. In Russian. refs

A83-13633
A QUANTITATIVE DETERMINATION OF THE HEMODEPRESSIVE EFFECT OF SOME ALKYLATING AGENTS [KOLICHESTVENNAIA OTSENKA GEMODEPRESSIVNOGO DEISTVIIA NEKOTORYKH ALKILIRUIUSHCHIKH AGENTOV]
I. V. KIREEVA, E. I. KHOMCHENOVSKII, and A. A. PYKHTINA (II Moskovskii Meditsinskii Institut, Moscow, USSR) Farmakologiia i Toksikologiia, vol. 45, Sept.-Oct. 1982, p. 90-93. In Russian. refs

A83-13634
FURTHER STUDIES AND THE COMPARATIVE CHARACTERISTICS OF POTENTIAL STIMULANTS OF HIGHER NERVOUS ACTIVITY [DAL'NEISHEE IZLUCHENIE I SRAVNITEL'NAIA KHARAKTERISTIKA POTENTSIAL'NYKH STIMULIATOROV VYSSHEI NERVNOI DEIATEL'NOSTI]
V. M. VINOGRADOV and A. T. GRECHKO (Voenno-Meditsinskaia Akademiia, Leningrad, USSR) Farmakologiia i Toksikologiia, vol. 45, Sept.-Oct. 1982, p. 108-111. In Russian. refs

The effects of the most active stimulants of the higher nervous activity (nootropil, tonibral, mefexamide, sydnocarb, pyrroxane, ethimizole, gutimin, and an analog of gutimin) on the time course of the formation of the conditioned reflex of active avoidance were studied in rats during one-time and fractional learning. Results show that the acceleration of the formation of the conditional reflex by the drugs during fractional learning is evidently linked with the activation of the transfer of information to long-term memory, the formation of a tracking system, and a decrease of fear and a stabilization of the emotional condition. The effects reflect the stability of the dynamic stereotype and the rapid formation of the adjusting reaction of the eventual goal. N.B.

A83-13637
THE CYCLASE SYSTEM AND LYZOSOME ENZYME ACTIVITY IN HEALTH AND DISEASE [TSIKLAZNAIA SISTEMA I AKTIVNOST' LIZOSOMNYKH FERMENTOV V NORME I PRI PATOLOGII]
B. F. KOROVKIN (Voenno-Meditsinskaia Akademiia, Leningrad, USSR) Akademiia Meditsinskikh Nauk SSSR, Vestnik, no. 9, 1982, p. 69-74. In Russian. refs

A parallel study is presented of the activities of the lyzosome-contained acid hydrolases and the adenyl cyclase-diesterase system in various tissues under various pathological conditions in light of the purported role of the cyclic nucleotides (cAMP and cGMP) in the regulation of the lyzosome membrane. Experimentally induced myocardial infarction, traumatic shock and prolonged hypokinesia are found to cause a decrease in cAMP levels, an increase in cGMP, an impairment in the hormonal regulation of adenyl cyclase activity, and a reduction in cAMP-dependent protein kinase activity in the damaged tissues. A marked correlation is also observed between the reduction in cAMP levels and an increase in the free acid hydrolase activity in the cytoplasm of the cell. In addition, the preliminary administration of liposome-encapsulated cAMP is found to exert a stabilizing effect on the liver lyzosome membrane during traumatic shock. Results thus demonstrate the as-yet-unexplained stabilizing influence of cAMP on the lyzosome membrane. A.L.W.

A83-13638
REGULATION OF THE ACTIVITY OF ENZYMATIC REACTIONS IN THE BRAIN IN THE PRESENCE OF NERVOUS SYSTEM PATHOLOGY [REGULIATSIIA AKTIVNOSTI FERMENTNYKH REAKTSII MOZGA PRI PATOLOGII NERVNOI SISTEMY]
M. SH. PROMYSLOV (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Akademiia Meditsinskikh Nauk SSSR, Vestnik, no. 9, 1982, p. 81-86. In Russian. refs

Disturbances in brain enzymatic reactions accompanying nervous system pathology are considered with a view towards devising a suitable intervention strategy. Results from animal studies are presented which show energy metabolism to be the first system affected by cranial trauma, with coupling between respiration and oxidative phosphorylation becoming sharply uncoupled. The activities of cerebral gamma-amylase, the enzyme responsible for the freeing of glucose from gluycogen to meet increased demands from anaerobic metabolism, and monoamine oxidase are shown to be suppressed upon cranial trauma, while glycogen accumulates in cerebral tissues. N-acetyl aspartic acid and cystathionine metabolisms also show significant impairments. It is noted, however, that all these changes may be reversed upon the administration of such nervous system stimulants as phenamine (amphetamine sulfate) or prolonged upon the inhibition of nervous activity. A.L.W.

A83-13639
THE ACTIVITY OF PROSTAGLANDIN SYNTHETASE IN BRAIN TISSUES DURING RADIATION SICKNESS IN EXPERIMENTAL ANIMALS [PROSTAGLANDINSINTETAZNAIA AKTIVNOST' TKANEI GOLOVNOGO MOZGA PRI LUCHEVOI BOLEZNI U EKSPERIMENTAL'NYKH ZHIVOTNYKH]
E. F. ROMANTSEV, Z. I. ZHULANOVA, and T. I. NIKANDROVA (Ministerstvo Zdravookhraneniia SSSR, Institut Biofiziki, Moscow, USSR) Akademiia Meditsinskikh Nauk SSSR, Vestnik, no. 9, 1982, p. 86-89. In Russian. refs

A83-13640
HISTOLOGICAL AND HISTOCHEMICAL INVESTIGATIONS OF THE LOCOMOTOR SYSTEM DURING GENERAL HYPOXIA [GISTOLOGICHESKOE I GISTOKHIMICHESKOE IZUCHENIE OPORNO-DVIGATEL'NOGO APPARATA PRI OBSHCHEI GIPOKSII ORGANIZMA]
L. R. GONGADZE, B. M. TOGONIDZE, R. M. GUGUSHVILI, and N. N. KACHARAVA (Ministerstvo Zdravookhraneniia Gruzinskoi SSR, Nauchno-Issledovatel'skii Institut Travmatologii i Ortopedii, Georgian SSR) Akademiia Nauk Gruzinskoi SSR, Soobshcheniia, vol. 103, July 1982, p. 193-196. In Russian.

The structural organization and the trophic-plastic parameters of the osteoarticular system were investigated in white rats that were exposed to conditions of general hypoxia for 2 hr each day for 30 days. Results show that the tissues of the locomotor system underwent changes in their microstructure and histochemistry which appeared to be adaptations to the conditions of general hypoxia. The articular cartilage, due to its lack of a microvascular system, was found to be the tissue most adapted to conditions of general hypoxia. N.B.

A83-13646
COMBINED LIGHT AND ELECTRON MICROSCOPIC INVESTIGATIONS OF THE CONNECTIONS IN THE CENTRAL NERVOUS SYSTEM - A REVIEW OF CURRENT METHODOLOGICAL APPROACHES [KOMPLEKSNOE SVETO- I ELEKTRONNO-MIKROSKOPICHESKOE IZUCHENIE SVIAZEI V TSENTRAL'NOI NERVNOI SISTEME - OBZOR SOVREMENNYKH METODICHESKIKH PODKHODOV]
A. P. NOVOZHILOVA and E. V. PONOMAREVA (Leningradskii Gosudarstvennyi Universitet, Leningrad, USSR) Arkhiv Anatomii, Gistologii i Embriologii, vol. 83, Sept. 1982, p. 91-97. In Russian. refs

A review is presented concerning the current two most important methods for studying the synaptic organization of identified neurons. One method, the electron microscopy of impregnated sections using Golgi preparations, has been used for the determination of synaptic connections of identified cells in conjunction with light microscopic techniques in investigations of bulbs, retina, cerebellum, various subcortical formations, and the cerebrum of various animals and humans. The other primary method, the electron-microscopic study of neurons after injections of horseradish peroxidase, allows the investigator to study the synaptic organization, the morphological peculiarities, and the location of neurons as sources of defined intrabrain paths. N.B.

A83-13720* National Aeronautics and Space Administration, Washington, D. C.
LIFE SCIENCE RESEARCH IN SPACE - THE SPACELAB ERA
R. M. FARRELL, D. B. CRAMER (NASA, Washington, DC), and D. H. REID (GE Management and Technical Services Co., Arlington, VA) In: NASA-ESA Spacelab systems and programs; Proceedings of the Seminar, Washington, DC, April 23, 24, 1981. Bellingham, WA, SPIE - The International Society for Optical Engineering, 1982, p. 158-168.

The events leading up to Spacelab mission 4, which is to be dedicated exclusively to life sciences experimentation in 1984-85, are described. Out of 400 experiment proposals initially received and assessed, 87 candidates were chosen for definition studies to identify the resources which would be required. These proposals addressed such problems encountered in previous space flights as space motion sickness, cardiovascular deconditioning and muscle wasting, calcium loss, and red cell mass reduction. Additional experiments were selected from bioengineering, plant physiology, and cell biology. Human subjects will consist of a Mission Specialist Astronaut and up to four Payload Specialists. Equipment to be used in experimentation includes biotelemetry systems, microscopes, cameras, centrifuges and refrigerators, all of which have been designed for use in weightless conditions. The 87 candidate experiments will be further reduced to about 20. O.C.

A83-14327
AN APPROACH FOR DETERMINING COMMON CHOLESTEROL AND ITS STRUCTURAL-FUNCTIONAL FRACTIONS IN ERYTHROCYTES ON THE BASIS OF THE DIGITONIN METHOD [K METODIKE OPREDELENIIA OBSHCHEGO KHOLESTERINA I EGO STRUKTURNO-FUNKTSIONAL'NYKH FRAKTSII V ERITROTSITAKH DIGITONINOVYM METODOM]
V. I. FEDENKOV, E. N. VOROBEVA, V. G. SHUMSKAIA, and V. D. OVCHINNIKOVA (Novosibirskii Gosudarstvennyi Meditsinskii Institut, Novosibirsk, USSR) Akademiia Nauk SSSR, Sibirskoe Otdelenie, Izvestiia, Seriia Biologicheskikh Nauk, Aug. 1982, p. 141-143. In Russian. refs

A83-14328
SEROTONIN AND THE ADRENOCORTICAL RESPONSE TO COLD DURING THE EARLY POSTNATAL DEVELOPMENT OF RATS [SEROTONIN I REAKTSIIA KORY NADPOCHECHNIKOV NA OKHLAZHDENIE V RANNEM POSTNATAL'NOM ONTOGENEZE KRYS]
I. I. LOBACHEVA (Akademiia Nauk SSSR, Institut Tsitologii i Genetiki, Novosibirsk, USSR) Akademiia Nauk SSSR, Sibirskoe Otdelenie, Izvestiia, Seriia Biologicheskikh Nauk, Aug. 1982, p. 160-164. In Russian. refs

A83-14333
THE ASSAY OF GLYCOSAMINOGLYCANES IN THE BLOOD SERUM [OPREDELENIE GLIUKOZAMINOGLIKANOV SYVOROTKI KROVI]
E. V. KARIAKINA and D. V. KOSIAGIN (Saratovskii Nauchno-Issledovatel'skii Institut Travmatologii i Ortopedii, Saratov, USSR) Laboratornoe Delo, no. 10, 1982, p. 591-593. In Russian. refs

A83-14334
RAPID MONITORING OF THE ACID-BASE AND GAS COMPOSITION OF THE BLOOD [EKSPRESS-KONTROL' KISLOTNO-OSNOVNOGO I GAZOVOGO SOSTAVA KROVI]
V. N. OBUKHOV, E. S. FILIMONOV, E. A. STUNZHA, V. E. SHEPEL, L. G. BOROVSKIKH, and G. K. SOLOVEVA (Ministerstvo Zdravookhraneniia RSFSR, Nauchno-Issledovatel'skii Institut Patologii Krovoobrashcheniia, Novosibirsk, USSR) Laboratornoe Delo, no. 10, 1982, p. 606, 607. In Russian. refs

A83-14347
A HYGIENIC EVALUATION OF THE EFFECTIVENESS OF ULTRAVIOLET RADIATION DURING THE ACTION OF INDUSTRIAL POISONS ON THE ORGANISM [GIGIENICHESKAIA OTSENKA EFFEKTIVNOSTI UL'TRAFIOLETOVYKH OBLUCHENII PRI VOZDEISTVII NA ORGANIZM PROIZVODSTVENNYKH IADOV]
I. N. MOTUZKOV, I. A. MIKHALIUK, I. I. SHVAIKO, N. F. UZHVA, and I. P. KOZIARIN (Kievskii Meditsinskii Institut, Kiev, Ukrainian USSR) Vrachebnoe Delo, Sept. 1982, p. 96-98. In Russian. refs

The prophylactic effectiveness of UV radiation for animals subjected to industrial poisons was investigated in albino rats. The rats were given daily injections of lead acetate (5 mg/kg) and were exposed to different levels of UV radiation at doses roughly equivalent to a weekly exposure of 120 mrad-hr/sq m. Results show that the rats which did not receive supplemental UV exposure were very sensitive to lead acetate, an effect that was characterized by harmful changes in the functional condition of various separate systems and organs, especially of the central nervous system. In the groups that received prophylactic doses of UV radiation, the lead acetate intoxication was either absent or appeared infrequently at lesser intensities. A comparative statistical analysis showed no significant differences in various indices, such as the content of erythrocytes and hemoglobin in the blood, for the three groups exposed to different dose rates of UV radiation. However, other indicators, such as the accumulation and excretion of lead acetate, revealed that daily exposures to UV radiation, at low dose rates, provided a significantly better prophylactic effect than exposures of two or three days a week at higher dose rates.

It is concluded that daily exposure to UV radiation provides the best prophylactic method for industrial workers who work with poisonous chemicals. N.B.

A83-14356
CONCERNING THE ABSENCE OF MAGNETIC-FIELD EFFECT ON THE DISSOLVING OF OXYGEN IN AQUEOUS SOLUTIONS [OB OTSUTSTVII VLIIANIIA MAGNITNOGO POLIA NA RASTVORENIE KISLORODA V VODNYKH RASTVORAKH]
T. V. USHAKOVA, V. A. LIVSHITS, and A. N. KUZNETZOV (Nauchno-Issledovatel'skii Institut po Biologicheskim Ispytaniiam Khimicheskikh Soedinenii, Kupavna; Akademiia Nauk SSSR, Institut Khimicheskoi Fiziki, Moscow, USSR) Biofizika, vol. 27, Sept.-Oct. 1982, p. 757-761. In Russian. refs

In order to verify a number of experimental studies, the present investigation considers the effect of a constant magnetic field with an induction of 0.35 T on the dissolving of oxygen in water and in an 0.1 n solution of NaCl. It is shown that the solubility and rate of dissolving of oxygen in water and the aqueous solution of an electrolyte are not affected by magnetic fields with an induction of the order of 0.1 T. This result agrees well with theory and makes it impossible to consider the direct effect of a magnetic field upon molecules of paramagnetic oxygen as one of the possible mechanisms of the magnetic-field effect upon biological systems. B.J.

A83-14357
PHOTOPHYSICAL PROCESSES IN RETINOID MOLECULES, RELATED TO VISUAL CHROMOPHORES [FOTOFIZICHESKIE PROTSESSY V MOLEKULAKH RETINOIDOV, RODSTVENNYKH ZRITEL'NYM KHROMOFORAM]
S. L. BONDAREV, M. V. BELKOV, K. I. SALOKHIDDINOV, and P. N. DYLKO (Akademiia Nauk Belorusskoi SSR, Institut Fiziki, Minsk, Belorussian SSR) Biofizika, vol. 27, Sept.-Oct. 1982, p. 776-779. In Russian. refs

A83-14358
DEPENDENCE OF THE STRUCTURAL LABILITY OF THE OUTER MEMBRANE OF LIVER MITOCHONDRIA ON THE AGE AND SEX OF RATS [ZAVISIMOST' STRUKTURNOI LABIL'NOSTI NARUZHNOI MEMBRANY MITOKHONDRII PECHENI OT VOZRASTA I POLA KRYS]
V. V. LEMESHKO (Khar'kovskii Gosudarstvennyi Universitet, Kharkov, Ukrainian SSR) Biofizika, vol. 27, Sept.-Oct. 1982, p. 837-840. In Russian. refs

A83-14359
THE IMPLANTATION OF SARCOPLASMIC RETICULUM MEMBRANES IN A PLANAR LIPID MEMBRANE [IMPLANTATSIIA MEMBRAN SARKOPLAZMATICHESKOGO RETIKULUMA V PLSOKUIU LIPIDNUIU MEMBRANU]
I. N. BABUNASHVILI, V. A. NENASHEV, and V. V. PLETNEV (Akademiia Nauk SSSR, Institut Biologicheskoi Fiziki, Pushchino, SSSR) Biofizika, vol. 27, Sept.-Oct. 1982, p. 844-847. In Russian. refs

A83-14360
THE EFFECT OF 8-METHOXYPSORALEN AND UV RADIATION ON THE ELECTRIC STABILITY OF LIPOSOME MEMBRANES [VLIIANIE 8-METOKSIPSORALENA I UF-IZLUCHENIIA NA ELEKTRICHESKUIU STABIL'NOST' MEMBRAN LIPOSOM]
O. M. PARNEV, L. N. BEZDETNAIA, A. IA. POTAPENKO, and IU. A. VLADIMIROV (II Moskovskii Meditsinskii Institut, Moscow, USSR) Biofizika, vol. 27, Sept.-Oct. 1982, p. 848-850. In Russian. refs

A83-14361
STABLE ECOLOGICAL STRUCTURES IN TIME-LAG MODELS [USTOICHIVYE EKOLOGICHESKIE STRUKTURY V MODELIAKH S ZAPAZDYVANIEM]
V. G. ILICHEV (Nauchno-Issledovatel'skii Institut Mekhaniki i Prikladnoi Matematiki, Rostov-on-Don, USSR) Biofizika, vol. 27, Sept.-Oct. 1982, p. 858-862. In Russian. refs

The problem of the forming and the disintegration of stable ecological structures is investigated, using the simple closed ecological system model 'phytoplankton-phosphorous'. This model, as in closed single-component systems with a time lag, requires a restricted range for the time-lag in order to be stable. It is shown that the stability of a multicomponent system with a time lag can be fulfilled by the application of less stringent conditions for the parameters of the model. In particular, the limiting condition for the length of the time lag is determined not to be necessary for the accuracy of the model. In addition, it is found that the stability of the ecosystem is determined by the multiformity and the balance of the stream of nutrients. N.B.

A83-14362
SPATIAL-FREQUENCY CHARACTERISTICS OF RECEPTIVE FIELDS OF THE CAT VISUAL CORTEX IN CASES OF HOMOGENEOUS AND INHOMOGENEOUS BACKGROUNDS [PROSTRANSTVENNO-CHASTOTNYE KHARAKTERISTIKI RETSEPTIVNYKH POLEI ZRITEL'NOI KORY KOSHKI V USLOVIIAKH ODNORODNOGO I NEODNORODNOGO FONA]
V. D. GLEZER, V. E. GAUZELMAN, V. M. BONDARKO, and T. A. SHCHERBACH (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR) Biofizika, vol. 27, Sept.-Oct. 1982, p. 871-874. In Russian. refs

A83-14363
THE RELATIONSHIP BETWEEN LENGTH AND FORCE IN THE CARDIAC MUSCLE - ELECTROMECHANICAL COUPLING DURING DEFORMATION OF THE MYOCARDIUM [VZAIMOSVIAZ' MEZHDU DLINOI I SILOI V SERDECHNOI MYSHTSE - ELEKTROMEKHANICHESKOE SOPRIAZHENIE PRI DEFORMATSII MIOKARDA]
V. IA. IZAKOV and IU. L. PROTSENKO (Sverdlovskii Nauchno-Issledovatel'skii Institut Gigieny Truda i Profzabolevanii, Sverdlovsk, USSR) Biofizika, vol. 27, Sept.-Oct. 1982, p. 880-885. In Russian. refs

A83-14364
MECHANISM FOR THE APPEARANCE OF SPIRAL WAVES IN ACTIVE MEDIA, ASSOCIATED WITH THE PHENOMENON OF CRITICAL CURVATURE [MEKHANIZM VOZNIKNOVENIIA SPIRAL'NYKH VOLN V AKTIVNYKH SREDAKH, SVIAZANNYI S IAVLENIEM KRITICHESKOI KRIVIZNY]
A. V. PANFILOV and A. M. PERTSOV (Akademiia Nauk SSSR, Institut Biologicheskoi Fiziki, Pushchino, SSSR) Biofizika, vol. 27, Sept.-Oct. 1982, p. 886-889. In Russian. refs

A new mechanism for the appearance of spiral waves was revealed in a digital-computer study of a two-dimensional active medium described by the Fitz-Hugh, Nagumo equations. It is shown that when the wave rounds a barrier where the Neumann boundary conditions are set the wave separates from the boundary and a discontinuity appears in the front, which further evolves into a spiral. This effect is observed when the discontinuity curvature is close to the critical one for a given medium. The results obtained may be of interest in elucidating the initiation of spiral waves in damaged regions of myocardium tissues B.J.

A83-14365
NUMERICAL STUDY OF THE STOCHASTIC BEHAVIOR OF A SIMPLE BIOLOGICAL SYSTEM [CHISLENNOE ISSLEDOVANIE STOKHASTICHESKOGO POVEDENIIA PROSTOI BIOLOGICHESKOI SISTEMY]
V. V. ALEKSEEV and A. N. KORNILOVSKII (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR) Biofizika, vol. 27, Sept.-Oct. 1982, p. 890-894. In Russian. refs

A system of differential equations modeling metabolism dynamics is examined. The presence of a strange attractor in the phase space leads to the conclusion that stochastic behavior is a common phenomenon in biophysics. It is shown that the dimensions of the strange attractor determine the system sensitivity threshold with respect to each of the dynamic variables. B.J.

A83-14366
MECHANISM FOR THE APPEARANCE OF THE FIRST EXTRASYSTOLE DURING SHORT-LIVED ATRIAL ARRHYTHMIA [MEKHANIZM VOZNIKNOVENIIA PERVOI EKSTRASISTOLY PRI KOROTKOZHIVUSHCHEI PREDSERDNOI ARITMII]
A. B. MEDVINSKII and A. M. PERTSOV (Akademiia Nauk SSSR, Institut Biologicheskoi Fiziki, Pushchino, SSSR) Biofizika, vol. 27, Sept.-Oct. 1982, p. 895-899. In Russian. refs

The propagation of excitation during arrhythmias induced by electrical stimulation into the vulnerable phase was studied on rabbit left auricle bands by mapping in 80-150 points. The first extrasystole wave was shown to be associated with the appearance of one or several pointlike or ringlike excitation sources on the myocardium surface. The circulation of excitation in the myocardium bulk (intramural reentry) is suggested to be the most probable mechanism for the appearance of such sources. B.J.

A83-14368
THE RELATIONSHIP BETWEEN PEROXIDE OXIDATION AND CELL RESPIRATION [SVIAZ' PEREKISNOGO OKISLENIIA LIPIDOV I KLETOCHNOGO DYKHANIIA]
A. S. SEILANOV, G. A. POPOV, and V. V. KONEV (Akademiia Meditsinskikh Nauk SSSR, Obninsk, USSR) Biofizika, vol. 27, Sept.-Oct. 1982, p. 906-908. In Russian.

The relationship between lipid peroxide oxidation (LPO) in biological membranes and the kinetics of oxygen uptake by intact cells and cells under hypotonic shock during incubation was investigated. Different effects of bivalent ferrum ions (LPO activators), depending on cell integrity, were found. In cells under normal conditions the rate of oxygen uptake was independent of the amount of LPO products, whereas in cells placed in a hypotonic medium this rate decreased on the background of LPO intensification compared to the normal rate. The specific effects of LPO products on intact cells appear to be related to the spatial disconnection of respiratory centers and to the localization of peroxide oxidation reactions. B.J.

A83-14369
THE ROLE OF PHYSICAL CHARACTERISTICS OF LASER RADIATION IN THE ABSORPTION OF LIGHT BY HEME-CONTAINING BIOLOGICAL MOLECULES [O ROLI FIZICHESKIKH KHARAKTERISTIK LAZERNOGO IZLUCHENIIA V POGLOSHCHENII SVETA GEMOSODERZHASHCHIMI BIOLOGICHESKIMI MOLEKULAMI]
V. A. DUBROVSKII, V. V. GUSEV, and O. G. ASTAFEVA (Saratovskii Gosudarstvennyi Meditsinskii Institut, Saratov, USSR) Biofizika, vol. 27, Sept.-Oct. 1982, p. 908, 909. In Russian.

A83-14370
REFRACTORINESS OF HEART TISSUES DURING A DECREASE OF FAST SODIUM CURRENT - A COMPARISON OF THE ATRIUM AND THE VENTRICLE [REFRAKTERNOST' SERDECHNOI TKANI PRI UMEN'SHENII BYSTROGO VKHODIASHCHEGO NA-TOKA SRAVNENIE PREDSERDIIA I ZHELUDOCHKA]
A. K. GRENADER, V. M. PONOMAREVA, G. G. ZURABISHVILI, and B. N. VASIEV (Akademiia Nauk SSSR, Institut Biologicheskoi Fiziki, Pushchino, USSR) Biofizika, vol. 27, Sept.-Oct. 1982, p. 911-914. In Russian. refs

In experiments with left atrial and right ventricular tissues, fast sodium current (FSC) was decreased by replacing sodium with sucrose in Tyrode's solution and by means of antiarrhythmic drugs which are FSC blockers (lidocaine, diphenylhydantoine, and ethmozine). The decrease in FSC was found to result in an increase of the refractoriness of heart tissues. It is suggested that the refractoriness increase caused by the FSC decrease is a mechanism responsible for the selective sensitivity of ischemic heart tissues to antiarrhytmic drugs which are FSC blockers. B.J.

A83-14371
OPTICAL DETERMINATION OF THE THICKNESS OF AN INHOMOGENEOUS MEMBRANE [OPREDELENIE TOLSHCHINY NEODNORODNOI MEMBRANY OPTICHESKIM METODOM]
V. I. PASECHNIK (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR) Biofizika, vol. 27, Sept.-Oct. 1982, p. 914, 915. In Russian. refs

The paper proposes a simple method for calculating the thickness of a bilayer lipid membrane on the basis of measurements of membrane reflectivity. The membrane is considered to be inhomogeneous, with the refractive index $n = n(z)$ being a function of the coordinate z normal to the plane of the membrane. The membrane thickness obtained with this method is shown to be 4-6% less than that obtained by the standard method. B.J.

A83-14372
RELATIVE CONTENT OF CHOLESTEROL AND THE MICROVISCOSITY OF SERUM APO-B-CONTAINING LIPOPROTEINS OF MAMMALS [OTNOSITEL'NOE SODERZHANIE KHOLESTERINA I MIKROVIAZKOST' SYVOROTOCHNYKH APO-B-SODERZHASHCHIKH LIPOPROTEIDOV MLEKOPITAIUSHCHIKH]
V. E. FORMAZIUK (II Moskovskii Gosudarstvennyi Meditsinskii Institut, Moscow, USSR) and V. A. POLESSKII (Vsesoiuznyi Kardiologicheskii Nauchnyi Tsentr, Moscow, USSR) Biofizika, vol. 27, Sept.-Oct. 1982, p. 916-918. In Russian. refs

A83-14877
THE ACTIVITY OF AP-ENDONUCLEASE IN THYMOCYTES OF NORMAL AND IRRADIATED RATS [AKTIVNOST' AP-ENDONUKLEAZ V TIMOTSITAKH NORMAL'NYKH I OBLUCHENNYKH KPYS]
B. P. IVANNIK and N. I. RIABCHENKO (Akademiia Meditsinskikh Nauk SSSR, Obninsk, USSR) Radiobiologiia, vol. 22, Sept.-Oct. 1982, p. 597-602. In Russian. refs

A83-14878
THE EFFECT OF ACTIVATORS OF CAMP ACCUMULATION ON SEPARATE STAGES OF THE CELL GENOME EXPRESSION DURING ACUTE RADIATION DAMAGE OF THE ANIMAL. V INVESTIGATIONS OF THE SEDIMENTATION CHARACTERISTICS OF RNP-PARTICLES RELEASED FROM THE CELL NUCLEI OF IRRADIATED ANIMALS AND OF ANIMALS PROTECTED WITH SEROTONIN [VLIIANIE AKTIVATOROV NAKOPLENIIA TSAMF NA OTDEL'NYE ETAPY EKSPRESSII GENOMA V KLETKAKH PRI OSTROM LUCHEVOM PORAZHENII ORGANIZMA. V - ISSLEDOVANIE SEDIMENTATSIONNYKH KHARAKTERISTIK RNP-CHASTITS, TRANSPORTIRUEMYKH IZ IADER KLETOK OBLUCHENNOGO I ZASHCHISHCHENNOGO RADIOPROTEKTOROM SEROTONINOM ORGANIZMA]
B. A. TSUDZEVICH, L. A. GALKINA, and N. E. KUCHERENKO (Kievskii Gosudarstvennyi Universitet, Kiev, Ukrainian SSR) Radiobiologiia, vol. 22, Sept.-Oct. 1982, p. 603-607. In Russian. refs

A83-14879
THE OXYGEN EFFECT AND THE ADAPTIVE REACTIONS OF CELLS. IX - THE DEPENDENCE OF THE RADIOPROTECTIVE EFFECTIVENESS OF GASEOUS HYPOXIA ON ITS DEGREE AND DURATION IN NEONATAL AND ADULT MICE [KISLORODNYI EFFEKT I ADAPTATSIONNYE REAKTSII KLETOK. IX - ZAVISIMOST' RADIOZASHCHITNOI EFFEKTIVNOSTI GAZOVOI GIPOKSII OT EE STEPENI I DLITEL'NOSTI NA NOVOROZHDENNYKH I POLOVOZRELYKH MYSHAKH]
A. L. VYGODSKAIA, N. P. VINSKAIA, B. Z. IVE, and S. P. IARMONENKO (Akademiia Meditsinskikh Nauk, Moscow, USSR) Radiobiologiia, vol. 22, Sept.-Oct. 1982, p. 608-613. In Russian. refs

A83-14880
THE EFFECT OF ADETURON ON THE SURVIVAL AND THE BLOOD SYSTEM OF MICE UNDER THE EFFECT OF VARIOUS TYPES OF IONIZING RADIATION [VLIIANIE ADETURONA NA VYZHIVAEMOST' I SISTEMU KROVI MYSHEI PRI VOZDEISTVII RAZLICHNYKH VIDOV IONIZIRUIUSHCHEI RADIATSII]
N. I. GVOZDEVA, K. S. CHERTKOV, I. NIKOLOV, M. F. SBITNEVA, I. A. SIDOROV, IU. IU. PREOBRAZHENSKII, B. S. FEDORENKO, and T. PANTEV Radiobiologiia, vol. 22, Sept.-Oct. 1982, p. 614-618. In Russian. refs

A83-14881
THE MODIFICATION WITH METHYLATED HEMATOPORPHYRIN OF THE COMBINED EFFECT OF RADIATION AND HYPERTHERMIA IN EXPERIMENTS ON ASYNCHRONOUS AND SYNCHRONOUS CELL CULTURES [MODIFIKATSIIA METILIROVANNYM GEMATOPORFIRINOM SOCHETANNOGO EFFEKTA RADIATSII I GIPERTERMII V OPYTAKH NA ASINKHRONNOI I SINKHRONIZIROVANNOI KUL'TURE KLETOK]
S. D. NOVOSELTSEVA, R. A. KLIMOVA, and E. I. IARTSEV Radiobiologiia, vol. 22, Sept.-Oct. 1982, p. 624-627. In Russian. refs

A83-14882
THE TOXICITY AND RADIOPROTECTIVE EFFECT OF MULTICOMPONENT COMBINATIONS OF SULFUR-CONTAINING COMPOUNDS [TOKSICHNOST' I RADIOZASHCHITNYI EFFEKT PRI MNOGOKOMPONENTNOM SOCHETANII SEROSODERZHASHCHIKH VESHCHESTV]
G. V. KALISTRATOV, L. P. BELAVINA, and P. G. ZHEREBCHENKO Radiobiologiia, vol. 22, Sept.-Oct. 1982, p. 628-632. In Russian. refs

The toxicity and radioprotective activity of various mixtures of sulfur-containing compounds were investigated in studies on mice. Results show that the radioprotective action of a multicomponent complex of sulfur-containing compounds significantly exceeds the effect of individual compounds. It is concluded that the increased therapeutic effect of a multicomponent combination results from the introduction of ingredients which have no toxic effect and also from the potentiation of the radioprotective effect in such multicomponent combinations. N.B.

A83-14883
THE MOLECULAR MECHANISMS OF THE INTERPHASE DEATH OF LYMPHOID CELLS. VI - A LOW MOLECULAR WEIGHT DNA FRACTION IN THE PRODUCTS OF THE DEGRADATION OF THE CHROMATIN OF IRRADIATED RAT THYMUS [MOLEKULIARNYE MEKHANIZMY INTERFAZNOI GIBELI LIMFOIDNYKH VLETOK. VI - NIZKOMOLEKULIARNAIA FRAKTSIIA DNK V SOSTAVE PRODUKTOV DEGRADATSII KHROMATINA TIMUSA OBLUCHENNYKH KPYS]
N. B. ZVONAREVA, B. D. ZHIVOTOVSKII, G. V. VOSKOBOINIKOV, and K. P. KHANSON (Ministerstvo Zdravookhraneniia SSSR, Tsentral'nyi Nauchno-Issledovatel'skii Rentgeno-Radiologicheskii Institut, Leningrad, USSR) Radiobiologiia, vol. 22, Sept.-Oct. 1982, p. 643-647. In Russian. refs

A83-14884
THE EFFECT OF HEAVY IONS ON MAMMALIAN CELLS. I - THE CYTOGENIC EFFECTS DURING THE IRRADIATION OF CHINESE HAMSTER CELLS INDUCED BY ACCELERATED IONS OF HELIUM, CARBON, AND NEON [DEISTVIE TIAZHELYKH IONOV NA KLETKI MLEKOPITAIUSHCHIKH. I - TSITOGENETICHESKIE EFFEKTY PRI OBLUCHENII KLETOK KITAISKOGO KHOMIACHKA USKORENNYMI IONAMI GELIIA UGLERODA I NEONA]
R. D. GOVORUN, N. I. RYZHOV, O. A. SMIRNOVA, A. I. PORTMAN, G. ERTSGREBER, and K. AIKHORN Radiobiologiia, vol. 22, Sept.-Oct. 1982, p. 648-653. In Russian. refs

A83-14885
THE EFFECT OF RADIATION ON THE POOL OF FREE AMINO ACIDS IN THE TISSUES OF RATS [VLIIANIE OBLUCHENIIA NA FOND SVOBODNYKH AMINOKISLOT V TKANIIAKH KRYS]
T. A. LAPTEVA and G. A. DOKSHINA (Tomskii Gosudarstvennyi Universitet, Tomsk, USSR) Radiobiologiia, vol. 22, Sept.-Oct. 1982, p. 666-669. In Russian. refs

It is shown that total-body irradiation of rats at a dose of 0.1806 C/kg changes the endogenous pool of free amino acids in the thymus, liver, spleen, and skeletal muscles shortly after irradiation. The content of most amino acids in the lymphoid tissues and mainly the gluconeogenic amino acids (glycine and alanine) in the muscles was found to be decreased 24 hr and 3 days after irradiation. In addition, a shift in the amino acid balance was detected in the livers of the animals at the same time intervals following irradiation. N.B.

A83-14886
THE ROLE OF CATECHOL-O-METHYLTRANSFERASE IN CATECHOLAMINE TRANSFORMATIONS IN THE HYPOTHALAMUS OF RATS AT LONG-TERM INTERVALS AFTER IRRADIATION [O ROLI KATEKHOL-O-METILTRANSFERAZY V PREOBRAZOVANII KATEKHOLAMINOV V GIPOTALAMUSE KPYS V OTDALENNYI PERIOD POSLE OBLUCHENIIA]
E. A. PROKUDINA and N. V. BAZANOVA (Ministerstvo Zdravookhraneniia SSSR, Tsentral'nyi Nauchno-Issledovatel'skii Rentgeno-Radiologicheskii Institut, Leningrad, USSR) Radiobiologiia, vol. 22, Sept.-Oct. 1982, p. 672-674. In Russian.

A83-14887
THE INHIBITORY EFFECT OF LINOLEIC ACID HYDROPEROXIDE ON THE ACTIVITY OF SUPEROXIDE DISMUTASE [INGIBIROVANIE AKTIVNOSTI SUPEROKSIDDISMUTAZY GIDROPEREKIS'IU LINOLENOVOI KISLOTY]
T. I. GUDZ, E. G. PESHKOVA, and E. N. GONCHARENKO (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR) Radiobiologiia, vol. 22, Sept.-Oct. 1982, p. 674-677. In Russian. refs

The effects of the primary products of linoleic acid oxidation on the activity of copper-containing superoxide dismutase (a substance that is known to possess marked radio-protective properties) isolated from rat livers were investigated. Results show that linoleic acid hydroperoxide has an inhibitory effect on superoxide dismutase, while aldehyde-containing compounds have no such inhibiting effect. It is concluded that one of the causes of the decrease in the activity of superoxide dismutase in the livers of irradiated animals is the accumulation of toxic products of the peroxidation of membrane lipids. N.B.

A83-14888
THE EFFECT OF MAGNETIC FIELDS ON THE RADIOSENSITIVITY OF MICE. I - THE EFFECT OF INFRALOW FREQUENCY MAGNETIC FIELDS OF LOW INTENSITY ON THE SURVIVAL OF EXPERIMENTAL ANIMALS AFTER GENERAL IRRADIATION WITH X-RAYS [VLIIANIE MAGNITNYKH POLEI NA RADIOCHUVSTVITEL'NOST' MYSHEI. I - O VLIIANII INFRANIZKOCHASTOTNYKH MAGNITNYKH POLEI MALOI NAPRIAZHENNOSTI NA VYZHIVAEMOST' PODOPYTNYKH ZHIVOTNYKH POSLE OBSHCHEGO RENTGENOVSKOGO OBLUCHENIIA]
A. N. KOPYLOV and M. A. TROITSKII (Simferopol'skii Gosudarstvennyi Universitet, Simferopol, Ukrainian SSR) Radiobiologiia, vol. 22, Sept.-Oct. 1982, p. 687-690. In Russian. refs

A83-14889
THE RADIOPROTECTIVE EFFECT OF A GASEOUS HYPOXIC MIXTURE ON HEMOPOIESIS IN MICE [RADIOZASHCHITNOE DEISTVIE GAZOVOI GIPOKSICHESKOI SMESI NA KROVETVORENIE U MYSHEI]
L. P. ZHAVORONKOV, R. B. STRELKOV, I. E. SKLOBOVSKAIA, and A. IA. CHIZHOV (Akademiia Meditsinskikh Nauk SSSR, Obninsk, SSSR) Radiobiologiia, vol. 22, Sept.-Oct. 1982, p. 696-699. In Russian. refs

A83-14890
THE MUTAGENIC EFFECT OF LASER RADIATION IN THE VISIBLE RANGE ON CULTURED HUMAN CELLS [MUTAGENNOE DEISTVIE LAZERNOGO IZLUCHENIIA VIDIMOI OBLASTI SPEKTRA NA KLETKI CHELOVEKA V KUL'TURE]
I. V. KHOKHLOV, V. A. MOSTOVNIKOV, and L. K. SHAMGINA (Akademiia Nauk Belorusskoi SSR, Institut Fiziki, Minsk, Belorussian SSR) Radiobiologiia, vol. 22, Sept.-Oct. 1982, p. 700-703. In Russian. refs

A83-14927
PHOTOBIOLOGICAL ASPECTS OF THE DAMAGE OF CELLS BY RADIATION [FOTOBIOLOGICHESKIE ASPEKTY RADIATSIONNOGO PORAZHENIIA KLETOK]
M. N. MIASNIK, V. A. SOKOLOV, and V. G. SKVORTSOV (Akademiia Meditsinskikh Nauk SSSR, Obninsk, USSR) Priroda, Oct. 1982, p. 32-38. In Russian. refs

The role of light in the repair of DNA after damage by ionizing radiation is reviewed. One of the two main repair processes of cells is photoreactive and receives the energy for repair by means of visible light. The biochemical bases of this photoreactive repair process are outlined and possible mechanisms for the photoreactive effect are discussed. N.B.

A83-15536
EFFECTS OF TIME AND DURATION OF EXPOSURE TO 12% O2 AND PRIOR FOOD DEPRIVATION ON HYPOXIC HYPOPHAGIA OF RATS
D. D. SCHNAKENBERG and Q. R. ROGERS (California, University, Davis, CA) Aviation, Space, and Environmental Medicine, vol. 53, Dec. 1982, p. 1202-1206. refs
(Contract NIH-AM-13252)

The effect of acute hypoxic exposure on food consumption in rats is investigated using a newly developed low cost, gas-dilution type, high-altitude simulator that provides access to the animals without disturbance to the gaseous atmosphere. Results show that the onset of hypoxic hypophagia occurs within the first 3 hr following abrupt ascent to a simulated altitude of 4419.6 m. The magnitude of the anorexic effect was found to be uniform throughout the first day of exposure to 12% O2, and food consumption rapidly recovered folowing return to a sea level atmosphere. It is concluded that the hypophagic effect of hypoxia is not absolute and that the severity of the hypophagia can be reduced by prior food deprivation, although the degree of attenuation of the hypophagic response is not directly related to the length of the deprivation period. It is suggested that food deprivation may sufficiently enhance metabolic-induced food demand signals to partially override the inhibitory effect of hypoxia on feeding behavior, or the metabolic perturbations associated with the food-deprived state may in some way minimize the severity of acute hypoxic stress. N.B.

A83-15675#
RADIOBIOLOGICAL RESEARCH IN SPACE
G. HORNECK and H. BUECKER (Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Institut fuer Flugmedizin, Cologne, West Germany) In: International Scientific Conference on Space, 22nd, Rome, Italy, March 25, 26, 1982, Proceedings. Rome, Rassegna Internazionale Elettronica Nucleare ed Aerospaziale, 1982, p. 307-316. refs

Reference is made to the Biostack experiments carried out on Apollo 16 and 17 and the Apollo Soyuz Test Project showing that a very high local concentration of absorbed energy produced by single HZE particles of cosmic radiation can cause serious biological damage in that entire cells can be damaged or destroyed. These findings are considered striking in view of the very low dose contribution of HZE particles to the total dose of cosmic radiation. Since, however, the Biostack experiments dealt with bacterial spores, plant seeds, and animal eggs and embryos, it is not clear how relevant the findings are to manned spaceflight. Even though the radiation resistance of man is significantly higher than that of the test organisms, especial care must be taken with regard to nonregenerating tissue, which includes portions of the central nervous system, in particular, certain cells of the sense organs, and such other specialized cells as those of the eye lens. The possibility of delayed effects from sublethally damaged cells must also be considered. C.R.

A83-15826
THE REGULATION OF THE DEFENSE FUNCTIONS OF ORGANISMS [REGULIATSIIA ZASHCHITNYKH FUNKTSII ORGANIZMA]
E. A. KORNEVA and V. A. SHEKOIAN Leningrad, Izdatel'stvo Nauka, 1982. 140 p. In Russian. refs

The regulation of nonspecific and specific (immunological) mechanisms for the defense of organisms is reviewed. Attention is focused on studies concerning the participation of deep structures of the brain, in particular the hypothalamus, in modulating the defense functions, since the hypothalamus is one of the areas of the brain responsible for the regulation of homeostatic reactions, which include immune homeostasis. Also discussed are the morphological aspects of the lysosome apparatus and the membranes of macrophages in the presence of a damaged hypothalamus, as well as the neuromediator correction of the immunogenesis process. N.B.

A83-15828
THE RHEOLOGY OF THE BLOOD [REOLOGIIA KROVI]
V. A. LEVTOV, S. A. REGIRER, and N. KH. SHADRINA Moscow, Izdatel'stvo Meditsina, 1982. 272 p. In Russian. refs

Studies concerning the mechanical properties of the blood are reviewed, and the finding are analyzed in light of traditional and recent data on the physiology and pathology of the blood and blood circulation. The mechanisms which cause the non-Newtonian properties of the blood, including the aggregation and movement of erythrocytes, are considered. The rheological processes of blood coagulation are examined. In addition, clinical aspects of blood rheology are discussed, including the rheological and microrheological properties of the blood during illnesses. N.B.

A83-15836
THE NEUROCHEMICAL AND FUNCTIONAL BASES OF LONG-TERM MEMORY [NEIROKHIMICHESKIE I FUNKTSIONAL'NYE OSNOVY DOLGOVREMENNOI PAMIATI]
IU. S. BORODKIN and IU. V. ZAITSEV (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Leningrad, Izdatel'stvo Meditsina, 1982. 216 p. In Russian. refs

The biochemical, neurochemical, and physiological processes involved in the formation of long-term memory are reviewed. The role of nonspecific proteins, neuropeptide hormones, and oligopeptides in the formation of engrams is examined. On the synaptic level, the neurochemical processes relating to membranes during memory formation and the role of the different neurotransmitter systems of the brain are considered. Attention is focused on the functional organization of the central nervous system at various stages of the formation, storage, and retrieval of memory traces of learned behavior. Studies concerning the pharmacology of memory and the search for nonspecific connectors, which are of great importance in the mechanism of the consolidation of engrams, are examined in detail. N.B.

A83-15890
PECULIARITIES OF THE REACTION OF CORTICAL PYRAMIDAL NEURONS TO THE CESSATION OF OXYGEN SUPPLY BY THE EFFECT OF CAMP [OSOBENNOSTI REAGIROVANIIA PIRAMIDNYKH NEIRONOV KORY NA PREKRASHCHENIE KISLORODNOGO SNABZHENIIA NA FONE VOZDEISTVIIA TSAMF]
M. O. SAMOILOV, D. G. SEMENOV, and N. G. IARANTSEV (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR) Fiziologicheskii Zhurnal SSSR, vol. 68, Oct. 1982, p. 1313-1321. In Russian. refs

A83-15891
THE COMPARATIVE ACTIVITY OF NEUROPEPTIDE MODULATORS OF MEMORY BEFORE AND AFTER ELECTROSHOCKS IN WHITE RATS [SRAVNITEL'NAIA AKTIVNOST' NEIROPEPTIDOV-MODULIATOROV PAMIATI DO I POSLE ELEKTROSHOKOVYKH VOZDEISTVII U BELYKH KRYS]
V. I. MEDVEDEV, V. D. BAKHAREV, and O. A. KAUROV Fiziologicheskii Zhurnal SSSR, vol. 68, Oct. 1982, p. 1322-1329. In Russian. refs

It is shown that neuropeptides have a pronounced effect on the processes of memory in white rats. The peptides eliminate the effect of electroshock amnesia, with arginine-vasopressin having the strongest effect, while exytocin, enkephalin, and melanocytin have a lesser activity. It is found that ACTH(4-7) and Leu-enkephalin speed up primary learning in the animals, while vasopressin and oxytocin improve long-term memory. These peptides are also able to reverse retrograde as well as antegrade amnesia and to preserve previously formed habits from disturbances by electric shocks, with vasopressin and the melanocytin inhibiting factor having the most pronounced antiamnesic effects. N.B.

A83-15892
AN INVESTIGATION OF THE ROLE OF THE SYMPATHETIC NERVOUS SYSTEM IN THE NEUROTROPHIC CONTROL OF MUSCLE FIBER MEMBRANES IN FROGS [IZUCHENIE ROLI SIMPATICHESKOI NERVNOI SISTEMY V NEIROTROFICHESKOM KONTROLE MEMBRANY MYSHECHNYKH VOLOKON U LIAGUSHKI]
E. M. VOLKOV and G. I. POLETAEV (Kazanskii Meditsinskii Institut, Kazan, USSR) Fiziologicheskii Zhurnal SSSR, vol. 68, Oct. 1982, p. 1362-1366. In Russian. refs

A83-15893
STATIC AND DYNAMIC COMPONENTS OF THE HETEROMETRIC REGULATION OF MYOCARDIAL CONTRACTIONS OF THE AURICLE AND VENTRICLE [STATICHESKII I DINAMICHESKII KOMPONENTY GETEROMETRICHESKOI REGULIATSII SOKRASHCHENII MIOKARDA PREDSERDIIA I ZHELUDOCHKA]
IU. L. PROTSENKO, V. IA. IZAKOV, and O. N. BERSHITSKAIA (Nauchno-Issledovatel'skii Institut Gigieny Truda i Profzabolevanii, Sverdlovsk, USSR) Fiziologicheskii Zhurnal SSSR, vol. 68, Oct. 1982, p. 1392-1397. In Russian. refs

A83-15894
A THEORETICAL ANALYSIS OF THE REGULARITIES OF THE BAINBRIDGE REFLEX [TEORETICHESKII ANALIZ ZAKONOMERNOSTEI PROIAVLENIIA REFLEKSA BEINBRIDZHA]
B. L. PALETS (Akademiia Nauk Ukrainskoi SSR, Institut Kibernetiki, Kiev, Ukrainian SSR) Fiziologicheskii Zhurnal SSSR, vol. 68, Oct. 1982, p. 1398-1403. In Russian. refs

A mathematical model is developed to describe the reactions of the heart rate (F) during increasing venous pressure. The model assumes that changes in F are determined by the interaction of the Bainbridge reflex and the arterial baroreflex, the functional capacity of which depends on the initial F. The results of the model are in good quantitative agreement with the experimental data from a number of investigations. The model can also be used to analyze the peculiarities of the F response to the volume of the load in various experimental conditions. N.B.

A83-15895
THE ROLE OF CENTRAL AND PERIPHERAL SEROTONINERGIC MECHANISMS [ROL' TSENTRAL'NYKH I PERIFERICHESKIKH SEROTONINERGICHESKIKH MEKHANIZMOV]
A. V. KONUSOVA (Novosibirskii Gosudarstvennyi Universitet, Novosibirsk, USSR) and N. K. POPOVA (Akademiia Nauk SSSR, Institut Tsitologii i Genetiki, Novosibirsk, USSR) Fiziologicheskii Zhurnal SSSR, vol. 68, Oct. 1982, p. 1416-1420. In Russian. refs

The effect of stimulating and blocking the serotonin receptors of the brain and the peripheral tissues on the development of acute hyperthermia was studied in white male rats overheated by an infrared lamp. Intraperitoneal injections of serotonin were found to lead to a strong and more rapid increase in the body temperature in comparison with the controls. This effect depended upon the dose of serotonin and was reduced after the intraperitoneal injection of cyproheptadine. The injection of serotonin in the lateral ventricle of the brain produced no effect on the development of hyperthermia. The blocking of the serotonin receptors of the brain by cyproheptadine or decreasing the level of serotonin in the brain by p-chlorophenylalanine resulted in a significantly greater increase in the temperature of the heated rats than in the controls. It is concluded that the serotoninergic mechanisms of the brain and the peripheral tissues play opposing roles in the reaction of the body to thermal radiation. N.B.

A83-15896
HEAT LOSS AND TISSUE METABOLISM IN WHITE MICE DURING THE RECOVERY AFTER ACUTE HYPOTHERMIA [TEPLOOTDACHA I METABOLIZM TKANEI U BELYKH MYSHEI PRI VYKHODE IZ OSTROI GIPOTERMII]
G. I. IBRAIMOVA and A. S. SEPISHEVA (Akademiia Nauk Kirgizskoi SSR, Institut Fiziologii i Eksperimental'noi Patologii Vysokogor'ia, Frunze, Kirgiz SSR) Fiziologicheskii Zhurnal SSSR, vol. 68, Oct. 1982, p. 1421-1426. In Russian. refs

A83-15897
THE MECHANISMS OF THE EFFECT OF THE ADAPTATION TO COLD ON THE RESISTANCE OF AN ORGANISM TO HYPEROXIA [O MEKHANIZMAKH VLIIANIIA ADAPTATSII K KHOLODU NA USTOICHIVOST' ORGANIZMA K GIPEROKSII]
A. A. KRICHEVSKAIA, V. S. SHUGALEI, A. A. ANANIAN, and E. G. STEPNINA (Rostovskii Gosudarstvennyi Universitet, Rostov-on-Don, USSR) Fiziologicheskii Zhurnal SSSR, vol. 68, Oct. 1982, p. 1427-1430. In Russian. refs

It was found that the effect of hyperoxia on male white rats in conditions of cold stress (3 day exposure at a temperature of 2-4 C) leads to a significant decrease in the content of urea (36-37%) and a decrease in the activity of arginase in the brain and liver by 23% and 32% respectively. The resistance of these animals to hyperoxia was reduced. However, a preliminary 45 day adaptation to cold at a temperature of 2-4 C increased the resistance of the animals to the effect of acute hyperoxia. The activity of arginase in the liver increased and the content of urea in the brain and liver increased by 32% and 30% respectively. It is concluded that the activation of arginase and the increase in urea are nonspecific biochemical mechanisms for increasing the resistance of animals against the effects of extreme environmental factors. N.B.

A83-15898
THE SIGNIFICANCE OF GLUCOCORTICOIDS IN THE REGULATION OF THE RESYNTHESIS OF GLYCOGEN IN THE POSTEXERCISE PERIOD AND THE MECHANISM OF THEIR ACTION [ZNACHENIE GLIUKOKORTIKOIDOV V REGULIATSII RESINTEZA GLIKOGENA V POSLERABOCHEM PERIODE I MEKHANIZM IKH DEISTVIIA]
P. K. KYRGE, A. K. ELLER, S. K. TIMPMANN, and E. K. SEPPET (Tartuskii Gosudarstvennyi Universitet, Tartu, Estonian SSR) Fiziologicheskii Zhurnal SSSR, vol. 68, Oct. 1982, p. 1431-1437. In Russian. refs

A83-16009#
EFFECTS OF EXPOSURE TO LOW O2 OR HIGH CO2 ENVIRONMENTS ON RESPIRATION IN HIBERNATING HAMSTERS AND GROUND SQUIRRELS
E. SAKAGUCHI, H. OSADA, T. SAKAGUCHI, I. SAKURAI, A. NAKAMURA (Japan Air Self-Defense Force, Aeromedical Laboratory, Tachikawa, Tokyo, Japan), and R. YURUGI (Japan Air Self-Defense Force, Aeromedical Laboratory, Tachikawa, Tokyo; National Defence Medical College, Japan) Japan Air Self Defence Force, Aeromedical Laboratory, Reports, vol. 23, June 1982, p. 59-72. In Japanese, with abstract in English. refs

The effect of low O2 and or high CO2 environments on the body temperature and respiration were investigated for hibernating and nonhibernating hamsters and ground squirrels in a cold environment at 6 C in winter. Among other results, it was found that when nonhibernating hamsters and ground squirrels were exposed to a hypobaria of 1/2 ata for 24 hr, their body temperature was lowered in the same way observed for nonhibernating animals such as rats and mice. During exposure to the hypobaria, some hibernating animals remained hibernating while others began to awake. The hibernating hamsters exhibited peculiar periodic breathing in which the long period of apnea was followed by several breathings with short intervals, although this breathing was not the Cheyne-Stokes or Biot's respiration. When the hibernating hamsters were exposed to a hypoxic gas mixture below 10% at normobaria, their respiratory rates were somewhat increased due to a shortening of the apneic period. It is concluded that respiration in the hibernating animals was controlled in the same manner observed in nonhibernating animals and that respiration acted to increase the ventilation according to the inspired gases of low O2 or high CO2. It is suggested that the arterial blood PCO2 might have a primary role in the regulation of respiration. N.B.

A83-16046
THE HAIR CELLS OF THE INNER EAR
A. J. HUDSPETH (California Institute of Technology, Pasadena, CA) Scientific American, vol. 248, Jan. 1983, p. 54-64.

The functioning of the hair cell in converting a mechanical force into an electrical signal is discussed. The anatomy and embryological development of the hair cell is described. The structure and function of the six receptor organs in which hair cells are found, the three semicircular canals, the utricle, the saccule, and the cochlea, are addressed. The experimental difficulties and their soulution in studying the conversion of the mechanical stimulus into electrical signals are described. The electrical phenomena that take place in the stimulated hair cell are discussed, showing why this cell is so exceptionally sensitive. Finally, the way in which the electrical signal is relayed to the brain is considered. C.D.

A83-16414
THE PEPTIDE DSIP AS A FACTOR FOR RAISING THE RESISTANCE OF ANIMALS TO EMOTIONAL STRESS [PEPTID DELTA-SNA KAK FAKTOR, POVYSHAIUSHCHII USTOICHIVOST' ZHIVOTNYKH K EMOTSIONAL'NOMU STRESSU]
E. V. KOPLIK, D. F. VEDIAEV, I. I. MIKHALEVA, A. S. SARGSIAN, V. T. IVANOV, and K. V. SUDAKOV (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Akademiia Nauk SSSR, Doklady, vol. 267, no. 1, 1982, p. 230-233. In Russian. refs

The effect of DSIP, a peptide whose neurotropic actions are unclear, on the resistance to emotional stress in rats is evaluated. Emotional stress is evoked in the experimental animals by confinement and electric shocks, and measured by changes in the arterial pressure of the animals. The peptide, in a dose of 60 mM/kg, is injected into the descending aorta 10 min before the initiation of the stress experiments. Results show that the peptide greatly changes the overall distribution of the animals' arterial pressure reactions to emotional stress, and the number of animals resistant to emotional stress is found to increase by more than 4 times after the injection of the peptide. In addition, the effect of a mixture of the individual amino acids comprising the peptide DSIP on the resistance of the animals to emotional stress is studied. It is found that this mixture of amino acids also increases the resistance of the animals, but by a lesser amount than the peptide. N.B.

N83-12842# Materials Research Labs., Melbourne (Australia).
A GUIDE TO THE PRINCIPAL MARINE FOULING ORGANISMS, WITH PARTICULAR REFERENCE TO COCKBURN SOUND, WESTERN AUSTRALIA
J. A. LEWIS Jul. 1982 30 p refs
(MRL-R-858; AR-003-040) Avail: NTIS HC A03/MF A01

The principal types of marine fouling organisms collected from the marine exposure raft at HMAS STIRLING, Cockburn Sound, Western Australia, are described and twenty-nine of the most abundant species are illustrated. Less common species are listed and references are given to facilitate further identification of fouling species both at this site and elsewhere in Australia. R.J.F.

N83-12843# District of Columbia Univ., Washington, D. C. Dept. of Biology.
A NEUROBEHAVIORAL STUDY OF RATS USING A MODEL PERFLUORINATED ACID, NDFDA Final Report
I. R. BACON 13 Jul. 1982 20 p refs
(Contract AF-AFOSR-0136-81; AF PROJ. 2312)
(AD-A118560; AFOSR-82-0634TR) Avail: NTIS HC A02/MF A01 CSCL 06T

Fischer 344 rats were treated with 10,20, or 30 mg/kg of nonadecafluorodecanoic acid (NDFDA) on day 12 of gestation. Negative controls were given the vehicle (propylene glycol and

water; 50:50) and positive controls were given a single ip injection of 500 mg/kg hydroxyurea (diluent, physiological saline). Developmental eruption, eye opening, and growth) and behavior, NDFDA was found to produce increased visuomotor development (visual placing). It is also caused decreased prenatal and postnatal weight gain, delayed cliff avoidance and surface righting, decreased open field rearing, aberrant swimming development and increased auditory startle. The observed effects indicate that NDFDA is a potential toxic neurochemical teratogen. Author (GRA)

N83-12844# Southwest Research Inst., San Antonio, Tex. Electronic Systems Div.

BIOTECHNOLOGY RESEARCH REQUIREMENTS FOR AERONAUTICAL SYSTEMS THROUGH THE YEAR 2000, VOLUME 1 Final Report, 1 Apr. 1981 - 30 Jul. 1982

H. H. PEEL 30 Jul. 1982 60 p 3 Vol.

(Contract F49620-81-C-0059; AF PROJ. 2305)

(AD-A118457; SWRI-14-6522-VOL-1; AFOSR-82-0642TR-VOL-1)

Avail: NTIS HC A04/MF A01 CSCL 01A

This report discusses the basic biotechnology research problems that require solution by the year 2000 to ensure optimum performance of manned Air Force aeronautical systems. The projected aeronautical systems for strategic, tactical and support systems are discussed, with emphasis placed on the roles of increased automation and information processing, as well as the increased physical stress of higher performance aircraft, extended mission durations and new weapon threats. Six generic areas of biotechnology are considered, along with the research needed to address the needs of the year 2000 aircrew. First discussed is the human-machine symbiosis needed in systems that will become extraordinarily complex. This is followed by the related needs in developing improved human-machine information interfaces that avoid overloading the human operator or pilot. Many missions of the future will be unforgiving and of high intensity. The problems and research needed to deal with the increased stress and to protect and enhance aircrews' performance during these missions are discussed in detail. The report discusses how simulators can be advanced to provide not only better training for aircrews, but also how they can be used in the development of new systems for optimizing the human-information-machine relationship. GRA

N83-12845# Southwest Research Inst., San Antonio, Tex. Electronic Systems Div.

BIOTECHNOLOGY RESEARCH REQUIREMENTS FOR AERONAUTICAL SYSTEMS THROUGH THE YEAR 2000, VOLUME 2 Final Report, 1 Apr. 1981 - 30 Jul. 1982

H. H. PEEL 30 Jul. 1982 204 p refs Proceedings of Biotechnol. Res. Requirements Study Session, San Antonio, 4-8 Jan. 1982 2 Vol.

(Contract F49620-81-C-0059; AF PROJ. 2305)

(AD-A118458; SWRI-14-6522-VOL-2; AFOSR-82-0643TR-VOL-2)

Avail: NTIS HC A10/MF A01 CSCL 01A

This report discusses the basic biotechnology research problems that require solution by the year 2000 to ensure optimum performance of manned Air Force aeronautical systems. The projected aeronautical systems for strategic, tactical and support systems are discussed, with emphasis placed on the roles of increased automation and information processing, as well as the increased physical stress of higher performance aircraft, extended mission durations and new weapon threats. Six generic areas of biotechnology are considered, along with the research needed to address the needs of the year 2000 aircrew. Author (GRA)

N83-12846# Naval Aerospace Medical Research Lab., Pensacola, Fla.

HYPERTHERMIA IN RHESUS MONKEYS EXPOSED TO A FREQUENCY (225 MHZ) NEAR WHOLE-BODY RESONANCE

W. G. LOTZ 1 Jun. 1982 13 p refs

(Contract MF5852402)

(AD-A118364; NAMRL-1284) Avail: NTIS HC A02/MF A01 CSCL 06R

Exposure of rhesus monkeys to 225 MHz radiation caused severe hyperthermia at power densities greater than 5 mW/sq cm (2.3 W/kg). A comparison of body temperature responses to exposure at two frequencies, 225 and 1290 MHz, indicated that the resonant frequency (225 MHz) is at least two times more effective in causing hyperthermia than the higher frequency, even after considerations of specific absorption rate are included in the analysis. It was concluded, therefore, that the effects on rhesus monkeys of exposure to a resonant frequency (225 MHz) were substantially greater than what could be predicted based upon straightforward comparisons of dosimetric information (SAR) and the effects of exposures to a much higher frequency (1290 MHz). Author (GRA)

N83-13778 Defence Research Information Centre, Orpington (England).

INVESTIGATIONS ON THE METHOD OF LONG TERM PRESERVATION OF LIVING BLOOD CELLS BY FREEZING Ph.D. Thesis - Tech. Hochschule, Aachen

M. W. SCHEIWE Aug. 1982 147 p refs Transl. into ENGLISH of 'Untersuch. zum verfahren der langzeitkonservierung lebender blutzellen durch gefrieren' (Aachen)

(DRIC-T-6438; BR84551) Avail: Issuing Activity

The processes in the freezing and thawing of the components of blood are discussed, and a thermodynamic model of the processes in freezing is presented. A cryomicroscope for the analysis of dynamic processes in freezing is described. The determination of water loss from erythrocytes and leukocytes, and intercellular crystallization temperatures were studied. The influence of hydroxyethyl starch on the cryopreservation of erythrocytes was considered and the systematic aspects of the crystallization of the solutions were investigated. Author (ESA)

N83-13779 Defence Research Information Centre, Orpington (England).

LUMINESCENCE SPECTRA OF SEA ULTRANANOPLANKTONIC 'OLIVE GREEN' CELLS

T. F. NARUSEVICH, P. P. MARTSENYUK, and V. N. KARNAUKHOV Jul. 1982 9 p refs Transl. into ENGLISH from Biol. Morya (Kiev), v. 51, 1979 p 52-55

(DRIC-T-6616; BR84268) Avail: Issuing Activity

Changes in the luminescence spectra of single olive green cells in the normal state and as affected by formalin, and 365 and 436 nm radiation were examined. The presence of compounds luminescent in the regions 687 to 690 and 530 to 550 nm was demonstrated. The spectra of live olive green cells show no evidence of the presence of phycobilin pigments. It is suggested that the olive green cells are not related to fungal spores nor to blue-green or red algae. Author (ESA)

N83-13780 Defence Research Information Centre, Orpington (England).

LUMINESCENCE OF NOCTILUCA MILIARIS AND THE CHARACTERISTICS OF ITS EXCITABILITY

E. P. BITYUKOV Aug. 1982 11 p refs Transl. into ENGLISH from Zhurnal Evolutsionnoi Biokhimi i Fiziol. (USSR), v. 2, no. 5, 1966 p 452-456

(DRIC-T-6728; BR84553) Avail: Issuing Activity

The excitability of the bioluminescence of the dinoflagellate noctiluca miliaris was characterized quantitatively by photometry of light of low intensity, when the organism was electrically stimulated to flashing. No species specific light response is reported. The magnitude of the light response is directly related to the magnitude of the exciting current. Chronaxie values suggest that noctiluca should be classed as rapid if Lapicque's terminology is used. Author (ESA)

N83-13781 Defence Research Information Centre, Orpington (England).
BIOLUMINESCENCE AS A HYDROOPTICAL AND BIOLOGICAL FACTOR IN THE OCEAN
I. I. GITELZON, O. G. BAKLANOV, V. S. FILIMONOV, A. S. ARTEMKIN, and V. F. SHATOKHIN Jul. 1982 17 p refs Transl. into ENGLISH from Trudy Moskovskogo Obshchestva Ispytatelei Prirody, (USSR), v. 21, 1965 p 147-155
(DRIC-T-6729; BR84270) Avail: Issuing Activity

Bathyphotometric investigations of regions of the Pacific and Indian Oceans are described. Bioluminescence was measured to a depth of 2000 m, using a specially designed instrument. Bioluminescence is found to vary in intensity and form depending on depth, time of day, quantity and species composition of bioluminescent organisms. Author (ESA)

N83-13782# New South Wales Univ., Kensington (Australia). Centre for Biomedical Engineering.
ELECTRORETINOGRAPHY M.S. Thesis
K. S. KRUSZELNICKI 1981 208 p refs
Avail: NTIS HC A10/MF A01

The electroretinogram (E.R.G.) is a low level electrical signal that is generated by the retina in response to stimulation by light. The apparatus that records E.R.G.s for diagnostic purposes is described. The function of the rod cells of the retina is evoked dark adaptation. Both visual electrophysiology and dark adaptation are discussed. Various specialized devices were manufactured to test dark adaptation, and to enable the operator/s to work in the dark without destroying their own dark adaptation, and details of their construction and testing are given. Cone function was tested in subjects following exposure to light intensities normal for the working environment. S.L.

N83-13783# Joint Publications Research Service, Arlington, Va.
USSR REPORT: SPACE BIOLOGY AND AEROSPACE MEDICINE, VOLUME 16, NO. 5, SEPTEMBER - OCTOBER 1982
9 Nov. 1982 154 p refs Transl. into ENGLISH of Kosm. Biol. i Aviakosmicheskaya Med. (Moscow), v. 16, no. 5, Sep. - Oct. 1982 96 p
(JPRS-82194) Avail: NTIS HC A08

Articles on the effects of space flight stress and on man and animals and other aspects of aerospace medicine are presented.

N83-13795# Joint Publications Research Service, Arlington, Va.
BIOCHEMICAL CHANGES IN CANINE BLOOD PLASMA UNDER EFFECT OF REPEATED EXPOSURE TO ACCELERATIONS
R. A. VARTBARONOV, G. D. GLOD, Y. P. LANOVENKO, and N. N. UGLOVA *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 16 (JPRS-82194) p 86-89 9 Nov. 1982 refs Transl. into ENGLISH from Kosm. Biol. i Aviakosmicheskaya Med. (Moscow), v. 16, no. 5, Sep. - Oct. 1982 p 60-61
Avail: NTIS HC A08

Dogs were exposed for 3 months to +Gz acceleration applied three times a day for 3 days a week. Biochemical measurements showed the largest changes (decrease in total protein, increase in sugar, bilirubin, cholesterol, alkaline phosphatase and transaminases) after the first day of the repeated exposure to +Gz. Following 1 to 3 months of the exposure, the changes decreased significantly; however, the K+ concentration continued to decline and that of alkaline phosphatase continued to increase. It is indicated that the development of adaptation to repeated +Gz exposures differs from that to short term exposures. E.A.K.

N83-13796# Joint Publications Research Service, Arlington, Va.
REPRODUCTIVE FUNCTION IN MALE RATS AFTER FLIGHT ABOARD COSMOS-1129 BIOSATELLITE
L. V. SEROVA, L. A. DENISOVA, Z. I. APANASENKO, M. A. KUZNETSOVA, Y. S. MEYZEROV, and N. A. CHELNAYA *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 16 (JPRS-82194) p 90-95 9 Nov. 1982 refs Transl. into ENGLISH from Kosm. Biol. i Aviakosmicheskaya Med. (Moscow), v. 16, no. 5, Sep. - Oct. 1982 p 62-65
Avail: NTIS HC A08

Male rats which were flown for 18.5 days on Cosmos-1129 were mated postflight with intact females. The mating took place 5 days postflight, when the ejaculate consisted of spermatozoids that were exposed to zero-g effects in the mature stage, and yielded a litter which lagged behind the controls in growth and development during the first postnatal month. The mating which took place 2.5-3 months postflight, when the ejaculate consisted of spermatozoids that were exposed to zero-g effects at the stem cell stage, yielded a litter which did not differ from the control. E.A.K.

N83-13797# Joint Publications Research Service, Arlington, Va.
EFFECT OF STRESS ON NUCLEIC ACID METABOLISM IN RAT SPLEEN AND LIVER FOLLOWING FLIGHT ABOARD COSMOS-1129 BIOSATELLITE
G. S. KOMOLOVA, Y. N. TROITSKAYA, I. A. YEGOROV, and R. A. TIGRANYAN *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 16 (JPRS-82194) p 96-101 9 Nov. 1982 refs Transl. into ENGLISH from Kosm. Biol. i Aviakosmicheskaya Med. (Moscow), v. 16, no. 5, Sep. - Oct. 1982 p 66-69
Avail: NTIS HC A08

Changes in nucleic acid metabolism of the spleen and liver of rats flown for 18.5 days on Cosmos-1129 were investigated. Postflight changes in liver RNA synthesis after an additional stress effect (immobilization) were noted to a lesser degree in the rats than in the controls. The DNA synthesis remained essentially at the preflight level. The tissue content of nucleic acids suggests that postflight the dystrophic changes induced by the additional stress effect increased. It is suggested that an exposure to space flight contributes to the depletion of compensatory mechanisms maintaining the normal level of metabolic processes. E.A.K.

N83-13798# Joint Publications Research Service, Arlington, Va.
EFFECT OF EXCESSIVE PHOSPHORUS INTAKE ON SOME ASPECTS OF PHOSPHORUS-CALCIUM METABOLISM AND CONDITION OF BONE TISSUE IN HYPOKINETIC RATS
M. S. BELAKOSKIY, N. V. BLAZHEYEVICH, V. B. SPIRICHEV, I. N. SERGEYEV, and N. Y. SPISYNA *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 16 (JPRS-82194) p 102-107 9 Nov. 1982 refs Transl. into ENGLISH from Kosm. Biol. i Aviakosmicheskaya Med. (Moscow), v. 16, no. 5, Sep. - Oct. 1982 p 70-73
Avail: NTIS HC A08

The exposure of rats fed with the diet containing Ca:P = 1:05-1:3 to hypokinesia produced by hypocalciemia, osteoporosis and increased renal calcinosis. The reduced phosphorus consumption prevented the disorders in the intact animals and increased bone density in the hypokinetic rats. The excessive phosphorus consumption caused hypocalciemia, hyperphosphatemia and slight osteoporosis in both intact and hypokinetic rats. It is concluded that the diet with Ca:P = 1:0.5-1:1 is optimal for hypokinetic rats. E.A.K.

N83-13803# Joint Publications Research Service, Arlington, Va.
SEROTONIN CONCENTRATION IN ISOLATED NUCLEI OF THE HYPOTHALAMUS, LIMBIC SYSTEM AND BRAIN OF RATS FOLLOWING FLIGHT ABOARD COSMOS-1129 BIOSATELLITE
J. CHULMAN, R. KWETNIANSKY, and R. A. TIGRANYAN *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 16 (JPRS-82194) p 131-135 9 Nov. 1982 refs Transl. into ENGLISH from Kosm. Biol. i Aviakosmicheskaya Med. (Moscow), v. 16, no. 5, Sep. - Oct. 1982 p 87-89
Avail: NTIS HC A08

Serotonin (5-hydroxytryptamine) in isolated nuclei of the rat hypothalamus, limbic system, brain stem and cerebellum after a long term spaceflight aboard Cosmos-1129 biosatellite was investigated. It is noted that the greatest changes in serotonin concentration are observed in some hypothalamic nuclei of flight group rats submitted to repeated immobilization after the flight. It appears that reactivity of the hypothalamic serotoninergic system of these animals was altered; which could be significant to the regulation of various autonomic functions. E.A.K.

52

AEROSPACE MEDICINE

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

A83-13250
ASTRONAUTS CAN'T STOMACH ZERO GRAVITY
M. M. WALDROP Science, vol. 218, Dec. 10, 1982, p. 1106.

The problem of space sickness, i.e., motion sickness, during Shuttle flights is discussed. It is noted that the illness usually occurs soon after orbit is assumed, then lasts for two days before disappearing. This is not a problem on long-duration missions, but becomes significant when considering the tight schedule on a 7-day Shuttle flight. No definite predictive techniques have been found to identify persons who are subject to space sickness. Dosages of ScopDex, a combination of scopalamine and dexedrine, have proven to be different for different individuals. Attempts to use biofeedback techniques to give the astronauts control over their autonomic nervous systems are being considered. Possible sources for the illness are considered, including conflicts between auditory, visual, and proprioceptive sensors. M.S.K.

A83-13281
RETROACTIVE PHENOMENA IN THE VISUAL SYSTEM [RETROAKTIVNYE IAVLENIIA V ZRITEL'NOI SISTEME]
R. M. MESHCHERSKII Psikhologicheskii Zhurnal, vol. 3, Jan.-Feb. 1982, p. 141-150. In Russian. refs

The significance of retroactive phenomena in the activity of the visual system is investigated, particularly in the case of spatial-temporal (subjective) interaction. The types of retroactive effects are classified, including Brock-Sulzer's effect, Crawford's effect (reverse masking), overprinting, metacontrast, successive omission, mixture of colors, apparent movements, and short-term visual storage. N.B.

A83-13290
THE RETINAL VISUAL ACUITY OF NORMAL EYES [RETINAL'NAIA OSTROTA ZRENIIA NORMAL'NYKH GLAZ]
E. S. AVETISOV, E. SH. SHAPIRO, D. G. BEGISHVILI, S. L. SHAPOVALOV, V. N. TARASENKOV, and E. B. ANIKINA (Moskovskii Nauchno-Issledovatel'skii Institut Glaznykh Boleznei, Moscow, USSR) Oftal'mologicheskii Zhurnal, vol. 37, no. 1, 1982, p. 32-36. In Russian. refs

The distinguishing power of the retina (retinal visual acuity) is measured by means of laser retinography in order to provide baseline data on the normal visual capacities of adults and children. Measurements were performed on 188 normal adult eyes (ages 18-35) and on 106 practically healthy childrens' eyes (ages 3-7). An anisotropy is found to exist in the normal eyes of both adults and children, expressed as a retinal astigmatism in which acuity differs in different retinal meridians. From these measurements retinal acuity norms are presented corresponding to a positive acuity when acuity is at least 1.0 along any two meridians and not less than 0.8 in the remaining meridians. Retinal acuity and degree of astigmatism are found not to differ between adults and children, although in children there exists a functional isolation between rapidly developing distinguishing ability and the objects of vision. Finally, the decrease in visual acuity from the center to the periphery is attributed to a significant degree to the neuroreceptor apparatus. A.L.W.

A83-13293
COLOR-STRESS AS A METHOD FOR DETECTING THE FOCAL REACTION IN ENDOGENOUS UVEITIS [TSVETOSTRESS KAK METOD VYIAVLENIIA OCHAGOVOI REAKTSII PRI ENDOGENNYKH UVEITAKH]
N. I. SHPAK and N. I. NARITSYNA (Odesskii Nauchno-Issledovatel'skii Institut Glaznykh Boleznei i Tkanevoi Terapii, Odessa, Ukrainian SSR) Oftal'mologicheskii Zhurnal, vol. 37, no. 3, 1982, p. 164-166. In Russian.

A83-13294
A CASE OF RECORDING CHANGES IN THE RHYTHM OF SYSTOLES ON AN OPTHALMOTONOGRAM [SLUCHAI REGISTRATSII NA OFTAL'MOTONOGRAMME IZMENENII RITMA SERDECHNYKH SOKRASHCHENII]
N. V. KOSYKH, A. N. PASTUKHOVA, and V. B. RYBAS (Omskii Meditsinskii Institut, Omsk, USSR) Oftal'mologicheskii Zhurnal, vol. 37, no. 3, 1982, p. 189. In Russian.

The effect of general hemodynamics on the blood circulation within the eye is investigated in clinical situations by observing the changes in the tonographic curves of patients with ventricular extrasystole. It is found that the disruption of the rhythm of the heart hardly has a great significance in the steady changes of pressure within the eye, since after cessation for even an extended period the extrasystole tonographic curves coincide with the natural continuations of its beginning. N.B.

A83-13576
CHANGES IN EMG POWER SPECTRUM /HIGH-TO-LOW RATIO/ WITH FORCE FATIGUE IN HUMANS
J. MOXHAM, R. H. T. EDWARDS, M. AUBIER, A. DE TROYER, G. FARKAS, P. T. MACKLEM (University College, London, England; Royal Victoria Hospital, Montreal, Canada), and C. ROUSSOS Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology, vol. 53, Nov. 1982, p. 1094-1099. Research supported by the Medical Research Council of Canada, Wellcome Trust, and Muscular Dystrophy Group of England. refs

The EMG high-to-low ratio and the force response of muscle to electrical stimulation during and following high-load contractions were investigated in humans in order to establish the relationship of these different indices of muscle fatigue. Results show that the fall in the EMG high-to-low ratio observed during two types of heavy prolonged muscular exercise was rapidly restored to normal during the recovery period. The forces developed in response to electrical stimulation of 100 Hz rapidly returned to normal during recovery, which illustrates the rapid resolution of high-frequency fatigue, while the force developed from 20 Hz stimulation was reduced for many minutes showing the characteristic slow recovery of low-frequency fatigue. In addition, the change in the EMG high-to-low ratio had a similar time course to the force response to phrenic nerve stimulation at 100 Hz, although it was not affected in any way be the presence or absence of low-frequency fatigue. N.B.

A83-13577
NONINVASIVE CARDIAC OUTPUT DETERMINATION USING INHALED OXYGEN-15-LABELED CARBON DIOXIDE
N. M. BRASLOW, C. A. HALES, B. HOOP, D. J. KANAREK, and H. KAZEMI (Massachusetts General Hospital, Boston; Harvard University, Cambridge, MA) Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology, vol. 53, Nov. 1982, p. 1125-1132. refs
(Contract NIH-HL-07354)

A noninvasive technique is developed for the determination of CO which employs the clearance of inhaled oxygen-15-labeled carbon dioxide from the lung following single bolus inhalation. Two different techniques for the determination of CO are evaluated based on a modified indicator-dilution approach using oxygen-15-labeled CO2 to label the pulmonary capillary and parenchymal lung water. The analysis of clearance from the lungs and the emergence into blood is solved to obtain the values for CO. Comparisons of indocyanine green dye-dilution CO to experimentally determined CO in mongrel dogs shows that this technique is sufficiently accurate and reproducible to be developed for clinical use. N.B.

A83-13578
RESTORATION OF THERMOREGULATORY RESPONSE TO BODY COOLING BY COOLING HANDS AND FEET
R. N. M. VAN SOMEREN, S. R. K. COLESHAW, P. J. MINCER, and W. R. KEATINGE (London Hospital Medical College, London, England) Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology, vol. 53, Nov. 1982, p. 1228-1233. Research supported by the Science and Engineering Research Council. refs

Hypothermia, with deep body temperatures below 35 C, in which the cooling was insidious with little shivering or sensation of cold, was investigated to see whether insidious body cooling of this kind resulted either from exposure to a uniform skin temperature near 29 C or from some effect of prolonged immersion of the skin on local temperature receptors. In addition, the effect of local cooling of the hands and feet on restoring the normal thermoregulatory response was studied. Results show that deep body temperature fell progressively by 0.5-1.4 C during 3 hr immersions in 29 C water. Both in unacclimatized subjects and to a lesser extent in divers in cold-water training, cooling the hands and feet for 1 hr in 12 C water during such immersion caused a sensation of cold, shivering, and a rise in metabolic rate. Tissue conductances generally fell in divers but rose in unacclimatized subjects. Soaking the skin for 4 hr produced no major changes in cutaneous thermal sensation assessed in the forearm, although with seawater it sometimes reduced cold sensation and with distilled water sometimes reduced warm sensation. It is concluded that uniform skin temperature of 29 C often induces insufficient heat-gain reflexes to maintain body temperature and that cooling of the extremeties can restore adequate thermoregulatory response. N.B.

A83-13579
HUMAN BREATHING PATTERNS ON MOUTHPIECE OR FACE MASK DURING AIR, CO2, OR LOW O2
J. A. HIRSCH and B. BISHOP (New York, State University, Buffalo, NY) Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology, vol. 53, Nov. 1982, p. 1281-1290. refs
(Contract F41609-75-C-0003; NIH-P01-HL-14414)

Steady-state breathing patterns on mouthpiece and noseclip (MP) and face mask (MASK) during air and chemostimulated breathing were obtained from pneumotachometer flow. On air, all 10 subjects decreased frequency (f) and increased tidal volume (VT) on MP relative to that on MASK without changing ventilation (VE), mean inspiratory flow (VT/TI), or mean expiratory flow (VT/TE). On elevated CO2 and low O2, MP exaggerated the increase in VE, f, and VT/TE due to profoundly shortened TE. On elevated CO2, MASK exaggerated VT increase with little change in f. Increased VE and VT/TI were thus due to increased VT. During low O2 on MASK, both VT and f increased. During isocapnia, shortened TE accounted for increased f; during hypocapnia, increased f was related primarily to shortened TI. Thus the choice of a mouthpiece or face mask differentially alters breathing pattern on air and all components of ventilatory responses to chemostimuli. In addition, breathing apparatus effects are not a simple consequence of a shift from oronasal to oral breathing; since a noseclip under the mask did not change breathing pattern from that on mask alone. (Author)

A83-13602
CONCERNING THE SO-CALLED LASER STIMULATION OF THE MACULA LUTEA AND THE POSSIBILITY OF THEORETICAL INTERPRETATION OF THE MECHANISM OF ITS ACTION [O TAK NAZYVAEMOI LAZERNOI STIMULIATSII ZHELTOGO PIATNA I VOZMOZHNOSTI TEORETICHESKOI INTERPRETATSII MEKHANIZMA EE DEISTVIIA]
M. M. KRASNOV, A. V. BOLSHUNOV, G. G. ZIANGIROVA, and N. N. PIVOVAROV (Ministerstvo Zdravookhraneniia SSSR, Vsesoiuznyi Nauchno-Issledovatel'skii Institut Glaznykh Boleznei, USSR) Oftal'mologicheskii Zhurnal, vol. 37, no. 4, 1982, p. 197-201. In Russian. refs

A technique has been developed for the laser stimulation of the macula lutea in macular dystrophies, utilizing a device based on the helium-neon laser OKG-13. The laser stimulation consisted of a three-minute exposure of the patient's eye to non-focused, parallel laser beams in the pulsed mode with a frequency of 10 Hz and a constant voltage of 0.25 mV. The use of this treatment for 52 eyes of 45 patients with senile (34 eyes, 31 patients) and myopic (18 eyes, 14 patients) macular dystrophies has produced a positive therapeutic effect in 39 eyes, including a rise of visual acuity, a reduction in the size of scotomas, an improvement of macular test indices, and an increase in the value of the modulated critical fusion frequency to red color by an average of 5-6 Hz. It is concluded that the mechanism of the therapeutic action of laser stimulation involves an increase in the phagocytic activity of the pigmented epithelium of the retina and, possibly, the direct effect of the laser radiation on the disintegration products of the neuroreceptors. N.B.

A83-13603
THE STIMULATING EFFECT OF A HELIUM-NEON LASER IN ACUTE INFLAMMATORY PROCESSES OF THE EYE [STIMULIRUIUSHCHEE DEISTVIE GELII-NEONOVOGO LAZERA PRI OSTRYKH VOSPLAITEL'NYKH PROTSESSAKH GLAZA]
G. S. SEMENOVA, I. I. VOROBEVA, V. P. SEMENOV, and T. P. DONARSKAIA (L'vovskii Meditsinskii Institut Lvov, Ukrainian SSR) Oftal'mologicheskii Zhurnal, vol. 37, no. 4, 1982, p. 201-204. In Russian. refs

A83-13604
STIMULATION LASER THERAPY FOR DISEASES OF THE CORNEA WITH THE IRRADIATION OF A RUBY LASER [STIMULIRUIUSHCHAIA LAZERNAIA TERAPIIA ZABOLEVANII ROGOVITSY IZLUCHENIEM RUBINOVOGO OKG]
E. S. LIBMAN, IU. I. KIIKO, and S. V. IVANOV (Moskovskii Tsentr Reabilitatsii Invalidov po Zreniiu, Moscow; Tsentral'nyi Nauchno-Issledovatel'skii Institut Ekspertizy Trudosposobnosti i Organizatsii Truda Invalidov, USSR) Oftal'mologicheskii Zhurnal, vol. 37, no. 4, 1982, p. 204-207. In Russian. refs

A83-13605
THE EFFECTIVENESS OF STIMULATING ARGON LASER THERAPY FOR SOME FORMS OF MACULAR DYSTROPHY [EFFEKTIVNOST' STIMULIRUIUSHCHEI ARGONLAZERNOI TERAPII PRI NEKOTORYKH FORMAKH MAKULODISTROFII]
A. S. SMELOVSKII, M. N. BOIKOVA, and V. P. IANUKOVICH (Kalininskii Meditsinskii Institut, Kalinin, USSR) Oftal'mologicheskii Zhurnal, vol. 37, no. 4, 1982, p. 207-209. In Russian. refs

A83-13606
THE STIMULATING ACTION OF COAGULATING LASER INTERVENTIONS IN MACULAR PATHOLOGIES [STIMULIRUIUSHCHEE DEISTVIE KOAGULIRUIUSHCHIKH LAZERNYKH VMESHATEL'STV PRI MAKULIARNOI PATOLOGII]
IU. A. IVANISHKO and A. A. BOCHKAREVA (Rostovskii Meditsinskii Institut, Rostov-on-Don, USSR) Oftal'mologicheskii Zhurnal, vol. 37, no. 4, 1982, p. 209-211. In Russian. refs

A83-13607
A STIMULATING LASER THERAPY FOR SCLEROTIC AND POSTTRAUMATIC CENTRAL DYSTROPHIES OF THE RETINA [STIMULIRUIUSHCHAIA LAZERNAIA TERAPIIA PRI SKLEROTICHESKIKH I POSTTRAVMATICHESKIKH TSENTRAL'NYKH DISTROFIIAKH SETCHATOI OBOLOCHKI]
I. L. BARONETSKAIA and E. S. PUKHLIK (Odesskii Nauchno-Issledovatel'skii Institut Glaznykh Boleznei i Tkanevoi Terapii, Odessa, Ukrainian SSR) Oftal'mologicheskii Zhurnal, vol. 37, no. 4, 1982, p. 212-214. In Russian. refs

A83-13608
LASER STIMULATION IN THE COMPREHENSIVE THERAPY OF CENTRAL DYSTROPHIES OF THE RETINA [LAZERNAIA STIMULIATSIIA V KOMPLEKSNOI TERAPII TSENTRAL'NYKH DISTROFII SETCHATKI]
S. N. BERENOV and B. G. ORAZMUKHAMEDOV (Turkmenskii Nauchno-Issledovatel'skii Institut Glaznykh Boleznei, Ashkhabad, Turkmen SSR) Oftal'mologicheskii Zhurnal, vol. 37, no. 4, 1982, p. 214-216. refs

A83-13609
CONDITION OF THE ORGANUM VISUS IN PERSONS PERFORMING PRECISION WORK [SOSTOIANIE ORGANA ZRENIIA U LITS, VYPOLNIAIUSHCHIKH PRETSIZIONNYE TRUDOVYE OPERATSII]
V. V. KOVALENKO and A. D. LIMAN (Khar'kovskii Nauchno-Issledovatel'skii Institut Gigieny Truda i Profzabolevanii Kharkov, Ukrainian SSR) Oftal'mologicheskii Zhurnal, vol. 37, no. 4, 1982, p. 238-241. In Russian. refs

Results are presented of ophthalmological studies of workers engaged in high-precision operations. Examinations were performed on two groups of workers of the same classification, with one group engaged in precision adjustment and assembly and the other serving as a control. Among the characteristics observed more frequently in the study group than the control were a hyperemia of the palpebral and bulbar conjunctiva and vascular disturbances in the fundus oculi. Although the refractive characteristics of the two groups of precision workers and the control group were similar and within the limits of normalcy, the corneal refractivity in the study group showed a two-peaked distribution in the horizontal meridian. High-precision workers were also observed to have a higher prevalence of asthenoptic complaints, accompanied by a higher rate of astigmatism, hypermetropia, emmetropia and mypoia in these individuals. Reexaminations two years later revealed a greater tendency to decreases in visual acuity in the study group, and the development and aggravation of mypoia. Results thus demonstrate the importance of regular ophthalmological examinations for precision workers, as well as the effects of working conditions on the visual organs. A.L.W.

A83-13611
A METHODOLOGICAL APPROACH TO THE DETERMINATION OF ENERGY EXPENDITURES DURING PERIODS OF ATHLETIC TRAINING ACTIVITIES [METODICHESKII PODKHOD K OPREDELENIIU ENERGOTRAT ZA PERIOD SPORTIUNOGO TRENIROVOCHNOGO ZANIATIIA]
M. M. FILIPPOV (Akademiia Nauk Ukrainskoi SSR, Institut Fiziologii, Kiev, Ukrainian SSR) Gigiena i Sanitariia, Sept. 1982, p. 63, 64. In Russian.

A83-13612
A PHYSIOLOGICAL-HYGIENIC EVALUATION OF EYE FATIGUE IN WOMEN WORKERS OF THE WARPING SHOP AT A WEAVING MILL [FIZIOLOGO-GIGIENICHESKAIA OTSENKA ZRITEL'NOGO UTOMLENIIA U RABOTNITS SNOVAL'NOGO TSEKHA TKATSKOI FABRIKI]
IU. M. STENKO, I. N. DANTSIG, and A. V. DIEV (Ministerstvo Zdravookhraneniia SSSR, Nauchno-Issledovatel'skii Institut Gigieny Vodnogo Transporta, Moscow, USSR) Gigiena Truda i Professional'nye Zabolevaniia, Sept. 1982, p. 30-33. In Russian. refs

A83-13613
METHODS FOR CALCULATING THE OPTIMAL AND ALLOWABLE IRRADIATION LEVELS DURING RADIANT HEATING [METODIKA RASCHETA OPTIMAL'NYKH V DOPUSTIMYKH UROVNEI OBLUCHENNOSTEI PRI LUCHISTOM OBOGREVE]
A. E. KOVALEV and V. N. SHAMARIN (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Gigiena Truda i Professional'nye Zabolevaniia, Sept. 1982, p. 37-41. In Russian. refs

Methods are developed for calculating the optimal and allowable irradiation levels for the whole or individual parts of the human body during radiant heating. The methods are based on the principle of the equivalence of the optimal or allowable heating conditions of humans during convection heating and radiant heating. The methods utilize the microclimate parameters established by the All-Union State Standard 12.1.005-76 and SN 245-71. N.B.

A83-13614
A COMPARISON OF SEVERAL METHODS FOR MEASURING VARIABLE OCCUPATIONAL NOISE FOR THEIR HYGIENIC EVALUATION [SRAVNENIE RAZNYKH METODOV IZMERENIIA NEPOSTOIANNYKH PROIZVODSTVENNYKH SHUMOV DLIA IKH GIGIENICHESKOI OTSENKI]
V. G. SHINEV and A. G. GAMBASHIDZE (Akademiia Meditsinskikh Nauk, Moscow, USSR) Gigiena Truda i Professional'nye Zabolevaniia, Sept. 1982, p. 41-44. In Russian.

A83-13615
THE COMBINED EFFECT OF NOISE, VIBRATION, AND HIGH TEMPERATURES ON THE CONDITION OF THE SYMPATHETIC-ADRENAL SYSTEM IN SAILORS [VLIIANIE SOCHETANNOGO DEISTVIIA SHUMA, VIBRATSII I VYSOKIKH TEMPERATUR NA SOSTOIANIE SIMPATIKO-ADRENALOVOI SISTEMY U MORIAKOV]
T. D. BOLSHAKOVA (Ministerstvo Zdravookhraneniia SSSR, Institut Gigieny Vodnogo Transporta, Moscow, USSR), A. M. VOITENKO, N. A. NEIZHMAKOVA, and L. M. SHAFRAN (Ministerstvo Zdravookhranemiia SSSR, Institut Gigieny Vodnogo Transporta, Odessa, Ukrainian SSR) Gigiena Truda i Professional'nye Zabolevaniia, Sept. 1982, p. 44-46. In Russian. refs

A83-13616
TWO TYPES OF ADAPTATION REACTIONS OF THE BLOOD CIRCULATION APPARATUS [O DVUKH TIPAKH PRISPOSOBITEL'NYKH REAKTSII APPARATA KROVOOBRASHCHENIIA]
N. N. SAVITSKII Kardiologiia, vol. 22, Sept. 1982, p. 7-9. In Russian.

A review is presented of research concerning the adaptation reactions of the blood circulation apparatus and how the energetic losses which take place during pathological changes occur in the human body. One adaptation reaction, hyperkinesia, is found to occur during chronic anemia. While hyperkinesia helps the human body to adapt to chronic anemia, the reaction exerts a significant load on the heart and the heart becomes unable to supply the needs of the body during long-term cases of anemia. The second type of adaptation reaction of the blood circulation apparatus, hypokinesia, is found to occur during hypertonia. It is concluded that these compensatory reactions act to increase the action of the heart, accelerate the blood flow, and raise the minute volume during corresponding demands of the body. It is also shown that

in special conditions the compensation of blood circulation can be provided for by the opposite reaction - hypokinetic circulation. N.B.

A83-13617
THE 'VOLUME-DEPENDENT' FORM OF ESSENTIAL HYPERTENSION ['OB'EM-ZAVISIMAIA' FORMA GIPERTONICHESKOI BOLEZNI]
M. S. KUSHAKOVSKII and N. V. IVANOVA (Leningradskii Institut Usovershenstvovaniia Vrachei, Leningrad, USSR) Kardiologiia, vol. 22, Sept. 1982, p. 9-13. In Russian. refs

The extracellular, intravascular, and interstitial fluid volumes were measured in 67 patients with essential hypertension stage II, using (Na-82)Br and (I-131)-albumin techniques. Also, the central hemodynamic parameters of these patients were determined, and the renin activity and the plasma aldosterone levels were assayed by radioimmunology. The clinical, hemodynamic, and biochemical patterns of the hyperhydration-hypervolemic essential hypertension are described. Among the patients with essential hypertension stage II, 15.5% were found to have extracellular hyperhydration, and 7.5% had hypervolemic hypertension. An inverse relationship was established between the total peripheral resistance and the circulating plasma volume in normovolemic and hypovolemic hypertension. The coefficient that reflects the ratio between the plasma and the interstitial fluid volumes was shown to indicate an adaptive redistribution of the fluid into the interstitial spaces in some patients. N.B.

A83-13618
THE HEMODYNAMIC PARALLELS BETWEEN THE TYPES OF CENTRAL AND CEREBRAL BLOOD CIRCULATION IN INDIVIDUALS WITH NORMAL ARTERIAL PRESSURE [GEMODINAMICHESKIE PARALELLI MEZHDU TIPAMI TSENTRAL'NOGO I TSEREBRAL'NOGO KROVOOBRASHCHENIIA U LITS S NORMAL'NYM ARTERIAL'NYM DAVLENIEM]
I. K. SHKHVATSABAIA, I. A. GUNDAROV, E. N. KOSTANTINOV, and IU. T. PUSHKAR (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Kardiologiia, vol. 22, Sept. 1982, p. 13-16. In Russian. refs

A83-13619
THE GENERAL PATTERNS AND TYPES OF THE HEMODYNAMIC CHANGES DURING MYOCARDIAL INFARCTION [OBSHCHIE ZAKONOMERNOSTI I TIPY GEMODINAMICHESKIKH IZMENENII PRI INFARKTE MIOKARDA]
A. P. GOLIKOV and V. A. RIABININ (Nauchno-Issledovatel'skii Institut Skoroi Pomoshchi, Moscow, USSR) Kardiologiia, vol. 22, Sept. 1982, p. 18-21. In Russian. refs

A83-13620
THE ADAPTIVE PROPERTIES OF THE MAJOR ARTERIAL VESSELS [ADAPTATSIONNYE SVOISTVA KRUPNYKH ARTERIAL'NYKH SOSUDOV]
K. A. MOROZOV and N. N. SLUPSKII (Leningradskii Pediatricheskii Meditsinskii Institut, Leningrad, USSR) Kardiologiia, vol. 22, Sept. 1982, p. 21-25 refs

The relationship of the general elastic resistance in the major arteries with the state of elasticity of both the elastic and muscular type vessels was investigated in normal and in pathological cases in which the rigidity of the aorta had increased. A total of 760 individuals were examined, 350 healthy individuals of various ages, 250 patients with ischemic heart disease mainly affecting the aorta, 100 patients with essential hypertension, and 110 patients with coronary disease and circulatory insufficiency stage II. It was found that as the aorta became more rigid, the optimal relationship between the total elastic and peripheral resistance changed, so that more strain was placed on the contractile myocardium and the heart expended more energy on blood propulsion and worked inefficiently. When rigid, the aorta was not able to fully perform its function in blood propulsion, which was then taken over by the muscular type vessels by means of decreases in the tonicity of the smooth muscle elements in their walls, leading to better circulatory conditions. N.B.

A83-13621
THE INTEGRAL EKG, THE VENTRICULAR GRADIENT, THE DIFFERENTIAL EKG, AND THEIR DIAGNOSTIC POSSIBILITIES [INTEGRAL'NYE EKG I ZHELUDOCHKOVYI GRADIENT, DIFFERENTSIAL'NYE EKG, IKH DIAGNOSTICHESKIE VOZMOZHNOSTI]
N. P. PALEEV, I. M. KAEVITSER, and L. A. KUBLANOV (Moskovskii Oblastnoi Nauchno-Issledovatel'skii Klinicheskii Institut, Moscow; Klinskaia Tsentral'naia Raionnaia Bol'nitsa, Klin, USSR) Kardiologiia, vol. 22, Sept. 1982, p. 25-31. In Russian. refs

A83-13622
THE ACTIVITY OF RENIN IN BLOOD PLASMA, THE INDICATORS OF CENTRAL HEMODYNAMICS, AND THE WATER-ELECTROLYTE BALANCE IN PATIENTS WITH HYPERTENSION [AKTIVNOST' RENINA V PLAZME KROVI, POKAZATELI TSENTRAL'NOI GEMODINAMIKI I VODNO-ELEKTROLITICHESKOGO OBMENA U BOL'NYKH GIPERTONICHESKOI BOLEZN'IU]
V. A. LIUSOV, V. I. KHARCHENKO, I. IU. POSTNOV, and E. I. EVSIKOV (II Moskovskii Meditsinskii Institut, Moscow, USSR) Kardiologiia, vol. 22, Sept. 1982, p. 32-37. In Russian. refs

A83-13623
THE USE OF PROSTAGLANDIN E2 DURING THE TREATMENT OF ESSENTIAL HYPERTENSION WHICH PROCEEDS WITH HIGH BLOOD PRESSURE [ISPOL'ZOVANIE PROSTAGLADINA E2 PRI LECHENII GIPERTONICHESKOI BOLEZNI, PROTEKAIUSHCHEI S VYSOKOI GIPERTENZIEI]
A. A. NEKRASOVA, A. K. DZHUSIPOV, and I. K. SHKHVATSABAIA (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Kardiologiia, vol. 22, Sept. 1982, p. 37-42. In Russian. refs

The effects of two infusions of PGE2, given at a one day interval, were studied in 22 patients with severe arterial hypertension (18 patients with essential hypertension and 4 with symptomatic hypertension). The immediate effects of PGE2 were found to produce a drop in the blood pressure, and enhanced diuresis and natriuresis during the injection of the solution. A high blood pressure sensitivity to PGE2 administration was shown in one-third of the patients, while some patients with essential hypertension and all patients with symptomatic hypertension had moderate sensitivity. One day after the initial administration of PGE2, the blood pressure was lower and the diurnal diuresis and natriuresis higher than the respective values before infusion with PGE2. Following an additional PGE2 infusion, the patients showed a higher sensitivity to diuretics and beta-blocking agents, such that even small doses of these drugs could produce a significant hypertensive effect, whereas much higher doses of these drugs did not have the desired effect prior to the administration of PGE2. N.B.

A83-13624
THE DIAGNOSTIC SIGNIFICANCE OF THE INTEGRAL ASSESSMENT OF MYOCARDIAL ISCHEMIA IN PATIENTS WITH ISCHEMIC HEART DISEASE FOR THE COMPUTERIZED MONITORING OF THE EKG DURING THE TREADMILL TEST [DIAGNOSTICHESKOE ZNACHENIE INTEGRAL'NOGO OPREDELENIIA ISHEMII MIOKARDA U BOL'NYKH ISHEMICHESKOI BOLEZN'IU SERDTSA PRI MONITORNO-KOMP'IUTERNOM ANALIZE EKG VO VREMIA PROBY NA TREDMILE]
S. B. FITILEV, M. P. SAVENKOV, and V. A. LIUSOV (II Moskovskii Meditsinskii Institut, Moscow, USSR) Kardiologiia, vol. 22, Sept. 1982, p. 80-85. In Russian. refs

A83-13625
THE DIAGNOSTIC POSSIBILITIES OF ULTRASONIC SECTOR SCANNING OF THE HEART [DIAGNOSTICHESKIE VOZMOZHNOSTI UL'TRAZVUKOVOGO SEKTORAL'NOGO SKANIROVANIIA SERDTSA]
V. A. GOLYZHNIKOV and S. N. ROMANOV (Moskovskii Meditsinskii Stomatologicheskii Institut, Moscow, USSR) Kardiologiia, vol. 22, Sept. 1982, p. 114-118. In Russian. refs

A review is presented of studies concerning the use of real-time ultrasonic sector scanning of the heart which allows the investigator to visualize the inner cardiac structures in the plane of the ultrasonic angle both in the long as well as the short axes of the left ventricle. The use of ultrasonic sector scanning for diagnosing various heart diseases is examined, including the use of this method for patients with rheumatic heart disease, prolapse of the mitral valve, aortic stenosis, aneurism of the thoracic section of the aorta, and bacterial endocarditis. In addition, this method can be utilized to obtain information about idiopathic hypertrophic subaortic stenosis and cardiac infarctions, not only to reveal the zone of infarcation, but also to evaluate the effects of various drugs on the infarction.
N.B.

A83-13631
THE EFFECTS OF HYPOTENSIVE DRUGS ON THE HUMORAL FACTORS OF THE REGULATION OF BLOOD CIRCULATION [VLIIANIE GIPOTENZIVNYKH PREPARATOV NA GUMORAL'NYE FAKTORY REGULIATSII KROVOOBRASHCHENIIA]
V. A. ALMAZOV, O. N. ZHDANOVA, N. K. MERKULOVA, M. IU. SITNIKOVA, and E. V. SHLIAKHTO (Ministerstvo Zdravookhraneniia RSFSR, Leningradskii Nauchno-Issledovatel'skii Institut Kardiologii; I Leningradskii Meditsinskii Institut, Leningrad, USSR) Farmakologiia i Toksikologiia, vol. 45, Sept.-Oct. 1982, p. 62-66. In Russian. refs

The effects of propanolol and clonidine on the central hemodynamics, plasma renin, dopamine beta-hydroxylase, and the urine and blood kallikrein were studied in 178 patients with labile arterial hypertension. It was found that a single adminstration of propanolol produced changes in the hemodynamics of the patients due to the beta-adrenalin inhibiting effect of the drug. Prolonged treatment of the patients with propanolol produced decreases in the general peripheral resistance, which was determined by the activation of the blood kallikrein-kinin system and the enhancement of the descending inhibition of the sympathetic nervous system due to the activation of the central alpha-adrenalin receptors during the extended inhibition of the beta-adrenalin receptors of the central nervous system. In addition, the changes in the hemodynamics evoked by low doses of clonidine are the result of its central alpha-adrenalin mimicking ability.
N.B.

A83-13635
THE ROLE OF PEPTIDASES IN THE REGULATION OF VASCULAR TONUS [ROL' PEPTIDAZ V REGULIATSII SOSUDISTOGO TONUSA]
V. N. OREKHOVICH, IU. E. ELISEEVA, and L. V. PAVLIKHINA (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Akademiia Meditsinskikh Nauk SSSR, Vestnik, no. 9, 1982, p. 34-38. In Russian. refs

Mechanisms for the regulation of vascular tonus by the components of the renin-angiotensin-aldosterone system and the kinin system are examined. The effects of angiotensin II and aldosterone of increasing blood pressure by, among other things, increasing vascular tonus, and of bradykinin in vasodilation and lowering blood pressure are noted. Evidence is then presented which shows the two systems to be mutually dependent through the actions of the proteolytic enzyme carboxycathepsin (angiotensin I transforming enzyme, kininase II, peptidyl-dipeptidase), which simultaneously converts angiotensin I into angiotensin II and destroys bradykinin, and through kallikrein, which activates both kinin and renin. Various compounds inhibiting carboxycathepsin activity are presented, and the value of these highly selective substances in the study of the role of the renin-angiotensin system in vivo and in the clinical management of hypertension is illustrated.
A.L.W.

A83-13636
COMPENSATORY AND PATHOGENETIC FUNCTIONS OF THE KALLIKREIN-KININ SYSTEM IN HEALTH AND IN CERTAIN DISEASES [KOMPENSATORNYE I PATOGENETICHESKIE FUNKTSII KALLIKREIN-KININOVOI SISTEMY V NORME I PRI NEKOTORYKH ZABOLEVANIIAKH]
T. S. PASKHINA (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Akademiia Meditsinskikh Nauk SSSR, Vestnik, no. 9, 1982, p. 50-56. In Russian. refs

Recent data concerning the adaptive functions of kinins and kallikreins is discussed together with the impairments in kinin metabolism occurring in the presence of pathology. The predominance of the indirect effects of kinins, which is due to the capacity of bradykinin to stimulate prostaglandin production, alter the relation between type E and type F prostaglandins, and activate PGE-9 ketoreductase, is discussed, and bradykinin effects in stimulating the release of histamine and serotonin and stimulating the transport and utilization of glucose are noted. The role of the kallikrein-kinin system in humoral and hormonal regulation of such functions as blood rheology, enzyme activation, and water-electrolyte balance is also considered, and the compensatory functions of hyperkininogenesis in response to trauma or infection are noted. Finally, attention is given to the pathogenetic effects of uncontrolled hyperkininogenesis which are involved in the nephrotic syndrome, and the necessity of distinguishing between the compensatory and pathogenetic effects in illness is pointed out.
A.L.W.

A83-13642
THE INITIAL MANIFESTATIONS OF THE DEFECTS OF BLOOD SUPPLY TO THE BRAIN /REVIEW OF THE LITERATURE/ [NACHAL'NYE PROIAVLENIIA NEPOLNOTSENNOSTI KROVOSNABZHENIIA GOLOVNOGO MOZGA /OBZOR LITERATURY/]
K. F. KANAREIKIN, S. V. BABENKOVA, L. S. MANVELOV, and M. N. TOLSTOVA Zhurnal Nevropatologii i Psikhiatrii im. S.S. Korsakova, vol. 82, no. 9, 1982, p. 106-119. In Russian. refs

A review is presented of studies, mostly conducted in the USSR, concerning the initial manifestations of the defects of blood supply to the brain. Topics discussed include the determination of what constitutes the manifestations and their basic pathological features, the selection and evaluation of combined methods for determining the clinical signs of these manifestations and the search for techniques to uncover hidden (subclinical) forms of these manifestations in order to define the range of individual possibilities to compensate for deficiencies in the blood supply to the brain.
N.B.

A83-13643
MORPHOLOGICAL CRITERIA FOR THE INDIVIDUAL VARIABILITY OF THE HUMAN BRAIN [MORFOLOGICHESKIE KRITERII INDIVIDUAL'NOI VARIABEL'NOSTI MOZGA CHELOVEKA]
I. N. BOGOLEPOVA, N. S. ORZHEKHOVSKAIA, and L. I. MALOFEEVA (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Arkhiv Anatomii, Gistologii i Embriologii, vol. 83, Aug. 1982, p. 5-9. In Russian. refs

The structural properties of four human brains are studied in an attempt to derive morphological criteria capable of characterizing archetectonic formations in different individuals. Various cortical fields playing roles in speech and sound production, spatial orientation and coordination, and reading, writing, drawing and other complex functions and the nucleus caudatus were examined in frontal section to determine the surface profile lengths of layer III and V neurons and the total cell volumes. Computerized analysis of video data reveals significant differences in cellular volumes and lengths in each hemisphere between the four individuals, with certain areas, particularly cortical fields 8 and 43 and the caudate nucleus, exhibiting greater variability than others. Individual differences in the size distributions of layer III and layer V neurons

were also found. The indices studied are thus concluded to be suitable criteria for individual differences. A.L.W.

A83-13644
THE ARTERIAL VASCULAR BED OF THE HUMAN MESENTERIC LYMPH NODES [ARTERIAL'NOE SOSUDISTOE RUSLO BRYZHEECHNYKH LIMFATICHESKIKH UZLOV CHELOVEKA]
L. G. GAVRICHENKOVA (I Moskovskii Meditsinskii Institut, Moscow; Rizhskii Meditsinskii Institut, Riga, Latvian SSR) Arkhiv Anatomii, Gistologii i Embriologii, vol. 83, Aug. 1982, p. 43-49. In Russian. refs

A83-13812
THE ADAPTIVE FUNCTION OF SLEEP, THE CAUSES AND MANIFESTATIONS OF ITS DISRUPTION [ADAPTIVNAIA FUNKTSIIA SNA, PRICHINY I PROIAVLENIIA EE NARUSHENIIA]
V. S. ROTENBERG Moscow, Izdatel'stvo Nauka, 1982. 176 p. In Russian. refs

The links between changes in sleep and the peculiarities of behavioral actions during waking periods are discussed. It is shown that REM sleep promotes the adaptation to conditions of refusal to search, which lowers the resistance of the body to pathological influences. The functional unfulfillment of REM sleep plays an important role in the pathogenesis of neurosis. The peculiarities of the psychophysiological correlations in night sleep are determined. It is shown how the various types of reactions to emotional stress and the level of adaptation to changes of working conditions can be differentiated according to the structure of sleep. The psychological significance of dreaming is also discussed. N.B.

A83-13818
COSMIC RADIOBIOLOGY [KOSMICHESKAIA RADIOBIOLOGIIA]
IU. G. GRIGOREV Moscow, Energoizdat, 1982. 176 p. In Russian. refs

A review of the biological effects of cosmic radiation is presented, and the radiation danger of heavy ions in galactic cosmic rays is evaluated. Results of experiments conducted on board biosatellites concerning the effects of gamma-irradiation on animals are examined. Among the topics considered are an evaluation of the combined action of ionizing radiation and other physical factors of the external environment, the radiation sensitivity of animals and humans during space flights, and the peculiarities of the biological effect of cosmic radiation. N.B.

A83-13973
OCCUPATIONAL SKIN HAZARDS FROM ULTRAVIOLET /UV/ EXPOSURES
F. URBACH (Skin and Cancer Hospital, Philadelphia, PA) and M. L. WOLBARSHT (Duke University, Medical Center, Durham, NC) In: Ultraviolet and vacuum ultraviolet systems; Proceedings of the Meeting, Washington, DC, April 21, 22, 1981. Bellingham, WA, SPIE - The International Society for Optical Engineering, 1981, p. 201-215.

The various types of UV effects on the skin are classified according to the part of the spectrum and their beneficial or deleterious nature. Some hazardous ultraviolet sources used in industrial processes are described, and examples of photoallergy, phototoxicity, and photosensitization resulting from UV exposures are given. The incidence of skin cancer as a function of geographical location and exposure to sunlight is discussed in relation to natural and artificial exposures to long and short wavelength UV, especially in connection with tanning booths. The conclusion is reached that there is enough ultraviolet in a normal environment to propose a hazard, and additional ultraviolet exposure from industrial or consumer sources is not necessary, and should be eliminated wherever possible. (Author)

A83-14102#
AN ANALYSIS AND IDENTIFICATION OF VISUAL-VESTIBULAR-MANUAL SYSTEMS IN HUMANS PLACED IN AN ENVIRONMENT OF BIOMECHANICAL PERTURBATION [ANALYSE ET IDENTIFICATION DES SYSTEMES VISUEL-VESTIBULAIRE-MANUEL CHEZ L'HOMME PLACE DANS UN ENVIRONNEMENT DE PERTURBATION BIOMECANIQUE]
J. C. ANGUE Valenciennes et Hainaut-Cambresis, Universite, Docteur es Sciences Physiques Thesis, 1981. 188 p. In French. Research supported by the Direction des Recherches, Etudes et Techniques. refs

A study is presented of investigations concerning man-machine interactions and the distribution of tasks between man, computer, and machine. The study consists of identifying the rate and the perturbation effects of vestibular stimuli of vibratory origin on vision and the rapidity of reactions of a human operator in a perturbed condition or in an accidental situation. The means and methods for analyzing the effect of vibration on humans are examined using a model of the principal sensory systems that are called into action by the vibrations. The mechanical and visual environment of the human operator and the automatic control of experiments are outlined. A model is developed for a human operator carrying out a task of surveillance in the presence of vibration. In addition, a model is constructed for the processing of the visual information and the decision making by a pilot in perturbed conditions. N.B.

A83-14330
MEASUREMENT OF THE SPECIFIC ELECTRICAL RESISTANCE OF THE BLOOD [IZMERENIE UDEL'NOGO ELEKTRICHESKOGO SOPROTIVLENIIA KROVI]
V. V. ZVIAGINTSEV (Vladimirskaia Oblastnaia Bol'nitsa, Vladimir, USSR) Meditsinskaia Tekhnika, Sept.-Oct. 1982, p. 30-32. In Russian. refs

The commercial electroplethysmograph RPG2-02 was used to measure specific blood resistance in a circulation study performed on various groups of healthy and sick individuals. Individual measurements have shown a marked variance from the permissible mean value of the resistance parameter. Relationships between hematocrit and venous blood specific resistance values are studied, and an analytical expression for the specific resistance of the blood as a function of hematocrit is obtained. B.J.

A83-14332
CYTOCHEMICAL LABELING AND MORPHOLOGICAL CHARACTERIZATION OF LYMPHOCYTE SUBPOPULATIONS IN HEALTH AND DISEASE [TSITOKICHIMICHESKAIA MARKIROVKA I MORFOLOGICHESKAIA KHARAKTERISTIKA SUBPOPULIATSII LIMFOTSITOV V NORME I PRI PATOLOGII]
V. V. SOKOLOV and L. A. IVANOVA (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Laboratornoe Delo, no. 10, 1982, p. 587-590. In Russian. refs

The possibility of labeling B-, T-, and 0-lymphocyte subpopulations on the basis of such cytochemical tests as staining for acid phosphatase and acid nonspecific esterase is demonstrated for a model of occupational diseases. Patients with silicosis (48 cases), a mild form of dust bronchitis (20 cases), berylliosis with manifest immunological shifts (26 cases), 23 healthy subjects exposed to toluene in concentrations close to the MAGs, and 20 subjects (the control group) not exposed to adverse occuptational factors were studied. The content of B-lymphocytes was found to be only slightly changed, while a decreased content of T-lymphocytes in nodal silicosis and berylliosis was revealed. The absolute and relative number of 0-cells in the blood was increased for all the diseases studied. B.J.

A83-14335
A METHOD FOR THE ASSESSMENT OF ENZYME ACTIVITY IN DRUG METABOLISM [METOD OTSENKI AKTIVNOSTI FERMENTOV METABOLIZMA LEKARSTVENNYKH SOEDINENII]
A. V. SEMENIUK, L. I. KOLESNIKOVA, V. IU. KULIKOV, S. V. NEDELNIKA, and R. I. SALGANIK (Akademiia Meditsinskikh Nauk SSSR; Akademiia Nauk SSSR, Institut Tsitologii i Genetiki, Novosibirsk, USSR) Laboratornoe Delo, no. 10, 1982, p. 607-609. In Russian. refs

Current methods for determining antipyrine half-life are discussed. A simple sensitive spectrophotometric technique is described which can be used to measure antipyrine content in the saliva and to determine its half-life. The mean normal values of antipyrine half-life are presented. B.J.

A83-14336
SIMULTANEOUS LUMINESCENT ASSESSMENT OF THE PHAGOCYTIC AND BACTERICIDAL FUNCTIONS OF THE MACROPHAGES AND NEUTROPHILS OF HUMAN SKIN EXUDATE [ODNOVREMENNAIA LIUMINESTSENTNAIA OTSENKA FAGOTSITARNOI I BAKTERITSIDNOI FUNKTSII MAKROFAGOV I NEITROFILOV KOZHNOGO EKSSUDATA CHELOVEKA]
S. M. GORDIENKO (Altaiskoe Motorostroitel'noe Ob'edinenie, Klinicheskaia Bol'nitsa, USSR) Laboratornoe Delo, no. 10, 1982, p. 614, 615. In Russian.

A83-14337
THE STATE OF THE VESTIBULAR-ANALYZER FUNCTION IN PATIENTS WITH INFECTIOUS-ALLERGIC BRONCHIAL ASTHMA [SOSTOIANIE FUNKTSII VESTIBULIARNOGO ANALIZATORA U BOL'NYKH INFEKTSIONNO-ALLERGICHESKOI BRONKHIAL'NOI ASTMOI]
L. V. DUBINCHIK (Uzbekskii Nauchno-Issledovatel'skii Institut Ekspertizy i Vosstanovleniia Trudosposobosti Invalidov, USSR) Vestnik Otorinolaringologii, Sept.-Oct. 1982, p. 13-15. In Russian. refs

A83-14338
THE USE OF REFLEXOTHERAPY FOR COCHLEOVESTIBULAR DISORDERS [PRIMENENIE REFLEKSOTERAPII PRI KOKHLEOVESTIBULIARNYKH NARUSHENIIAKH]
A. N. POMUKHINA, M. I. TIUKINA, and N. I. ROZHKOVA (Rostovskii Meditsinskii Institut, Rostov on Don, USSR) Vestnik Otorinolaringologii, Sept.-Oct. 1982, p. 21-26. In Russian. refs

A study is carried out on 34 patients suffering from cochleovestibular disorders accompanying Meniere's syndrome and cervical osteochondrosis. The treatment takes into consideration the etiology and pathogenesis of the cochleovestibular disorders. Use is made of the dehydration effect of reflexotherapy in treating the patients with Meniere's syndrome. The effect of reflexotherapy on blood circulation and the vertebrobasilar system is assessed. The results obtained from using rheoencephalography with an acupuncture test are presented. Reflexotherapy is shown to be effective, especially in the early stages of disease. C.R.

A83-14339
CLOSED OSTEOSYNTHESIS AND CONSERVATIVE THERAPY OF FRESH DIAPHYSEAL FRACTURES OF THE CRURAL BONES [ZAKRYTYI OSTEOSINTEZ I KONSERVATIVNOE LECHENIE SVEZHIKH DIAFIZARNYKH PERELOMOV KOSTEI GOLENI]
M. IA. BASKEVICH and V. A. MAZUROV (Tiumenskii Meditsinskii Institut, Tyumen, USSR) Sovetskaia Meditsina, no. 9, 1982, p. 59-61. In Russian. refs

A83-14340
PNEUMOMEDIASTINOGRAPHY IN THE INVESTIGATION OF THE THYMUS GLAND IN PATIENTS WITH MYASTHENIA [PNEVNOMEDIASTINOGRAFIIA V ISSLEDOVANII VILOCHKOVOI ZHELEZY U BOL'NYKH MIASTENIEI]
V. N. VASILEV and N. S. BELCHIKOVA (Leningradskii Institut Usovershenstvovaniia Vrachei, Leningrad, USSR) Sovetskaia Meditsina, no. 9, 1982, p. 62-66. In Russian. refs

A83-14341
TREATMENT OF DEGENERATIVE-DYSTROPHIC DISEASES OF THE VERTEBRAL COLUMN BY A HELIUM-NEON LASER [LECHENIE DEGENERATIVNO-DISTROFICHESKIKH ZABOLEVANII POZVONOCHNIKA GELII-NEONOVYM LAZEROM]
U. IA. BOGDANOVICH, M. G. KARIMOV, and V. E. KRYLOV (Kazanskii Nauchno-Issledovatel'skii Institut Travmatologii i Ortopedii, Kazan, USSR) Sovetskaia Meditsina, no. 9, 1982, p. 66-68. In Russian.

A83-14342
ULTRASONIC STUDY OF THE GALL BLADDER [UL'TRAZVUKOVOE ISSLEDOVANIE ZHELCHNOGO PUZYRIA]
Z. A. LEMESHKO and I. V. DVORIAKOVSKII (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Sovetskaia Meditsina, no. 9, 1982, p. 68-71. In Russian. refs

A83-14343
CLINICAL ASPECTS OF THE DISRUPTION OF THE WATER-ELECTROLYTE METABOLISM DURING ESSENTIAL HYPERTENSION [KLINICHESKIE ASPEKTY NARUSHENII VODNO-ELEKTROLITNOGO OBMENA PRI GIPERTONICHESKOI BOLEZNI]
V. A. LIUSOV, V. I. KHARCHENKO, E. M. EVSIKOV, I. IU. POSTNOV, A. A. MOROZOV, M. A. RIFAI, I. A. ISTOMINA, and E. F. ANDREEV (II Moskovskii Meditsinskii Institut, Moscow, USSR) Sovetskaia Meditsina, no. 9, 1982, p. 74-81. In Russian. refs

A review is presented of studies which examine the disruptions of the water-electrolyte metabolism in the pathogenesis of hypertension. Attention is focused on the role of excess sodium and the lack of potassium in the occurrence of hypertension and the hereditary predisposition to hypertension. In addition, the participation of calcium in the pathogenesis of hypertension is discussed, and the complexities this factor introduces in the clinical determination of hypertension are examined. N.B.

A83-14344
PSYCHOTHERAPY DURING THE TREATMENT OF SEASICKNESS [PSIKHOTERAPIIA PRI LECHENII MORSKOI BOLEZNI]
S. A. KULAKOV (Baltiiskaia Tsentral'naia Basseinovaia Bol'nitsa, Leningrad, USSR) Sovetskaia Meditsina, no. 9, 1982, p. 119, 120. In Russian. refs

The effects of various methods of psychotherapy for reducing the incidence of seasickness were investigated in 22 human subjects in order to correlate the affective-saturated emotional experience and vegetative components of the syndrome caused by rocking. Various standard psychotherapeutic drugs, including antihistamines, sodium hydrocarbonate, diazepam, and other tranquilizers, were found to have a significant effect on reducing the incidence of seasickness in only a few subjects. On the other hand, two-to-four sessions of hypnosis of a sedative character were found to generally increase the resistance of the subjects to the effects of a rocking motion. N.B.

A83-14345
INDICES OF HEMODYNAMICS IN PATIENTS WITH HYPERTENSION ACCORDING TO ECHOCARDIOGRAPHY DATA [POKAZATELI GEMODINAMIKI U BOL'NYKH GIPERTONICHESKOI BOLEZNIU PO DANNYM EKHOKARDIOGRAPHII]
L. S. CHERNOGUZ (Ukrainskii Nauchno-Issledovatel'skii Institut Kardiologii, Kiev, Ukrainian SSR) Vrachebnoe Delo, Sept. 1982, p. 58-61. In Russian. refs

A study of 56 patients with hypertension (Stage I, II) is presented in which echocardiography was used to determine indices of central and intracardial hemodynamics. It is shown that the reaction of the cardiovascular system in patients with different hemodynamic variants of hypertension under the effect of loads is characterized by a heterogeneity of hemodynamic parameters. This heterogeneity is a manifestation of compensatory responses directed at maintaining adequate hemodynamic functions of the body. B.J.

A83-14346
TEST WITH GRADED PHYSICAL LOAD ON BICYCLE-ERGOMETER AND TREADMILL IN PATIENTS WITH CHRONIC ISCHEMIC HEART DISEASE [PROBA S DOZIROVANNOI NAGRUZKOI NA VELOERGOMETRE I TREDMILE U BOL'NYKH KHRONICHESKOI ISHEMICHESKOI BOLEZN'IU SERDTSA]
K. D. BABOV (Ukrainskii Nauchno-Issledovatel'skii Institut Kardiologii, Kiev, Ukrainian SSR) Vrachebnoe Delo, Sept. 1982, p. 64, 65. In Russian. refs

A comparative analysis of graded physical loads on a bicycle-ergometer (sitting position) and treadmill in 100 patients with chronic ischemic heart disease is presented. It it shown that the treadmill load is more efficient and gives complete information on load tolerance. The bicycle-ergometer test is better for diagnostic purposes, while the treadmill test is better for physiological purposes, and may, therefore be used in patients with a lower tolerance to loads. B.J.

A83-14348
THE EFFECT OF DEFICIENCIES OF TRACE ELEMENTS ON IMMUNITY /REVIEW OF LITERATURE/ [VLIIANIE DEFITSITA MIKROELEMENTOV NA IMMUNITET /OBZOR LITERATURY/]
I. D. SURKINA (Vsesoiuznyi Nauchno-Issledovatel'skii Institut Fizicheskoi Kul'tury, USSR) and G. MATEEV (Vyssh Institut za Fizkultura, Sofia, Bulgariia) Teoriia i Praktika Fizicheskoi Kul'tury, Sept. 1982, p. 15-17. In Russian. refs

A review is presented of recent studies concerning the effect of a deficit of several important trace elements on immunity and general health in humans, with an emphasis on conditions related to athletic training. Clinical and biochemical studies of the effect of a deficit of zinc, iron, copper, manganese, and magnesium are discussed, and the roles of these trace elements in the main physiological processes in humans are examined. N.B.

A83-14349
A TECHNIQUE FOR DETERMINING THE FUNCTIONAL CONDITION OF ATHLETES BY A METHOD OF ELECTROPUNCTURE DIAGNOSTICS [SPOSOB OPREDELENIIA FUNKTSIONAL'NOGO SOSTOIANIA SPORTSMENA METODOM ELEKTROPUNKTURNOI DIAGNOSTIKI]
O. M. GOKBACHEV, A. B. GULEI, V. G. IVANOV, and A. V. CHEGLOKOV (Ukrainskii Zaochnyi Politekhnicheskii Institut, Kharkov, Ukrainian SSR) Teoriia i Praktika Fizicheskoi Kul'tury, Sept. 1982, p. 17, 18. In Russian.

A83-14350
DYNAMICS OF HEART RATE AND BLOOD PRESSURE IN THE EVALUATION OF THE FUNCTIONAL CONDITION OF SWIMMERS [DINAMIKA CHASTOTY SERDECHNYKH SOKRASHCHENII I ARTERIAL'NOGO DAVLENIIA V OTSENKE FUNKTSIONAL'NOGO SOSTOIANIIA PLOVTSOV]
V. A. PASICHNICHENKO (Minskii Radiotekhnicheskii Institut, Minsk, Belorussian SSR) Teoriia i Praktika Fizicheskoi Kul'tury, Sept. 1982, p. 18-20. In Russian.

A83-14351
THE EFFECT OF SUCCINIC ACID ON WORK CAPACITY AND RECOVERY DURING MUSCLE ACTIVITY IN CONDITIONS OF VARIOUS AMBIENT TEMPERATURES [VLIIANIE IANTARNOI KISLOTY NA RABOTOSPOSOBNOST' I VOSSTANOVLENIE PRI MYSHECHNOI DEIATEL'NOSTI V USLOVIIAKH RAZLICHNYKH VNESHNIKH TEMPERATUR]
K. M. AKHUNDOV and M. K. RIPS (Azerbaidzhanskii Gosudarstvennyi Meditsinskii Institut, Baku, Azerbaidzhan SSR) Teoriia i Praktika Fizicheskoi Kul'tury, Aug. 1982, p. 20-22. In Russian. refs

A83-14352
THE METHODOLOGICAL PRINCIPLES FOR THE DETERMINATION OF PHYSICAL WORK CAPACITY IN YOUNG ATHLETES [METODOLOGICHESKIE OSNOVY OPREDELENIIA FIZICHESKOI RABOTOSPOSOBNOSTI U IUNYKH SPORTSMENOV]
R. E. MOTYLIANSKAIA (Ministerstvo Zdravookhraneniia RSFSR, Republikanskii Vrachebno-Fizkul'turnyi Dispanser, USSR) and V. N. ARTAMONOV (Gosudarstvennyi Tsentral'nyi Institut Fizicheskoi Kul'tury, Moscow, USSR) Teoriia i Praktika Fizicheskoi Kul'tury, Aug. 1982, p. 24-27. In Russian. refs

A system of physiological mechanisms is developed in order to characterize the physi2al work capacity of young athletes during the favorable times of its development, which is based on clinical-physiological investigations of highly qualified young athletes in laboratory and natural conditions of training and competition. In addition, it is shown how the links in the body such as the unified functional system act to lower the functioning of the body. It is found that the physical work capacity determines the body's reserve and the quality of its regulation. It is concluded that the structural-systemic approach can be used to elucidate the principal elements which determine the physical preparation of athletes and also the factors which limit it. N.B.

A83-14353
SELECTION AND PREDICTION OF THE ATHLETIC RESULTS OF YOUNG FEMALE LONG-JUMPERS [OTBOR I PROGNOZIROVANIE SPORTIVNYKH REZUL'TATOV IUNYKH PRYGUNII V DLINU]
A. A. SHPOKAS and V. K. SAKALIS (Vil'niusskii Inzhenerno-Stroitel'nyi Institut, Vilnyus, Lithuanian SSR) Teoriia i Praktika Fizicheskoi Kul'tury, Aug. 1982, p. 27, 28. In Russian. refs

A83-14354
BREATHING EXERCISES BY V. S. CHUGUNOV [DYKHATEL'NAIA GIMNASTIKA PO V. S. CHUGUNOVU]
V. S. CHUGUNOV, T. N. SHCHERBA, and V. N. VASILEV (Klinicheskaia Spetsializirovannaia Bol'nitsa No. 8 im. Z. P. Solov'eva, USSR) Teoriia i Praktika Fizicheskoi Kul'tury, Aug. 1982, p. 45, 46. In Russian.

A series of breathing exercises is described which can be used not only for the improvement of the supply of oxygen to the body, but also for increasing the amount of oxygen reaching the brain, thus having positive effects on the psychological condition of the individual. General techniques and postures for conducting the exercises are outlined. Eight specific programs for exercises affecting different functions of the body are presented, including strengthening middle breathing, harmonious complete breathing, rhythmic breathing, and stimulating hissing breathing. N.B.

A83-14355
THE DEPENDENCE OF THE CHARACTER OF THE RECOVERY OF PULSE ON THE RHYTHM OF THE HEART AND THE LABILITY OF THE SINUSOID NODES IN ATHLETES AFTER STEP LOADS [O ZAVISIMOSTI KHARAKTERA VOSSTANOVLENIIA PUL'SA OT RITMA SERDTSA I LABIL'NOSTI SINUSOVOGO UZLA U SPORTSMENOV POSLE STEP-NAGRUZKI]
V. G. PUGAEV (Dobrovol'noe Sportivnoe Obshchestvo Spartak, Kalinin, SSSR) Teoriia i Praktika Fizicheskoi Kul'tury, Aug. 1982, p. 52, 61. In Russian.

A83-14367
OPTIMAL TACTICS OF ANTIBACTERIAL THERAPY FOR THE TRIGGER MODEL OF THE INJECTION PROCESS [OB OPTIMAL'NOI TAKTIKE ANTIBAKTERIAL'NOI TERAPII DLIA TRIGGERNOI MODELI INFEKTSIONNOGO PROTSESSA]
B. N. KHOLODENKO, KH. V. GEVIKSMAN, and L. E. KHOLODOV (Nauchno-Issledovatel'skii Institut po Biologicheskim Ispytaniiam Khimicheskikh Soedinenii, Kupavna, USSR) Biofizika, vol. 27, Sept.-Oct. 1982, p. 900-905. In Russian. refs

A83-14499
PROPHYLACTICS FOR MOUNTAIN SICKNESS [O PROFILAKTIKE GORNOI BOLEZNI]
V. B. MALKIN and V. V. LITOVCHENKO Voenno-Meditsinskii Zhurnal, Sept. 1982, p. 38-40. In Russian.

Methods for the rapid adaptation of humans to high altitude conditions are discussed, in view of the fact that healthy individuals suffer from hypoxic effects even at an altitude of 2000-2500 m. It is shown that the best method of prior adaptation to high altitude conditions is an incremental gradual acclimatization. This method consists of the training of the subject in a barochamber under conditions equivalent to increasing altitudes. N.B.

A83-14547
THE PECULIARITIES OF THE PATHOGENESIS OF DECOMPRESSION BAROTRAUMA OF THE LUNGS [OSOBENNOSTI PATOGENEZA DEKOMPRESSIONNOI BAROTRAVMY LEGKIKH]
I. N. CHERNIAKOV and V. I. PRODIN Voenno-Meditsinskii Zhurnal, Oct. 1982, p. 40, 41. In Russian.

Thirty-six tests were conducted on 14 healthy young male subjects in order to study the effects of a rapid decompression (from 4 atm to 1 atm at a rate of 0.1-0.25 atm/sec) which occurred with an open glottis and also during the involuntary holding of breath. Results show that the force developed by the connecting muscle apparatus of the glottis during the retention of an increasing intralung pressure exceeds the strength of the muscles which participate in the act of breathing during involuntary effort. This signifies that the mechanical opening of the glottis under the action of increased intralung pressure may be insufficient in order to provide the timely break of the excessive pressure as well as a defense against decompression barotrauma of the lungs even during the involuntary tension of the muscles which participate in the forced exit of air. N.B.

A83-15402
THE ROLE OF ENDOGENOUS CIRCADIAN RHYTHMICITY IN AIR-FORCE FLIGHT ACCIDENTS DUE TO PILOT ERROR
J. RIBAK, I. E. ASHKENAZI (Israel Air Force, Aeromedical Centre; Tel Aviv University, Tel Aviv, Israel), A. KLEPFISH, D. AVGAR, J. TAL, B. KALLNER, and Y. NOYMAN (Israel Air Force, Aeromedical Centre, Tel Aviv, Israel) In: SAFE Association, Annual Symposium, 19th, Las Vegas, NV, December 6-10, 1981, Proceedings. Van Nuys, CA, SAFE Association, 1982, p. 1-4. refs

The possible role of circadian rhythms in Air Force flight accidents caused by pilot error is retrospectively and statistically studied. A profile was obtained for the frequency of accidents per hour, combining separate profiles of flights and accidents for the full year, each month of the year, each monthly day, and each day of the week. Another profile for the frequency of flights at each hour was obtained, and the two profiles were compared with each other. The resulting pattern showed a diurnal rhythm which was independent of the frequency of hourly flights and seemed to be highly related to the sleep-wake cycle of the pilot. An hourly accident coefficient (HAC) ranging from 1.58 to 0.68 at various hours for all aircraft, and from 4.12 to 0.74 for fighters, was obtained. It is found that the nearer a pilot is to the time of his awaking the higher will be his HAC. Moderate exercise may beneficially affect the oscillatory pattern. C.D.

A83-15435
PHYSIOLOGICAL FACTORS AFFECTING MILITARY HIGH ALTITUDE HIGH OPENING /HALO/ OPERATIONS
R. CLAYTON (Pioneer Parachute Co., Inc., Manchester, CT) In: SAFE Association, Annual Symposium, 19th, Las Vegas, NV, December 6-10, 1981, Proceedings. Van Nuys, CA, SAFE Association, 1982, p. 214-217. refs

Free fall parachuting techniques have been incorporated by numerous military organizations throughout the world as a means of conducting clandestine infiltration of small, highly trained, combat teams into denied areas. High altitude low opening (HALO) operations were successfully used by the U.S. Army Special Forces during the late 1960's and early 1970's. A disadvantage of HALO operations was that the delivery aircraft had to enter enemy airspace in order to deliver the team on target. Within recent years, the advent of high glide parachutes has enabled military free fall teams to reach targets from far greater distances than was previously possible. The HAHO (for high altitude high opening) technique based on this development makes it possible for the delivery aircraft to remain in friendly territory. But HAHO parachutists are affected by many physiological factors. However, it has been possible to overcome these difficulties, and HAHO operations have become a viable method of conducting clandestine infiltration operations. G.R.

A83-15533
A COMPARISON OF SOME EFFECTS OF THREE ANTIMOTION SICKNESS DRUGS ON NYSTAGMIC RESPONSES TO ANGULAR ACCELERATIONS AND TO OPTOKINETIC STIMULI
W. E. COLLINS, D. J. SCHROEDER, and G. W. ELAM (FAA, Civil Aeromedical Institute, Oklahoma City, OK) Aviation, Space, and Environmental Medicine, vol. 53, Dec. 1982, p. 1182-1189. refs

The effect of three established antimotion sickness drugs on nystagmic eye movement responses to angular acceleration (whole-body movement) with vision either permitted or denied, and to optokinetic stimulation (visual field movement) is investigated. Results show that dimenhydrinate and promethazine hydrochloride reduced optokinetic nystagmus, thus making the following ability of the eye less accurate. Little placebo-drug difference in the vestibular response under alert conditions was found during whole-body motion in darkness, while under relaxed conditions significant declines in the vestibular eye movements were produced by dimenhydrinate and promethiazine hydrochloride. The same drugs were also found to interfere with the ability of the subject to fixate adequately on a visual task during motion. Vestibular eye movements were suppressed and good visual fixation was maintained in subjects who received a combination of promethazine plus d-amphetamine. It is concluded that the effect of a drug on nystagmus may be a poor indicator of its value in preventing motion sickness, and that assessments of an antimotion sickness drug should include the inability to maintain visual fixation during motion. N.B.

A83-15534
THE EFFECTS OF REST AND EXERCISE IN THE COLD ON SUBSTRATE MOBILIZATION AND UTILIZATION
B. F. HURLEY and E. M. HAYMES (Florida State University, Tallahassee, FL) Aviation, Space, and Environmental Medicine, vol. 53, Dec. 1982, p. 1193-1197. refs

The effects of cold and exercise-induced alterations in skin and core temperature on substrate mobilization and utilization were determined using data collected during rest and light exercise. Free fatty acid (FFA), glucose (GL), lactate (L), hemoglobin (Hb), and hematocrit (Hct) concentrations were measured along with

heart rate, respiratory exchange ratio (R) and oxygen consumption after 30, 60, and 90 min of exposure to neutral and cold conditions. Results show that FFA, GL, L, Hb, and Hct concentrations increased significantly during rest when both mean skin temperature and rectal temperature were reduced, while plasma FFA concentration was also significantly elevated and R values were reduced during exercise when both mean skin temperature and rectal temperature were lowered compared to exercise in a neutral environment. However, no significant differences in substrate concentration, hemoconcentration, or R values were observed when the mean skin temperature alone was reduced at rest or during exercise. It is concluded that a preferential utilization of fat occurs during light exercise when both skin and core temperatures have been lowered compared to skin and core temperature during exercise in a neutral environment. N.B.

A83-15535
PREVALENCE OF SELECTED PATHOLOGY AMONG CURRENTLY CERTIFIED ACTIVE AIRMEN
C. F. BOOZE, JR. (FAA, Civil Aeromedical Institute, Oklahoma City, OK) Aviation, Space, and Environmental Medicine, vol. 53, Dec. 1982, p. 1198-1201.

The results of an epidemiologic study of the prevalence of pathology among active airmen as of Jan. 1, 1980, are presented. The study recorded the prevalence of pathology by major body system and for other selected pathologies of interest within major body systems using data from active computer files maintained by the Aeromedical Certification Branch of the Civil Aeromedical Institute in connection with the certification program. It is found that 350,701 (42%) active airmen require correction for some visual deficiency, of whom 20,058 are contact lens wearers. Cardiovascular and abdominal pathology represent the most prevalent medical conditions among active airmen (3.7% and 2.6% respectively) after eye pathology. It is concluded that disease prevalence is greater among currently certified airmen than among previous groups studied, although this increase in prevalence is probably a reflection of more liberal standards than any other single factor. N.B.

A83-15537
ARTERIAL OXYGEN SATURATION AT ALTITUDE USING A NASAL CANNULA
J. P. DIXON (U.S. Armed Forces Institute of Pathology, Washington, DC) Aviation, Space, and Environmental Medicine, vol. 53, Dec. 1982, p. 1207-1210. refs

A nasal cannula was evaluated by observing arterial oxygen saturation levels in experimental subjects at altitudes up to 25,000 ft using oxygen flow rates of 1.5-2.5 LPM NTPD during four activities: at rest breathing through the mouth, at rest breathing through the nose, performing bicep-curls, and talking. Results show no difference in the saturation levels whether the subject breathed through the nose or through the mouth, and cannula position in the nose is critical to good oxygen saturation. During talking and while exercising, the subjects' saturations are found to very more than during rest conditions. It is concluded that at flow rates of 1.5-2.0 LPM NTPD the nasal cannula can be safely used to maintain adequate oxygenation in healthy individuals in hypobaric chamber operations, aircraft flight, and other operations at altitude. However, above 20,000 ft the cannula does not provide sufficient oxygenation for persons to perform these physical activities. N.B.

A83-15538
SURVIVAL FOLLOWING ACCIDENTAL DECOMPRESSION TO AN ALTITUDE GREATER THAN 74,000 FEET /22,555 M/
G. L. KOLESARI (Wisconsin, Medical College, Milwaukee, WI) and E. P. KINDWALL (Wisconsin, Medical College; St. Luke's Hospital, Milwaukee, WI) Aviation, Space, and Environmental Medicine, vol. 53, Dec. 1982, p. 1211-1214.

A83-15539
MEDICAL FITNESS EXAMINATION OF COMMERCIAL PILOTS - NEW CRITERIA FOR EVALUATION OF VESTIBULAR TESTS
M. H. MOSER and G. R. RANACHER (Graz, Universitaets-Hals-Nasen-und Ohren-Klinik, Graz, Austria) Aviation, Space, and Environmental Medicine, vol. 53, Dec. 1982, p. 1215-1219. refs

The use of extensive vestibular investigations in medical fitness examinations of commercial pilots is evaluated. It is found that the pendular test, as a weak rotational stimulation method, can disclose central vestibular disorders. It is shown that the central nystagmus tracing can be considered as a sign of irritation of vestibular centers, most frequently as a consequence of head trauma. However, a small nystagmus amplitude tracing is observed in cases of insufficient blood supply, particularly in elderly individuals. Cervical-nystagmus that is elicited by neck-torsion while keeping the layrinth fixed at rest is an objective demonstration of a cervical-spine-syndrome. Chiropractic manipulation may help the pilot to become fit to fly again. Further processing of the data from vestibular investigations using a computer and plotting is proposed in order to provide the cumulative eye position, which allows the evaluation of the compensation capacity, important in the assesment of normality of function of the vestibular system. N.B.

A83-15540
PREDICTION OF THRESHOLD PAIN SKIN TEMPERATURE FROM THERMAL PROPERTIES OF MATERIALS IN CONTACT
A. M. STOLL, M. A. CHIANTA, and J. R. PIERGALLINI (U.S. Naval Material Command, Naval Air Development Center, Warminster, PA) Aviation, Space, and Environmental Medicine, vol. 53, Dec. 1982, p. 1220-1223. Research supported by the U.S. Consumer Product Safety Commission and U.S. Navy. refs

A comparison of the theoretical and experimental temperatures for six materials in contact with human skin at pain threshold is presented, and a method for deriving the skin temperature productive of threshold pain from the thermal properties of any material within the range of these studies is developed. The ratios reflecting the heat transfer coefficient associated with the materials in contact are compared to their thermal properties in order to determine the skin temperature at pain threshold from that calculated from heat transfer theory. Tabular and graphical representations of the data are presented which permit interpolations within the range of properties in order that any material of known thermal conductivity, density, and specific heat may be assessed with respect to its effect on the skin temperature during contact to the end point of pain. N.B.

A83-15776
THE ROLE OF SLEEP IN THE REGULATION OF LEARNING AND MEMORY [ROL' SNA V REGULIATSII OBUCHENIIA I PAMIATI]
T. N. ONIANI (Akademiia Nauk Gruzinskoi SSR, Institut Fiziologii, Tbilisi, Georgian SSR) Fiziologiia Cheloveka, vol. 8, Nov.-Dec. 1982, p. 886-897. In Russian. refs

The relationship of sleep and memory is studied in both humans and animals by investigating the effect of prior learning on the following cycle of wakefulness-sleep, and the effect of the deprivation of sleep on learning. Attention is focused on clarifying the role of REM sleep in the processes of memory and learning by analyzing the effect of the deprivation of REM sleep on various processes of memory and learning. It is found that the deprivation of REM sleep has no apparent effect on tests of active and passive avoidance. N.B.

A83-15777
THE PHYSIOLOGICAL AND PSYCHOLOGICAL CONSEQUENCES OF A ONE-TIME DEPRIVATION OF SLEEP [FIZIOLOGICHESKIE I PSIKHOLOGICHESKIE POSLEDSTVIIA ODNOKRATNOI DEPRIVATSII SNA]
A. M. VEIN, I. G. DALLAKIAN, IA. I. LEVIN, and K. E. SKAKUN (I Moskovskii Meditsinskii Institut, Moscow, USSR) Fiziologiia Cheloveka, vol. 8, Nov.-Dec. 1982, p. 898-902. In Russian. refs

The physiological effects of a short-term (up to 3 days) deprivation of sleep in humans are investigated and the complex of psychological reactions caused by such deprivations are evaluated. Results show that the subjects relatively successfully coped with the deprivation of sleep and were able to maintain a state of wakefulness without special efforts during the course of the 36 hr test period. After the deprivation of sleep for 36 hr, psychological shifts were observed, which were primarily subclinical in character and were expressed as heightened anxiety, sensitivity, and excitability. The periods of sleep following short-term deprivation of sleep were characterized by increases in sleep, greater amounts of slow sleep, decreases in the activity of motion, and also by a series of qualitative shifts. In addition, the short-term deprivation of sleep was found to lead to changes in interhemispherical relations due to an activation of the right hemisphere. N.B.

A83-15778
THE CONDITIONS OF THE DEVELOPMENT AND THE REGULARITIES OF THE PATTERNS OF THE SKIN-GALVANIC RESPONSE [USLOVIIA VOZNIKNOVENIIA I ZAKONOMERNOSTI DINAMIKI KOZHNO-GAL'VANICHESKOI REAKTSII]
A. A. KRAUKLIS and A. A. ALDERSONS (Ministerstvo Zdravookhraneniia Latviiskoi SSR, Latviiskii Nauchno-Issledovatel'skii Institut Eksperimental'noi i Klinicheskoi Meditsiny, Riga, Latvian SSR) Fiziologiia Cheloveka, vol. 8, Nov.-Dec. 1982, p. 910-918. In Russian. refs

A method is developed to investigate and evaluate the patterns of the skin-galvanic response (SGR) as an indicator of neuroemotional tension in healthy humans. The patterns of the SGR are studied for 80 symmetric zones on the upper part of the body of the subjects during the application of thermal, physical, and mental-emotional loads. The presence of six phases for the SGR is shown, and the regularities of their changes following the application of the loads is established. The conditions for the development of the so-called paradoxical patterns of the SGR during increasing physical and mental-emotional loads are clarified. The limitations of earlier studies of the SGR in humans are identified. The physiological bases for the phase shifts of the SGR during graded loads are determined. N.B.

A83-15780
THE ADAPTATION OF THE HEART TO CHRONIC HIGH-ALTITUDE HYPOXIA [ADAPTATSIIA SERDTSA K KHRONICHESKOI VYSOKOGORNOI GIPOKSII]
M. M. MIRRAKHIMOV and T. S. MEIMANALIEV (Kirgizskii Nauchno-Issledovatel'skii Institut Kardiologii, Frunze, Kirgiz SSR) Fiziologiia Cheloveka, vol. 8, Nov.-Dec. 1982, p. 939-942. In Russian. refs

The effect of a long-term exposure to high altitude conditions involving hypoxia on the heart, especially the right side of the heart, were investigated for 651 males living in the Tian-Shan and Pamir mountains (2800-4200 m) and the data were compared to that obtained for 878 males living at lower altitudes (800-900 m). Results show that mountain subjects react to physical loads (bicycle ergometer tests) with a less pronounced rise in minute volume, heart index, and beat index, and these parameters return to normal levels faster than for subjects living at low altitudes. Hypertrophy of the right ventricle of the heart was observed to decrease the amount and strength of physical work able to be performed by mountain subjects and this condition increased with age. Moreover, this hypertrophy of the right ventricle, especially the changes in the S-T segment and the T wave, can be considered as a preclinical condition. N.B.

A83-15781
THE CORRELATION OF THE PARAMETERS OF THE CARDIAC RHYTHM WITH THE PHYSICAL WORK CAPACITY OF HUMANS DURING THE ADAPTATION TO HIGH-ALTITUDE HYPOXIA [VZAIMOSVIAZ' PARAMETROV SERDECHNOGO RITMA S FIZICHESKOI RABOTOSPOSOBNOST'IU LIUDEI PRI ADAPTATSII K VYSOKOGORNOI GIPOKSII]
K. IU. AKHMEDOV and F. A. SHUKUROV (Tadzhikskii Meditsinskii Institut, Dyushambe, Tadzhik SSR) Fiziologiia Cheloveka, vol. 8, Nov.-Dec. 1982, p. 943-949. In Russian. refs

A83-15782
THE PECULIARITIES OF THE FUNCTIONING OF THE CARDIOVASCULAR SYSTEM AND ITS REGULATOR MECHANISMS IN SWIMMERS DEPENDING ON THE INITIAL CONDITION OF THE VEGETATIVE NERVOUS SYSTEM [OSOBENNOSTI FUNKTSIONIROVANIIA SERDECHNO-SOSUDISTOI SISTEMY I EE REGULIATORNYKH MEKHANIZMOV U PLOVTSOV V ZAVISIMOSTI OT ISKHODNOGO SOSTOIANIIA VEGETATIVNOI NERVNOI SISTEMY]
V. A. PASICHNICHENKO and T. N. SHESTAKOVA (Minskii Radiotekhnicheskii Institut, Minsk, Belorussian SSR) Fiziologiia Cheloveka, vol. 8, Nov.-Dec. 1982, p. 950-956. In Russian. refs

A83-15783
THE THRESHOLD OF THE KINESTHETIC SENSITIVITY IN THE VERTICAL POSTURE [POROGI KINESTETICHESKOI CHUVSTVITEL'NOSTI V VERTIKAL'NOI POZE]
V. S. GURFINKEL, M. I. LIPSHITS, and K. E. POPOV (Akademiia Nauk SSSR, Institut Problem Peredachi Informatsii, Moscow, USSR) Fiziologiia Cheloveka, vol. 8, Nov.-Dec. 1982, p. 981-988. In Russian. refs

A quantitative evaluation of the kinesthetic sensitivity during the maintaining of the vertical posture is presented in order to compare the resulting data with the characteristic sizes of the changes of the joint angles during conditions which relate to the realized perception of these variations. In addition, the specificity of the changes in kinesthetic sensitivity, which are linked with the maintenance of the vertical posture, are separated from those changes which are linked with nonspecific factors. Results show that at rest, the threshold of maintaining passive motion in an ankle joint is 0.35-0.54 degrees. During the maintaining of the vertical posture, the threshold decreases by 5-10 times and attains a level which makes it possible to maintain a constantly moving joint. Experiments with analogues of nonspecific factors (step loads, muscle activity) show that these factors contribute to the lowering of the threshold, although the main factor is the specific increase in the sensitivity, which is linked with the fulfillment of the task of maintaining equilibrium. Experiments with vibrational stimulations of the receptors of the muscle spindles confirm that adequate kinesthetic maintenance forms the pathway for the integration of afferents of various modalities into a unified sensory complex. N.B.

A83-15784
THE SIGNIFICANCE OF FUNCTIONAL LATERALIZATION IN THE FORMATION OF COMPLEX MOTOR ACTS IN ATHLETES [O ZNACHENII FUNKTSIONAL'NOI LATERALIZATSII V FORMIROVANII SLOZHNYKH DVIGATEL'NYKH AKTOV U SPORTSMENOV]
A. B. KOGAN, A. B. POROSHENKO, P. N. ERMANKOV, and G. A. KURAEV (Rostovskii Gosudarstvennyi Universitet, Rostov-on-Don, USSR) Fiziologiia Cheloveka, vol. 8, Nov.-Dec. 1982, p. 989-993. In Russian. refs

A83-15785
THE OPTIMAL SHIFT SCHEDULE OF WORK IN INDUSTRY [K VOPROSU OB OPTIMAL'NOM SMENNOM REZHIME RABOTY NA PROIZVODSTVE]
A. A. AIDARALIEV and A. A. SOROKIN (Akademiia Nauk Kirgizskoi SSR, Institut Fiziologii i Eksperimental'noi Patologii Vysokogor'ia, Frunze, Kirgiz SSR) Fiziologiia Cheloveka, vol. 8, Nov.-Dec. 1982, p. 994-999. In Russian. refs

The changes in the amplitude of the circadian and noncircadian (8 and 12 hr) rhythmic components were investigated for broken shifts in industrial settings where the hours are changed at various intervals. Data for the daily changes in body temperature and pulse rate were collected for workers in a cement factory and a glass factory, which had different schedules for the changes in the shifts, while the hours for each shift were identical. Results show that for the cement factory workers, the greatest changes in the daily rhythms were detected when the hours of work occurred in periods which corresponded to the minimum levels of the physiological parameters studied. However, for workers at the glass factory, where the shift changes occurred more frequently, the significant changes in the daily rhythms occurred during various hours of the day in comparison with the phases of the daily pattern of the physiological functions. It is concluded that noncircadian rhythms (8 and 12 hr) can characterize the intensity of the reorientation of the daily rhythms. N.B.

A83-15786
BIORHYTHMIC CRITERIA OF NONSPECIFIC ADAPTIVE CAPABILITY [BIORITMOLOGICHESKIE KRITERII NESPETSIFICHESKOI ADAPTOSPOSOBNOSTI]
N. I. MOISEEVA (Akademiia Meditsinskikh Nauk SSSR, Leningrad, USSR) Fiziologiia Cheloveka, vol. 8, Nov.-Dec. 1982, p. 1000-1005. In Russian. refs

The use of biorhythm parameters is evaluated for determining the adaptive capability of individuals to great changes in their living condition i.e., their nonspecific adaptability. Data were collected for physiological parameters of individuals living in Leningrad, and for individuals living in cities 2-9 time zones east of Leningrad who visited that city for various periods of time. Results show that the structure of the biological rhythms of various human physiological functions can be used to evaluate nonspecific adaptive capability. Three criteria are proposed for evaluating the structure of biorhythms: criteria of the organization of separate curves, criteria of the degree of maintaining the position of the points of the curve in repeated experiments, and criteria of the degree of variation of the significance of the curves. It is found that individuals having high adaptive capabilities exhibit similar values for these three criteria. N.B.

A83-15787
THE EFFECT OF A GEOMAGNETIC FIELD AND NEURO-PSYCHOLOGICAL STRESS ON THE ELECTRICAL RESISTANCE IN BIOLOGICALLY ACTIVE POINTS OF THE SKIN [VLIIANIE GEOMAGNITNOGO POLIA I NERVNO-PSIKHICHESKOGO NAPRIAZHENIIA NA ELEKTRICHESKOE SOPROTIVLENIE V BIOLOGICHESKI AKTIVNYKH TOCHKAKH KOZHI]
G. V. RYZHIKOV, O. S. RAEVSKAIA, V. A. GUMENIUK, and A. N. KAPTSOV (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Fiziologiia Cheloveka, vol. 8, Nov.-Dec. 1982, p. 1006-1010. In Russian. refs

A83-15788
PHYSIOLOGICAL ASPECTS OF LYMPHOLOGY [FIZIOLOGICHESKIE ASPEKTY LIMFOLOGII]
N. U. BAZANOVA, L. E. BULEKBAEVA, and R. A. GAREEV (Akademiia Nauk Kazakhskoi SSR, Institut Fiziologii, Alma-Ata, Kazakh SSR) Fiziologiia Cheloveka, vol. 8, Nov.-Dec. 1982, p. 1011-1017. In Russian. refs

A review is presented of the research concerned with the functions of the lymph system conducted by investigators at the Institute of Physiology of the Academy of Sciences, Kazakh SSR, from 1945 to the present. Among other topics discussed are investigations of extero and interoceptive regulation of the lymph current in ontogenesis, the participation of various parts of the brain in the regulation of lymph circulation, the content of proteins in the perilymphatic spaces of the connecting tissues, the transport capabilities of the lymph vessels and nodes, and the comparative physiology of the lymph systems of various animal species. Various studies concerning the lymph system undertaken in conjunction with other scientific institutes in the USSR are also examined. N.B.

A83-15789
SEVERAL CONTEMPORARY PATHS OF THE ANALYTICAL INVESTIGATION OF THE HUMAN NEUROMOTOR UNITS [NEKOTORYE SOVREMENNYE PUTI ANALITICHESKOGO ISSLEDOVANIIA NEIROMOTORNOGO APPARATA CHELOVEKA]
R. S. PERSON (Akademiia Nauk SSSR, Institut Problem Peredachi Informatsii, Moscow, USSR) Fiziologiia Cheloveka, vol. 8, Nov.-Dec. 1982, p. 1018-1033. In Russian. refs

A review is presented of studies concerning the physiology of human movement, based on research using electrophysiological methods, among others. Topics discussed include investigations of the impulses of individual human motoneurons during involuntary muscle contractions, the properties of the individual motor units (motoneurons, axons, etc.), the reflex reactions at individual motor units (motoneurons), the registration of the action potentials of human muscle fibers, and the impulses from muscle receptors to individual afferent fibers. The importance of investigations on humans in which the subject is able to participate directly in the experiment is emphasized. N.B.

A83-16007#
STATISTICAL STUDIES ON THE PHYSICAL PERFORMANCE OF JASDF PILOTS
Y. KURIHARA, C. MIZUMOTO, and S. YAGURA (Japan Air Self-Defense Force, Aeromedical Laboratory, Tachikawa, Tokyo, Japan) Japan Air Self Defence Force, Aeromedical Laboratory, Reports, vol. 23, June 1982, p. 29-40. In Japanese, with abstract in English. refs

A statistical analysis is presented for the physical performance of Japan Air Self Defence Force pilots and the results are compared to the physical fitness and physical performance of normal Japanese males. The tests were conducted for approximately 1300 pilots in 1980. Among other results, it was found that the physical performance of the pilots was far superior to that of the normal males, with great differences exhibited in the dynamic muscular endurance, aerobic capacity, power, agility, and coordination for the two groups. The standard deviation of each test score for the pilots was smaller than that for the males of the same age group. The peak scores of the males were determined to occur at approximately 16-18 years of age, while for the pilots the peak scores occurred at the ages of 20-22. The performance of the pilots was found to decrease more rapidly with age than the performance of the males, although the pilots at the age of 39 scored higher on the physical performance tests than did the males at the age of 29. In aerobic capacity, agility, and coordination, the individual differences of the pilots became larger with increasing age, while the scores of some tests such as pull-ups and standing trunk flexion were influenced not only by aging but also by the physique of the pilots, such as the height and body weight. N.B.

N83-12847*# Massachusetts Inst. of Tech., Cambridge. Man Vehicle Lab.
A HEURISTIC MATHEMATICAL MODEL FOR THE DYNAMICS OF SENSORY CONFLICT AND MOTION SICKNESS
C. M. OMAN Aug. 1980 78 p refs
(Contract NAS9-15343; NSG-2032)
(NASA-CR-169472; NAS 1.26:169472; MIT-MVLR-MVT-80-1)
Avail: NTIS HC A05/MF A01 CSCL 06P

The etiology of motion sickness is explained in terms of a qualitatively formulated sensory conflict hypothesis. By consideration of the information processing task faced by the central nervous system in estimating body spatial orientation and

in controlling active body movement using an internal model referenced control strategy, a mathematical model for sensory conflict generation is developed. The model postulates a major dynamic functional role for sensory conflict signals in movement control, as well as in sensory-motor adaptation. It accounts for the role of active movement in creating motion sickness symptoms in some experimental circumstances, and in alleviating them in others. The relationship between motion sickness produced by sensory rearrangement and that resulting from external motion disturbances is explicitly defined. A nonlinear conflict averaging model is proposed which describes dynamic aspects of experimentally observed subjective discomfort sensation, and suggests resulting behaviors. S.L.

N83-12848*# National Aeronautics and Space Administration, Washington, D. C.
INTAKE AND URINARY EXCRETION OF SODIUM CHLORIDE UNDER VARYING CONDITIONS OF EFFORT AND ENVIRONMENT HEAT
E. ZOHAR, R. ADAR, J. TENNENBAUM, and M. KESTEN Sep. 1982 24 p refs Transl. into ENGLISH from Harefuah, J. of the Med. Assoc. of Israel (Israel), v. 60, no. 10, May 1961 p 326-332 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASW-3541)
(NASA-TM-76955; NAS 1.15:76955) Avail: NTIS HC A02/MF A01 CSCL 06P

Intake and urinary excretion of sodium were investigated in a group of young, healthy and acclimated men. The sodium excretions of workers and of machinists in the engine rooms of a ship were also investigated. S.L.

N83-12849*# National Aeronautics and Space Administration, Washington, D. C.
REDUCTION OF VOLUNTARY DEHYDRATION DURING EFFORT IN HOT ENVIRONMENTS
E. SOHAR, R. ADAR, T. GILAT, J. TENNENBAUM, and M. NIR Oct. 1982 15 p refs Transl. into ENGLISH from Harefuah, J. of the Med. Assoc. of Israel (Israel), v. 60, no. 10, 15 May 1961 p 319-323 Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prep. by Tel-Hashomer Government Hospital, Israel
(Contract NASW-3541)
(NASA-TM-76956; NAS 1.15:76956) Avail: NTIS HC A02/MF A01 CSCL 06P

During an experimental marching trip the daily positive fluid balance was preserved by providing a wide choice of beverages during the hours of the day. It was found that the beverage most suitable for drinking in large quantities during periods of effort was a cold drink with sweetened (citrus) fruit taste. Carbonated drinks, including beer, but milk also, were found unsuitable for this purpose. Author

N83-12850# Ohio State Univ., Columbus. Otological Research Labs.
CHANGES IN THE ORGAN OF HEARING PRODUCED BY SOUND Final Report, 1 Mar. 1977 - 1 May 1980
D. J. LIM and W. MELNICK Wright-Patterson AFB, Ohio AMRL Jul. 1982 24 p refs
(Contract F33615-77-C-0512; AF PROJ. 2312)
(AD-A118003; AFAMRL-TR-80-127) Avail: NTIS HC A02/MF A01 CSCL 06E

This report summarizes the research done for the Air Force from March 1, 1977, to May 1, 1980, by the Otological Research Laboratories at the Ohio State University College of Medicine, David J. Lim, M.D. and William Melnick, Ph.D., principal investigators. The research was funded by Air Force contract F33615-77-C-0512. The data have been presented at national and international meetings concerning auditory function and ototrauma; in addition, twelve articles have been published or are being submitted for publication. Author (GRA)

N83-13785# Joint Publications Research Service, Arlington, Va.
STATIC ELECTRIC AND ELECTROMAGNETIC LOW-FREQUENCY FIELDS (BIOLOGICAL EFFECTS AND HYGIENIC ASSESSMENT)
B. I. DAVYDOV and V. N. KARPOV *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 16 (JPRS-82194) p 21-30 9 Nov. 1982 refs Transl. into ENGLISH from Kosm. Biol. i Aviakosmicheskaya Med. (Moscow), v. 16, no. 5, Sep. - Oct. 1982 p 18-23
Avail: NTIS HC A08

The literature data are used to analyze the hygienic situation when man is exposed to constant electrical and low frequency electromagnetic radiations. The spectral characteristics and intensities of electrical fields near and on the surface of the earth generated by natural sources of electromagnetic radiations (electrical quasi-static fields, atmospheric electricity, thunderstorm charges, electromagnetic radiation emitted by the Sun and galaxies) are given. They can be employed to determine man's adaptive capabilities to the frequencies described during acute and chronic irradiation. The mechanisms of biological effects of the exposures are discussed. The methods for calculating the safety levels based on the USSR radiation safety standards and the "competing frequencies" procedure proposed can be applied to the design of electrotechnical devices and evaluation of integral hazard of constant electrical and electromagnetic fields of low frequencies. Author

N83-13786# Joint Publications Research Service, Arlington, Va.
POSSIBLE USE OF ULTRASONIC BIOLOGICAL ECHOLOCATION AS A NONINVASIVE METHOD OF EVALUATING INTRACRANIAL VOLUMES IN MAN
L. G. SIMONOV *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 16 (JPRS-82194) p 31-38 9 Nov. 1982 refs Transl. into ENGLISH from Kosm. Biol. i Aviakosmicheskaya Med. (Moscow), v. 16, no. 5, Sep. - Oct. 1982 p 24-28
Avail: NTIS HC A08

Potential applications of the method of ultrasonic echolocation for determining intracranial fluid volume relations are discussed. The data presented give evidence that variations in the attenuation coefficient and propagation pattern of the ultrasonic signal may reflect changes in both hemodynamics and intracranial pressure. Simultaneous invasive investigations may help quantify ultrasonic echolocation results. The review shows that ultrasonic echolocation of the brain can be used to determine variations in the intracranial volume relations induced by simulated space flights and to make well documented diagnoses. Author

N83-13788# Joint Publications Research Service, Arlington, Va.
BALLISTOCARDIOGRAPHIC STUDIES DURING FOURTH MISSION ABOARD SALYUT-6 ORBITAL STATION
R. M. BAYEVSKIY and I. I. FUNTOVA *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 16 (JPRS-82194) p 46-51 9 Nov. 1982 refs Transl. into ENGLISH from Kosm. Biol. i Aviakosmicheskaya Med. (Moscow), v. 16, no. 5, Sep. - Oct. 1982 p 34-37
Avail: NTIS HC A08

This paper presents ballistocardiographic examinations of the Salyut-6 fourth expedition crew members who showed variations in both the shape and amplitude of ballistocardiographic complexes. Ballistocardiograms (BCG) were reported by means of a piezoelectric sensor which was attached to the upper part of the iliac bone, near the body mass center. During ballistocardiography the ballistic forces in the head-to-feet direction were recorded. The examinations were performed preflight and on missions days 46, 71, 98, 133 and 175. Hemodynamic specificities of the right and left heart were determined with the aid of the breath-holding test. Measurements of BCG amplitudes were used to determine the kinetic effect of heart rate. The largest amplitude of BCG waves was seen on mission day 133. At this time period the systolic wave amplitude decreased during inhalation holding. Author

N83-13789# Joint Publications Research Service, Arlington, Va.
COMPARATIVE ASSESSMENT OF CIRCULATORY REACTION DURING WORK IN WEIGHTLESSNESS AND IN SALYUT STATION MOCKUP
V. G. DOROSHEV, N. A. LAPSHINA, Z. A. KIRILLOVA, O. B. KULIKOV, A. V. KALIBERDIN, and S. I. PONOMAREV *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 16 (JPRS-82194) p 52-56 9 Nov. 1982 refs Transl. into ENGLISH from Kosm. Biol. i Aviakosmicheskaya Med. (Moscow), Vol. 16 no. 5, Sep. - Oct. 1982 p 38-40
Avail: NTIS HC A08

Comparative evaluations of circulation responses of 22 operators and 13 cosmonauts to simulated and real flights onboard the Salyut station revealed significant differences. By the end of the flight cardiovascular responses of the operators showed signs of their increased conditioning, whereas the cosmonauts exhibited symptoms of circulation tension, which were particularly expressed during the first week and by the end of flight. Operator's activities in an orbital station mockup cannot be considered an adequate model for cardiovascular studies. Author

N83-13790# Joint Publications Research Service, Arlington, Va.
EFFECT OF IMMERSION HYPOKINESIA ON CHARACTERISTICS OF HUMAN EYE AND HEAD MOVEMENTS DURING GAZE FIXATION REACTION
Y. V. KREYDICH, A. A. REPIN, V. A. BARMIN, and I. B. KOZLOVSKAYA *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 16 (JPRS-82194) p 57-63 9 Nov. 1982 refs Transl. into ENGLISH from Kosm. Biol. i Aviakosmicheskaya Med. (Moscow), v. 16, no. 5, Sep. - Oct. 1982 p 40-44
Avail: NTIS HC A08

The effect of 7-day immersion hypokinesia on the coordination of eye and head movements during the gaze fixation reaction was investigated. The most distinct and persistent effect was an inadequate increase in the rate of eye counter-rolling that mismatched head movements. This reduced significantly the response time and accuracy: the time of gaze fixation lengthened appreciably and the number of positional errors grew considerably. These data suggest that in the oculomotor control system proprioceptive signals produce an inhibitory effect on the vestibular input. Author

N83-13791# Joint Publications Research Service, Arlington, Va.
CENTRAL CIRCULATION IN HEALTHY MAN DURING 7-DAY HEAD-DOWN HYPOKINESIA
V. Y. KATKOV, V. V. CHESTUKHIN, E. M. NIKOLAYENKO, S. V. GVOZDEV, V. V. RUMYANTSEV, T. M. GUEYNOVA, and I. A. YEGOROVA *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 16 (JPRS-82194) p 64-72 9 Nov. 1982 refs Transl. into ENGLISH from Kosm. Biol. i Aviakosmicheskaya Med. (Moscow), v. 16, no. 5, Sep. - Oct. 1982 p 45-51
Avail: NTIS HC A08

The effect of 7-day head-down tilt (-15 deg) and lower body negative pressure on circulation and oxidative metabolism was investigated on 13 healthy male test subjects. For 7-10 days they had Swan-Ganz catheters implanted in the pulmonary artery and a special cannula in the radial artery. The most marked changes were seen in the pulmonary artery pressure (PAP) and central venous pressure (CVP) that varied in a phase-like manner. By the 7th hour of bed rest the PAP increased significantly; this was followed by increases in the total lung resistance and the right ventricle function, as well as by a slight decrease of renin and aldosterone. Beginning with bed rest days 2 or 3 the PAP and CVP declined and remained lowered, till the end of bed rest. The responses to LBNP tests changed by bed rest day 2. Possible mechanisms of the above changes are discussed. Author

N83-13792# Joint Publications Research Service, Arlington, Va.
DISTINCTIONS OF CARDIOVASCULAR REACTIONS IN IMMEDIATE LBNP AFTEREFFECT PERIOD
L. Y. ANDRIYAKO, V. G. VOLOSHIN, and V. A. DEGTYAREV. *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 16 (JPRS-82194) p 73-77 9 Nov. 1982 refs Transl. into ENGLISH from Kosm. Biol. i Aviakosmicheskaya Med. (Moscow), v. 16, no. 5, Sep. - Oct. 1982 p 51-54
Avail: NTIS HC A08

Circulation variations during lower body negative pressure (LBNP) immediate aftereffects were investigated. Test subjects with different test tolerance showed dissimilar cardiovascular responses. The lack of reflect bradycardia in the test subjects with reduced LBNP tolerance gives evidence that their regulatory mechanisms are insufficiently reactive; this is manifested during the aftereffects of low LBNP (up to -40 mm Hg). Author

N83-13793# Joint Publications Research Service, Arlington, Va.
FEASIBILITY OF SIMULATING HEMODYNAMIC EFFECTS OF WEIGHTLESSNESS WITH USE OF POSITIVE PRESSURE
A. S. NEKHAYEV, V. A. DEGTYAREV, V. S. BEDNENKO, and Z. A. KIRILLOVA *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 16 (JPRS-82194) p 78-81 9 Nov. 1982 refs Transl. into ENGLISH from Kosm. Biol. i Aviakosmicheskaya Med., (Moscow), v. 16, no. 5, Sep. - Oct. 1982 p 54-57
Avail: NTIS HC A08

Venous and arterial circulation was investigated by simulating cephalad blood shifts generated by an exposure of test subjects to lower body positive pressure (LBPP) and head-down tilts at -8 deg and -15 deg. At LBPP and tilt -15 deg arterial pressure increased by 5 to 15%. During tilt -8 deg jugular vein blood filling increased 8 to 94% in the course of the first 3 hrs and then decreased reaching the baseline (horizontal position) level. During LBPP the parameter changed in a similar manner (increased by 2 to 50%). During tilt -15 deg the parameter grew by 10 to 110% and remained elevated. The exposures gave rise to bradycardia which was more pronounced during -8 deg and LBPP. The data obtained give evidence that circulation changes during LBPP and head-down tilts are identical. This suggests that LBPP can be used to simulate the effect of cephalad blood shifts. Author

N83-13794# Joint Publications Research Service, Arlington, Va.
EVALUATION OF MAN'S PHYSICAL CONDITIONING ACCORDING TO ENERGETICALLY OPTIMUM WALKING SPEED
In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 16 (JPRS-82194) p 82-85 9 Nov. 1982 refs Transl. into ENGLISH from Kosm. Biol. i Aviaosmicheskaya Med. (Moscow), v. 16, no. 5, Sep. - Oct. 1982 p 57-59
Avail: NTIS HC A08

Methods for evaluating energy expenditures associated with terrain cure walking under the assumption of additivity of expenditures involved in walking along flat and rugged terrain are described. It is shown that people of different physical fitness have different values of energetically optimal walking speed. The concept of the energetically optimal speed allows quantitative estimations of movement associated energy expenditures, taking into account individual exercise tolerance. Author

N83-13799# Joint Publications Research Service, Arlington, Va.
ROLE OF 24,25-DIHYDROXYCHOLECALCIFEROL IN BONE MINERALIZATION IN HYPOKINETIC RATS
I. N. SERGEYEV, N. V. BLAZHEYEVICH, M. S. BELAKOSKIY, V. B. SPIRICHEV, and A. S. USHAKOV *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 16 (JPRS-82194) p 108-113 9 Nov. 1982 refs Transl. into ENGLISH from Kosm. Biol. i Aviakosmicheskaya Med., (Moscow), v. 16, no. 5, Sep. - Oct. 1982 p 74-77
Avail: NTIS HC A08

The 24,25-Dihydroxycholecalciferol, and active D3 vitamin metabolite, at a dosage of 1.25 micro g/day/ animal prevents bone osteoporotic changes, effectively stimulates the diaphyseal and epiphyseal mineralization, and corrects hypocalciemia of

hypokinetic rats. It is found that 24,25 (OH)2D3 at this dosage does not increase nephrocalcinosis and does not produce the toxic effect as measured by body mass variations. E.A.K.

N83-13800# Joint Publications Research Service, Arlington, Va.
AUTONOMY OF OTOLITHIC NYSTAGMUS CENTERS
In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 16 (JPRS-82194) p 114-119 9 Nov. 1982 refs Transl. into ENGLISH from Kosm. Biol. i Aviakosmicheskaya Med. (Moscow), v. 16, no. 5, Sep. - Oct. 1982 p 77-80
Avail: NTIS HC A08

Pigeons (Columba livia) with unilaterally sectioned saccular nerves (Ramuli sacculi) were rotated in the dark along the horizontal plane. The nystagmic reaction which developed when the vestibular apparatus was simultaneously exposed to otolithic and canal stimuli, each of which taken separately causes nystagmus of the same direction, and is less pronounced in canal stimulation. It is indicated that the otolith nystagmus centers are an autonomous mechanism. E.A.K.

N83-13804# Joint Publications Research Service, Arlington, Va.
GAZE FIXATION USED TO SUPPRESS VESTIBULAR NYSTAGMUS
G. I. GORGILADZE, S. P. RITTER, V. N. SARYCHEV, and V. N. SABLIN *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 16 (JPRS-82194) p 136-139 9 Nov. 1982 refs Transl. into ENGLISH from Kosm. Biol. i Aviakosmicheskaya Med. (Moscow), v. 16, no. 5, Sep. - Oct. 1982 p 90-91
Avail: NTIS HC A08

The role of fixation in suppressing vestibular nystagmus was studied. High speed aviation and cosmonautics create adverse conditions for normal function of the vestibular system. Regulation of vestibular reactions by other sensory systems, in particular vision, eliminates or alleviates undesirable vestibular reactions. It is found that the vertigo and spatial illusions which occur in weightlessness become more marked when the eyes are closed. E.A.K.

N83-13806 Royal Aircraft Establishment, Farnborough (England).
HEART RATE AS AN IN-FLIGHT MEASURE OF PILOT WORKLOAD
A. H. ROSCOE Mar. 1982 17 p refs Presented at USAF AFFTC/NASA Dryden/AIAA Workshop on Flight Testing to Identify Pilot Workload and Pilot Dyn., Edwards AFB, Ca., Jan. 1982
(RAE-TM-FS(B)-464; BR84151) Avail: Issuing Activity

The relationship between a pilot's heart rate and his workload, whether heart rate is a valid and reliable indicator of workload (and, if so, how it should be used), and the neurophysiological mechanisms involved are discussed. Examples of heart rate were selected from more than 3000 plots recorded during flight tests. There is good evidence that heart rate increases with increased workload. Differences in heart rate values seem to indicate relative differences in workload. Heart rate is best used in conjunction with a good workload rating scale. Heart rate appears to be related to arousal. Author (ESA)

N83-13807# New South Wales Univ., Kensington (Australia). School of Physiology and Pharmacology.
BREATHING AND THE CONTROL OF HEART RATE Ph.D. Thesis
E. POTTER Jan. 1981 221 p refs
Avail: NTIS HC A10/MF A01

The neural basis of the relationship between heart rate and breathing was studied. Four reflexes that slow the heart were studied: the baroreceptor reflex, the chemoreceptor reflex, the diving response, and the oculoardiac reflex. Heart rate was studied in anaesthetised dogs and conscious human subjects. Dogs were chosen as experimental animals because even when anaesthetised they maintain a high level of cardiac vagal tone. More quantitative aspects of the interaction of breathing with the neural control of heart rate were studied in anaesthetised dogs by recording activity in single vagal efferent nerve fibres running to the heart. Each of the reflexes studied was found to slow the heart only, or most effectively, in the expiratory phase of breathing. Author

N83-13808# RAND Corp., Santa Monica, Calif.
MODELS FOR HUMAN EXPOSURE TO AIR POLLUTION
N. DUAN Jul. 1982 21 p refs Sponsored by Dept. of Health and Human Services
(RAND/N-1884-HHS/RC) Avail: NTIS HC A02/MF A01

Four models for human exposure to air pollution are discussed and compared. Simple microenvironment monitoring measures pollutant concentrations at fixed locations, regarded as proxies for similar locations or microenvironments. This model does not require pollutant measurements on the individual level, therefore is easy to implement. However, the model can be used only to estimate the average exposure in a population and does not provide any estimate of the variability and distribution of individual exposures. Replicated microenvironment monitoring provides some estimates of the variability and distribution. However, because of the possible discrepancy between the microenvironment concentration distribution and the individual concentration distribution, some adjustment might be necessary. Integrated personal monitoring allows direct estimation of the average exposure as well as the variability and distribution of individual exposures. Coupled with the appropriate time budget data, a regression analysis can be applied to estimate the contribution from each microenvironment type. B.W.

N83-13809# Pennsylvania State Univ., University Park. Biomechanics Lab.
EFFECTS OF GENDER, LOAD, AND BACKPACK ON EASY STANDING AND VERTICAL JUMP PERFORMANCE, VOLUME 2 Final Report, 1 Oct. 1979 - 31 Aug. 1981
R. C. NELSON and P. E. MARTIN Natick, Mass. Army Natick Research and Development Labs. Mar. 1982 78 p refs 4 Vol.
(Contract DAAK60-79-C-0131; DA PROJ. 1L1-62723-AH-98)
(AD-A119129; NATICK-TR-82/016; NATICK/IPL-240) Avail: NTIS HC A05/MF A01 CSCL 05E

This study was conducted to determine the effects of loads worn or carried and the type of backpack used on parameters of the easy standing and vertical jumping performance of men and women. Analyses of the easy standing data indicated that both men and women demonstrated greater stability with the medium than with the lighter or heavier loads. The internal frame backpack resulted in greater postural stability relative to the three, external-frame systems. Increasing loads produced a systematic, linear decrease in vertical jumping performance. Analyses of the effects of backpacks on the parameters of jumping performance revealed few differences among the packs. However, it was found that height of jump was somewhat better with the internal frame system than with the external-frame backpacks. Additional analyses were carried out on the trial-to-trial reliability of easy standing and on ground reaction force parameters of vertical jumping adjusted for body weight and system weight. GRA

N83-13810# Science Information Services, Inc., Philadelphia, Pa.
BIOLOGICAL EFFECTS OF NONIONIZING ELECTROMAGNETIC RADIATION: A DIGEST OF CURRENT LITERATURE, OCTOBER THRU DECEMBER 1981. VOLUME 6, NUMBER 2
B. KLEINSTEIN Apr. 1982 121 p
(Contract NT-81-SAC-00064)
(PB82-226853; NTIA/CR-82/19) Avail: NTIS HC A06/MF A01 CSCL 05R

Current awareness information on biological effects and health implications of microwave and other radio frequency radiation is provided. The effects of electric and magnetic fields (static and alternating) and research on medical applications of these nonionizing electromagnetic radiations are also included. Each issue contains abstracts of current English and foreign-language research literature, research summaries, news items and announcements and information on relevant meetings and conferences. Subject and author indices are provided for all

literature abstracts to facilitate specific search and reference use.
Author (GRA)

N83-13811# National Bureau of Standards, Washington, D.C. National Engineering Lab.
FURTHER DEVELOPMENT OF A TEST METHOD FOR THE ASSESSMENT OF THE ACUTE INHALATION TOXICITY OF COMBUSTION PRODUCTS
B. C. LEVIN, A. J. FOWELL, M. M. BIRKY, M. PAABO, A. STOLTE, and D. MALEK Jun. 1982 146 p refs
(PB82-217886; NBSIR-82-2532) Avail: NTIS HC A07/MF A01 CSCL 06T

The development of a test method for the assessment of acute inhalation toxicity of combustion products of materials is discussed. The procedure primarily intended for research and screening purposes, provides: (1) a method for determining, under flaming and non-flaming conditions, the LC(50) (the concentration of combustion products which causes 50% lethality in the test animals (rats) exposed for 30 minutes and observed for 14 days following exposure); (2) an optional procedure to examine materials which rapidly produce combustion products which cause death of test animals within a 10 minute exposure and a 14 day post-exposure observation period; and (3) a description of analytical and physiological measurements which can provide more detailed information on the nature of the toxic effects of combustion products. Limitations of the test method are identified and future work to address them is proposed. GRA

53

BEHAVIORAL SCIENCES

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

A83-13277
THE VERBAL AND AURAL FUNCTIONS OF COMMUNICATION SYSTEM OPERATORS [RECHEVYE I SLUKHOVYE FUNKTSII AUDITOROV V SISTEMAKH SVIAZI]
I. M. LUSHCHIKHINA and L. M. SOLOVOVA Psikhologicheskii Zhurnal, vol. 3, Mar.-Apr. 1982, p. 111-119. In Russian. refs

The findings of Anan'ev (1969, 1977) are summarized. The relationship between the verbal and aural abilities in the absence of any pathology is investigated. Attention is also given to the effect that a person's aural peculiarities have on his ability to understand speech in the presence of noise. The relationship between a person's psychological makeup and his suitability for work in communications systems is discussed. C.R.

A83-13279
TRENDS IN THE DEVELOPMENT OF SOVIET PSYCHOPHYSICS [O NEKOTORYKH NAPRAVLENIIAKH RAZVITIIA OTECHESTVENNOI PSIKHOFIZIKI]
IU. M. ZABRODIN Psikhologicheskii Zhurnal, vol. 3, Mar.-Apr. 1982, p. 55-69. In Russian. refs

Modern research in psychophysics seeks to discern the laws, relationships, and factors that determine the features of the formation and functioning of psychic images as subjective quantities and results of the imaging of phenomena, objects, and events in the outside world. Psychophysics endeavors to uncover the relationships between these subjective quantities and the properties of the natural objects from which the images derive. The theories, conceptions, and experimental data that have been produced in this field, however, have thus far not been synthesized, and the findings are often in apparent contradiction. On the other hand, it has been possible to provide a theoretical basis for processes of sensory perception. C.R.

A83-13280
PSYCHOLOGICAL PROBLEMS OF THE ACTIVITIES OF OPERATORS - THREE CONFERENCES IN ZVENIGOROD [PSIKHOLOGICHESKIE PROBLEMY DEIATEL'NOSTI OPERATORA. TRI KONFERESTSII V ZVENIGORODE]
IU. I. KIRILENKO, V. N. NOSULENKO, A. P. PAKHOMOV, and V. A. DENISOV Psikhologicheskii Zhurnal, vol. 3, Jan.-Feb. 1982, p. 158-163. In Russian.

A discussion of the topics examined at three conferences devoted to various psychological problems of operators that were held at Zvenigorod, USSR, is presented. The first conference, held in 1979, concerned the problems of measuring the psychological characteristics of humans. The second conference, 1980, examined the psychological problems of the analysis and synthesis of the activities of operators. The third conference, 1981, was devoted to analyzing the effectiveness of the activity of operators. N.B.

A83-13282
INDIVIDUAL DIFFERENCES IN SPATIAL REPRESENTATIONS DURING OPERATOR ACTIVITY [INDIVIDUAL'NYE OSOBENNOSTI PROSTRANSTVENNYKH PREDSTAVLENII V OPERATORSKOI DEIATEL'NOSTI]
A. A. GOSTEV Psikhologicheskii Zhurnal, vol. 3, Jan.-Feb. 1982, p. 101-109. In Russian. refs

Individual differences in the construction of spatial images from symbolic information during the course of operator activity are studied with particular attention given to the role of image characteristics and the structure and content of the image formation task. The self-ranking method was used to assess the characteristics of mental images formed in conjunction with the performance of tasks including the representation of a complex trajectory in the absence of feedback, identification based on symbolic information, determination of the vertical under continuously varying gravitational and inertial stimuli, and the formation of an image of the spatial position of an object. Results allow the classification of the images formed into five types based on combinations of the criteria of vividness and controllability, which types are related to the speed and accuracy of image formation. It is noted that task complexity, determined by subject familiarity, speed required, and amount of reflection required, greatly influences the relation of image formation to imaging ability.
A.L.W.

A83-13284
THE MANAGEMENT OF PSYCHOLOGICAL CLIMATE OF LOCOMOTIVE CREWS [UPRAVLENIE PSIKHOLOGICHESKIM KLIMATOM V LOKOMOTIVNYKH KOLONNAKH]
V. V. BELOUS and M. P. SHCHUKIN Psikhologicheskii Zhurnal, vol. 3, Mar.-Apr. 1982, p. 138-141. In Russian. refs

A83-13285
PSYCHOPHYSICAL RESEARCH ON MEMORY SENSORY PATTERNS [PSIKHOFIZICHESKOE ISSLEDOVANIE SENSORNYKH ETALONOV PAMIATI]
V. A. SADOV Psikhologicheskii Zhurnal, vol. 3, Jan.-Feb. 1982, p. 77-84. In Russian. refs

Human activities involve often the reception and processing of information which appears in the form of a combination of physical signals. Information regarding the physical characteristics of the environment in such cases is essential for effective and reliable work performance, and memory, as processing system for this information, can play a leading part in the involved activities. The conversion of information in the sensory system is studied by psychophysics. The present investigation is concerned with such studies. The theoretical aspects regarding the qualitative specificity of work in relation to short-term and long-term memory are considered, and the hypothesis is introduced that sensory information undergoes significant changes in connection with the storage process. A description is presented of experimental results which confirm this hypothesis. It is found that the information retention process involved has dynamic characteristics. G.R.

A83-13286
VERIFYING THE EQUATIONS FOR DYNAMIC MEMORY IN PSYCHOLOGICAL EXPERIMENTS [PROVERKA URAVNENII DINAMICHESKOI PAMIATI V PSIKHOLOGICHESKIKH OPYTAKH]
A. N. LEBEDEV, N. A. LAMZINA, G. V. KOTKOVA, I. V. MOSKALENKO, and V. P. ELCHANINOV Psikhologicheskii Zhurnal, vol. 3, Jan.-Feb. 1982, p. 60-70. In Russian. refs

It is shown that a solution to the system of equations of dynamic memory set forth here can predict the outcome of psychological experiments measuring the capacity of short-term memory and the time and accuracy characteristics of signal identification. This is seen as supporting the hypothesis concerning the coding of memory signals by systems of spatially organized periodic brain processes. C.R.

A83-13287
THE OBSERVER'S ACTIVITIES IN A NEAR-THRESHOLD REGION [RABOTA NABLIUDATELIA V PRIPOROGOVOI OBLASTI]
K. V. BARDIN Psikhologicheskii Zhurnal, vol. 3, Jan.-Feb. 1982, p. 52-59. In Russian. refs

In investigations conducted by Bardin (1962, 1966, 1968, 1969), it has been found that the near-threshold region can be suitably represented in the form of three zones, related to nondiscrimination (uniformity), doubt (uncertainty), and discrimination (disparity). The transition between the zone of discrimination and the zone of doubt has already been studied. The present investigation is, therefore, concerned with the transition from the zone of doubt to the zone of nondiscrimination. An experiment making use of the auditory modality is conducted. The stimuli used are tonal packets with a duration of 0.1 seconds provided by an acoustic generator. The stimuli are presented to the subject binaurally by means of headphones. Four persons are used as subjects. A frequency of 1000 Hz was used. The results of the experiment are discussed, taking into account the implications for the transition characteristics. G.R.

A83-13450
PERCEPTUAL CAPABILITIES, AMBIGUITIES, AND ARTIFACTS IN MAN AND MACHINE
A. P. GINSBURG (USAF, Aviation Vision Laboratory, Wright-Patterson AFB, OH) In: 3-D machine perception; Proceedings of the Conference, Washington, DC, April 23, 24, 1981. Bellingham, WA, SPIE - The International Society for Optical Engineering, 1981, p. 78-82. refs

Certain advances in visual science suggesting that perception may be structured from a hierarchy of filtered images are summarized. It is shown that a small numbered set of images created from filters based on biological data can provide a rich array of information about any object: contrast, general form, identification, textures and edges. It is contended that machine perception will require similar parallel processing of an array of filtered images if human-like visual performance is required. Such visual problems as certain visual illusion, multistable objects, and masking are analyzed in terms of the limitations of biological filtering. Machine solutions to these problems are then discussed. C.R.

A83-13641
AN INVESTIGATION OF THE RELATIONS BETWEEN EEG AND VEGETATIVE INDICATORS IN STRESS SITUATIONS IN PATIENTS WITH VARIOUS TYPES OF DEPRESSION [IZUCHENIE SOOTNOSHENII ELEKTROENTSEFALOGRAFICHESKIKH I VEGETATIVNYKH POKAZATELEI V STRESSOVOI SITUATSII U BOL'NYKH S RAZLICHNYMI TIPAMI DEPRESSII]
V. M. KAMENSKAIA and E. S. MIKHAILOVA (Ministerstvo Zdravookhraneniia RSFSR, Moskovskii Nauchno-Issledovatel'skii Institut Psikhiatrii, Moscow, USSR) Zhurnal Nevropatologii i Psikhiatrii im. S.S. Korsakova, vol. 82, no. 9, 1982, p. 57-62. In Russian. refs

A83-14111#
PERCEPTION OF POSITION BY THE PILOT IN THE CASE OF COMPUTER-GENERATED EXTERNAL VISUAL SCENE DISPLAYS FOR A LANDING APPROACH [ORTSWAHRNEHMUNG DURCH PILOTEN BEI RECHNER-ERZEUGTEN AUSSENSICHT-DARSTELLUNGEN EINES LANDEANFLUGS]
G. DOERFEL Wachtberg, West Germany, Forschungsgesellschaft fuer angewandte Naturwissenschaften (Forschungsinstitut fuer Anthropotechnik, Bericht No. 55), 1982. 55 p. In German. $4.00. refs

The steadily increasing complexity of the technical systems employed in aviation leads to requirements for more sophisticated and expensive simulators. In this connection, questions concerning the cost effectiveness of simulation systems for pilot training applications have become an important consideration. The employment of Computer Image Generation (CIG) systems represents a definite advance in sight simulation technology. However, questions arise regarding the absolute and relative significance of the effective visual elements of perception (cues). The present investigation provides a contribution to an answer to questions regarding the effect of certain elements of the visual scene on the perception of the position by the pilot. The obtained information is to provide an aid for the employment of cost effective visual scene simulation systems. G.R.

A83-14113#
THE DISPLAY CAPACITY OF ALPHANUMERIC INFORMATION ON VISUAL DISPLAY UNITS WITH RESTRICTIONS IN THE ELECTRICAL OR VISUAL CHANNEL [DE AFBEELDINGSCAPACITEIT VAN TEKST OP BEELDSCHERMEN BIJ BEPERKINGEN IN HET ELEKTRISCHE OF VISUELE KANAAL]
F. W. UMBACH Enschede, Technische Hogeschool Twente, 1982. 54 p. In Dutch. refs

The display capacity of alphanumeric information on visual display units is affected both by technical restrictions in the visual display unit or electrical transport channel and by limitations of the human visual system in regard to the perception of the presented picture. This work examines the effect of these restrictions and shows that the technical system should be trimmed to optimally match the visual channel. B.J.

A83-14500
THE EFFECT OF AUTOGENOUS TRAINING ON THE SUCCESS OF THE FLIGHT TRAINING OF STUDENTS [VLIIANIE AUTOGENNOI TRENIROVKI NA USPESHNOST' LETNOGO OBUCHENIIA KURSANTOV]
V. S. LOBZIN, A. A. BOCHENKOV, V. S. LOZINSKII, M. M. RESHETNIKOV, and N. S. KOSOVSKAIA Voenno-Meditsinskii Zhurnal, Sept. 1982, p. 42-44. In Russian.

The effect of autogenous training on the psychophysiological condition, on several peculiarities of personality, and on the success of professional training of student pilots is investigated. Results show that autogenous training increases the functional condition of the students. In part, the experimental group exhibited a greater speed of simple sensorimotor reaction, a larger number of precise reactions to a moving object, and a decrease in excess reactions as compared to the control group. In addition, the experimental group showed greater increases in indicators of emotional stability, motivation, self-confidence, and stability of behavioral reactions as compared to the control group. N.B.

A83-14525
THE EFFECT OF TWO TYPES OF INDUCED-MOTION DISPLAYS ON PERCEIVED LOCATION OF THE INDUCED TARGET
J. H. BACON, A. GORDON (Tufts University, Medford, MA), and P. H. SCHULMAN (New York, State University, Utica, NY) Perception and Psychophysics, vol. 32, no. 4, Oct. 1982, p. 353-359. refs

The perceived location of a target seen in induced motion was evaluated under two display conditions using a pointing test. In the first display, a fixated, horizontally stationary spot was

surrounded by a frame moving back and forth, and as the frame moved to each side, its center shifted correspondingly with respect to the subject's objective median plane. In the second display, the surround was constructed so that as it moved back and forth, its center remained in virtual alignment with the objective median plane. Results show that only the second display condition produced significant shifts in the target's perceived location, although both conditions produced a substantial induced-motion effect. In addition, similar shifts were also obtained with a stationary off-center frame. It is concluded that the changes in the perceived location obtained with the first induced-motion display were not derived from the induced motion per se, but, rather, from a frame effect produced when the surround moved to an off-center position. It is suggested that motion and position in all cases are derived from independent noninteractive processes. N.B.

A83-15413
THE HUMAN FACTOR IN MISHAPS - PSYCHOLOGICAL ANOMALIES OF ATTENTION
S. SANTILLI (USAF, Crew Technology Div., Brooks AFB, TX) In: SAFE Association, Annual Symposium, 19th, Las Vegas, NV, December 6-10, 1981, Proceedings. Van Nuys, CA, SAFE Association, 1982, p. 70-73.

The hazards of deficiencies in attention allocation on the part of pilots are discussed. These so-called anomalies of attention include channelized attention, distraction, cognitive task saturation, inattention, habituation, negative transfer, and fascination. Factors promoting these anomalies are mentioned and remedial strategies are suggested. The latter include adequate supervision, training of pilots for both high and low workload levels, high and low stress environments, and boring tasks as well as interesting ones. C.D.

A83-15541
NEGATIVE TRANSFER - A THREAT TO FLYING SAFETY
R. B. RAYMAN (USAF, England AFB, LA) Aviation, Space, and Environmental Medicine, vol. 53, Dec. 1982, p. 1224-1226.

Negative transfer is defined in the context of this paper as the transfer from one cockpit to another - of different design or configuration - of habits or responses which were appropriate in the former but are inappropriate in the latter, thereby posing a threat to flying safety. This danger has been demonstrated not only experimentally but also in a number of aircraft accident investigation reports. As new aircraft become available to the commercial, military, and private sectors and pilots consequently must transition from older to newer models, the phenomenon of negative transfer becomes increasingly significant. To illustrate the concept of negative transfer and aviation, the author compares the cockpits of two USAF aircraft and how their differences could adversely affect pilot performance. Recommendations are then made on ways organizational flight surgeons can minimize the negative transfer threat to aviation. (Author)

A83-15542
SAFETY ATTITUDES OF A GENERAL AVIATION PILOT POPULATION
T. KINASZCZUK, JR., R. E. DODGE, and S. R. MOHLER (Wright State University, Dayton, OH) Aviation, Space, and Environmental Medicine, vol. 53, Dec. 1982, p. 1227-1229.

Safety attitudes were elicited by forced-choice questionnaire responses obtained from 141 general aviation pilots in Ohio. The developed questionnaire was pretested on experienced pilots. Specific attitudes in five major categories significant to flight safety were surveyed: aerodynamics, meteorology, preflight activities, flight operations, and aeromedical factors. All pilots were active members of the Dayton Pilots Club. Two levels of concern were identified through the study: the first relates to those areas that are of extreme importance to safety; the second covers items that constitute a safety hazard when combined with other factors. (Author)

A83-15779
THE TIME OF IDENTIFICATION OF THE SHAPES OF COLORED STIMULI [VREMIA OPOZNANIIA FORMY TSVETOVYKH STIMULOV]
A. V. BERTULIS and A. I. GUTAUSKAS (Kaunasskii Meditsinskii Institut, Kaunas, Lithuanian SSR) Fiziologiia Cheloveka, vol. 8, Nov.-Dec. 1982, p. 919-923. In Russian.

The temporal characteristics of the processes involved in the identification by humans of colored figures of different shapes, according to their size and brightness, are investigated. Results show that the probability of identifying the shape of colored figures depend on the time of exposure, the brightness, and the color of the stimulus. In conditions of subjective equality in brightness, the main factor which determines the identification time is the color of the object, with red being identified before green, and green before violet. N.B.

A83-15899
A METHOD FOR INVESTIGATING HUMAN FACTOR ASPECTS OF AIRCRAFT ACCIDENTS AND INCIDENTS
A. J. FEGGETTER (Ministry of Defence, London, England) (Ergonomics Society, Annual Conference, University of Sussex, Brighton, England, Mar. 29-Apr. 1, 1982.) Ergonomics, vol. 25, Nov. 1982, p. 1065-1075. refs

A comprehensive procedure that has been designed to assess human behavior in instances of aircraft accidents and incidents is described. The goal of such a human factors investigation is to understand why the accident or incident occurred and through a better understanding of human error to increase flight safety. The use of questionnaries and interviews to assess the subjective data available is discussed, and it is recommended that the most appropriate technique for assessing the behavioral data is the use of an interview with a checklist. The importance of an early interview with all personnel associated with an accident or an incident by a human factors specialist trained in interviewing techniques is stressed. It is noted that the checklist described here has been developed after reviewing the relevant literature and has been modified by personal experience derived from investigating Army aircraft accidents and incidents in which human factors have played an important part. The checklist is based on a systems approach to understanding human error and contains such headings as 'stress' (including life events), 'fatigue', 'arousal', and 'personality'. C.R.

A83-16008#
A STUDY OF SELF-INITIATED ELIMINATION FROM THE FLIGHT TRAINING. III
M. OKAUE and H. ARUGA (Japan Air Self-Defense Force, Aeromedical Laboratory, Tachikawa, Tokyo, Japan) Japan Air Self Defence Force, Aeromedical Laboratory, Reports, vol. 23, June 1982, p. 41-58. In Japanese, with abstract in English. refs

An analysis of self-initiated elimination (SIE) from Japan Air Self Defence Force aircrews is presented which concentrates on the relations of the SIE students with their classmates prior to their voluntary withdrawal. Results show that many SIEs thought about their voluntary withdrawal and made up their mind about two months before their actual elimination. In many cases, the aircrews were unaware of the presence of a SIE in their classes until shortly before the voluntary withdrawal. The aircrews considered the withdrawal of a classmate with whom they had little contact or who had consulted them about withdrawing to be an expected event. On the other hand, intimacy with a SIE did not help the aircrews to notice their friend's elimination earlier than other classmates with whom they were not so intimate, and many aircrews considered a SIE to be unexpected even when he was a close friend. N.B.

A83-16128#
COLOR SELECTION AND VERIFICATION TESTING FOR AIRBORNE COLOR CRT DISPLAYS
L. D. SILVERSTEIN and R. M. MERRIFIELD (Boeing Commercial Airplane Co., Bellevue, WA) In: Advanced Aircrew Display Symposium, 5th, Patuxent River, MD, September 15, 16, 1981, Proceedings. Patuxent River, MD, U.S. Naval Air Test Center, 1982, p. 39-81. refs

Human factors and display hardware considerations which impact the selection of colors for airborne color CRT displays are described, and color selection and visual testing methods used for the shadow-mask color CRT displays on the Boeing Model 757/767 flight decks are discussed in detail. Topics include analytical methods for initial color selection, visibility and other discrimination testing under extreme high and low ambient lighting conditions, color saturation effects, and special display design considerations and limitations. The chromaticity and brightness specifications for a seven-color repertoire, determined by the methods presented, are also described. C.D.

A83-16129#
INFORMATION REQUIREMENTS FOR PILOT SUPERVISION OF AUTOMATIC LANDING IN LOW VISIBILITY CONDITIONS
G. TERHUNE and J. L. DECELLES (Air Line Pilots Association, Leawood, KS) In: Advanced Aircrew Display Symposium, 5th, Patuxent River, MD, September 15, 16, 1981, Proceedings. Patuxent River, MD, U.S. Naval Air Test Center, 1982, p. 129-137.

Displays necessary for an adequate automatic landing system are discussed. It is emphasized that the information which is required for supervising the conduct of an automatic landing in low visibility is the velocity vector of the aircraft in both the lateral and vertical planes. The reasons for the inadequacy of the conventional Attitude Director Indicator are detailed, as is the superiority of results from simulations and research aircraft with well-integrated electronic vertical situation displays based on 'airplane' symbols representing direction of flight instead of boresight. The importance of the head-up display is stressed, and reasons for adopting it are discussed. C.D.

A83-16327#
PILOT JUDGEMENTS OF DISTANCE, HEIGHT AND GLIDE SLOPE ANGLE FROM COMPUTER GENERATED LANDING SCENES
G. DOERFEL (Forschungsinstitut fuer Anthropotechnik, Werthhoven, West Germany) In: Flight simulation - Avionic systems and aero medical aspects; Proceedings of the International Conference, London, England, April 6, 7, 1982. London, Royal Aeronautical Society, 1982. 8 p. refs

To validate the information content of synthetic visual flight simulation, 28 military pilots made judgements of distance, height and correct glide slope angle from computer generated landing approach scenes representing five different positions from 4000 m to 250 m in relation to runway threshold. Within four levels of detail of the visual scene there was no significant difference in judgement quality for dynamic as well as for static apporach sequences. In spite of their preference for the highest level of detail, pilots were able to obtain their essential information from very simplified scenes. Estimation error was about 15% for all variables with a small increase in the static part of the research. There seems to be a tendency for undershooting, i.e., an underestimation of distance from threshold and an overestimation of glide slope angle respectively, indicating a correlation in perception of these variables. The findings yield the assumption that for many simulation tasks less expensive but effective visual simulation systems are achievable. (Author)

A83-16328#
THE PERCEPTION OF COLOUR ON ELECTRO-OPTICAL DISPLAYS
C. P. GIBSON (Royal Aircraft Establishment, Farnborough, Hants., England) In: Flight simulation - Avionic systems and aero medical aspects; Proceedings. of the International Conference, London, England, April 6, 7, 1982. London, Royal Aeronautical Society, 1982. 10 p. refs

It is pointed out that polychromatic CRT displays will probably become generally accepted display media for use on both civil and military flight decks within the next few years. In connection with advances in technology, there exist now CRTs which are sufficiently rugged to withstand the stresses imposed in the airborne environment. The employment of color has advantages for two areas of application. In connection with the display of real world imagery derived from electrooptical sensors, color can differentiate between areas which have previously only been separately identifiable as 'grey shades' on monochromatic displays. The second area of application involves the labelling of displays having a high information density such as ATC, tactical, or TAB type displays. In this context the use of color may reduce the time required to detect particular items by allowing the formation of attentional 'sets'. A computer controlled facility is described which will allow further research into the perception of color at high luminance levels. G.R.

A83-16329#
ASSESSING PILOT PERFORMANCE AND MENTAL WORKLOAD IN TRAINING SIMULATORS
M. THANDERZ (Forsvarets Forskningsanstalt, Linkoping, Sweden) In: Flight simulation - Avionic systems and aero medical aspects; Proceedings of the International Conference, London, England, April 6, 7, 1982. London, Royal Aeronautical Society, 1982. 4 p.

The investigation takes into account the experience with flight training simulators in the Swedish Air Force during a period of twenty years. It is pointed out that the effectiveness of a flight simulator in flight training is greatly dependent on details regarding the conduction of the training. The employment of adequate recording devices is a vital prerequisite for efficient training. It has been found that in the absence of a recording of the student's actions during training, it is easily possible that important mistakes made by the student are not noticed and, consequently, are not corrected. Attention is given to the analysis of a fighter pilot's job in two steps, the importance of training feedback, the effects of high mental workload due to lack of training, and the effects of mood on performance. One study project considered is concerned with the interactions between ratings of performance, mental and physical effort, levels of activation and tension, and the excretion of adrenaline and noradrenaline. The psychological and physiological costs of high performance are analyzed. G.R.

A83-16330#
PUTTING TEXTURE IN PERSPECTIVE
J. W. CHAPPELOW and J. A. SMART (RAF, Institute of Aviation Medicine, Farnborough, Hants., England) In: Flight simulation - Avionic systems and aero medical aspects; Proceedings of the International Conference, London, England, April 6, 7, 1982. London, Royal Aeronautical Society, 1982. 6 p. refs

It is felt that the most noticeable improvement in flight simulation during the last fifteen years has resulted from the application of computer generated imagery (CGI) techniques to the simulation of the world outside the aircraft. By comparison with its most widely employed predecessor, the closed circuit television and model board system, CGI has a much enhanced quality of image. One obvious deficiency is related to the lack of detail in daylight scenes. A remedy provided in connection with the proliferation of polygons in the database would be very costly. More practical appears to be a system which adds a random or pseudorandom pattern of texture to the polygons. Attention is given to the question whether the lack of texture is important for simulator training, taking into account the perception of static images, the salience of texture, and the perception of dynamic images. Some tentative

speculations are presented regarding the significance of texture. G.R.

N83-12851# Telos, Oxnard, Calif.
PILOT PERFORMANCE AND STRESS: SEARCH FOR A KILLER
T. J. SNYDER, F. C. SANDERS (Sanders Aircraft, Chino, Calif.), and A. A. REJZER (Camarillo State Hospital) 1981 13 p Presented at the Spring Symp. of the Soc. for Exptl. Test Pilots, San Diego, Calif., 2-3 Apr., 1982
Avail: NTIS HC A02/MF A01

Centers on high rate of fatal and near-fatal mishaps among skilled, experienced pilots. Presents a brief description of the adaptive process of stress and defines transient, extended and chronic stress conditions. Reviews current literature on release of endorphins under stress and considers evidence for linking endorphin production to reduced performance of pilots, together with the possibility of stress addition via opioid structure of endorphins. Asks whether the characteristics for which high-risk performers are selected might actually conspire against their survival. Suggests unobtrusive methods of monitoring in-flight stress. Author (GRA)

N83-12852# *American Airlines, Inc., Euless, Tex.*
DEFINITION OF ALASKAN AVIATION TRAINING REQUIREMENTS Final Report
Jul. 1982 189 p
Avail: NTIS HC A09/MF A01 CSCL 05I

A specially designed training program suited to the needs of Alaskan aviators was developed. Investigators travelled to 54 locations, interviewed approximately 177 air taxi operators and pilots, visited numerous aviation facilities, and attended several aviation related seminars and lectures. Respondents provided a variety of specific techniques which had helped them to prevent hazardous situations from becoming serious accidents. Unvalidated information from the questionnaires and the training objectives is provided. N.W.

N83-12853# Federal Aviation Administration, Atlantic City, N.J. Office of Systems Engineering Management.
THE RELATIONSHIP BETWEEN EFFORT RATING AND PERFORMANCE IN A CRITICAL TRACKING TASK Final Report, Apr. - Sep. 1981
B. ROSENBERG, J. REHMAN, and E. STEIN Oct. 1982 59 p refs
(Contract FAA PROJ. 161-301-150)
(FAA-EM-81-13; FAA-CT-82-66) Avail: NTIS HC A04/MF A01

A pilot objective/subjective workload assessment technique (POSWAT) was evaluated. A critical tracking task, in which 24 subjects (pilots and nonpilots) viewed an analog display of the error between operator input and system output while correcting with opposite pressure on a joystick was used. The relationship between participant responses on a 10 point scale administered during task performance and task difficulty was determined. It is generally concluded that POSWAT used for measuring effort rating and rating delay on a regular basis during this experiment is minimally intrusive, is informative, and merits further evaluation in a cockpit environment. S.L.

N83-12854# Embry-Riddle Aeronautical Univ., Daytona Beach, Fla. Aviation Research Center.
PILOT JUDGMENT TRAINING AND EVALUATION, VOLUME 1 Final Report, Jun. 1981 - Mar. 1982
J. I. BERLIN, E. V. GRUBER, C. W. HOLMES, P. K. JENSEN, J. R. LAU, J. W. MILLS, and J. M. OKANE Jun. 1982 100 p refs 3 Vol.
(Contract DOT-FA-79NA-6040)
(AD-A117508; DOT/FAA-CT-82-56-I) Avail: NTIS HC A05/MF A01 CSCL 05I

The evaluation experiment was conducted using three groups. The experimental roup received a written pretest, judgment ground and flight training, a written posttest, and an observation flight at the completion of the training. The flight control group received only the post-training observation flight. The academic control group received the written pretest and posttest along with the experimental group. The resulting data indicated statistically significant differences between the performance of experimental and control group subjects. This was true both in the acquisition of judgment concepts as measured by written tests and in the skills performance as measured during the observation flights. Two limitations to the judgment program's generalizability are the relative homogenity of the subjects and the compressed nature of the training time utilized. Author

N83-12855# *Embry-Riddle Aeronautical Univ., Daytona Beach, Fla. Aviation Research Center*
PILOT JUDGMENT TRAINING AND EVALUATION, VOLUME 3 Final Report, Jun 1981 - Mar 1982
J. I. BERLIN, E. V. GRUBER, C. W. HOLMES, P. K. JENSEN, J. R. LAU, J. W. MILLS, and J. M. OKANE Jun. 1982 143 p 3 Vol.
(Contract DOT-FA-79NA-6040)
(AD-A117508; DOT/FAA-CT-82-56-III) Avail: NTIS HC A07/MF A01 CSCL 05I

Judgment training presentation to the content of the Student Manual, lessons for the instructor to conduct during flight training, and support materials for the instructor are presented. The instructor's role as a coach of learning and value of using behavior modification in teaching are discussed. Teaching outlines presenting judgment concepts, behavioral aspects and applications are provided. Instructor initiated exercises designed to develop, focus, and reinforce the student's judgment-making abilities during flight training activities are provided. Basic management principles of the judgment training course, and various forms and other instructional support documents are also provided. Author

N83-12856# Portland State Univ., Oreg. Dept. of Psychology.
MODELS AND ESTIMATION PROCEDURES FOR THE ANALYSIS OF SUBJECTS-BY-ITEMS DATA ARRAYS Final Technical Report
J. A. PAULSON 30 Jun. 1982 33 p refs
(Contract N00014-79-C-0214; RR0420601; NR PROJ. 154-429)
(AD-A118730; TR-82-1) Avail: NTIS HC A03/MF A01 CSCL 05J

Results obtained in a study of models and estimation procedures for the analysis of subjects-by-items data arrays are described. The results include a new transformation to render an array additive and some simple empirical Bayes methods for estimating subject and item marginal effects. Unfortunately, the problems which these results concern are not as central to the problems of model-based psychological measurement as originally thought. The report discusses a new problem which is crucial for the foundations of model-based mastery testing. Author

N83-12857# Hershey (Milton S.) Medical Center, Hershey, Pa. Dept. of Behavioral Science.
INFORMATION LOAD STRESS, RISK TAKING AND PHYSIOLOGICAL RESPONSIVITY IN A VISUAL-MOTOR TASK
S. STREUFERT, S. C. STREUFERT, and A. L. DENSON May 1982 27 p refs
(Contract N00014-80-C-0581; NR PROJ. 170-909)
(AD-A118079; TR-ONR-8) Avail: NTIS HC A03/MF A01 CSCL 05J

The effects of four levels of information load on physiological responsivity (blood pressure and heart rate) and on risk taking were analyzed and compared to previous results concerning the effects of load on performance. Twenty-five adults participated in a hand-eye coordination task of moderate complexity. The task was designed to permit strategic responding, risk taking and retaliatory behavior. Risk taking was measured as the degree to which subjects acted to increase the probability of a major loss in the face of potential minor gains. It is argued that an expected stress effect on risk taking and performance can be defended only if load would result in elevated arousal with risk taking and with decreasing levels of performance. It was found that participation in the present task was associated with some degree

of arousal and that persons with greater (diastolic) arousal tended to take greater risks. Load affected risk taking but was not related to physiological responsivity. The potential that load as a stressor functions as a cognitive modifier of performance, and does not represent a precursor of strain (and stress), is considered. GRA

N83-12858# Navy Personnel Research and Development Center, San Diego, Calif.
MAP INTERPRETATION FOR LOW ALTITUDE FLIGHT: EVALUATION OF A PROTOTYPE COURSE Final Report
D. PAULSON Jun. 1982 19 p refs
(Contract ZF63521080)
(AD-A118391; REPT-14-81-19; NPRDC-TR-82-47) Avail: NTIS HC A02/MF A01 CSCL 05I

A two-part map interpretation and terrain analysis course (MITAC-II) was developed to improve the low-altitude visual orientation skills of fixed-wing pilots. Part 1, a lecture, explains and illustrates how real-world features are selected for map portrayal and how their visual significance is affected by low-altitude operations. Part 2 is composed of nine dynamic exercises designed to give practice, drill, and self-evaluation in the map interpretation principles presented in the lecture. An experimental evaluation of the course indicated that it provided a significant improvement in the location of tactical targets, but not in the identification of terrain targets. The latter finding may have been due to artifacts in the testing situation. Participants stated that low-altitude orientation skills were improved as a result of the course. It was recommended that the full MITAC-II course be implemented early in flight training. Author (GRA)

N83-12859# Naval Submarine Medical Research Lab., Groton, Conn.
THE EFFECT OF THE THERMAL CONDITIONS OF TRAINING AND TESTING ON THE PERFORMANCE OF MOTOR TASKS MEASURING PRIMARY MANUAL ABILITIES Interim Report
W. H. ROGERS, E. M. NODDIN, and G. MOELLER 15 Jun. 1982 18 p refs
(Contract MR0410106; MR0000101)
(AD-A118275; NSMRL-983) Avail: NTIS HC A02/MF A01 CSCL 06S

Two groups of U.S. Marines practiced a battery of nine motor tasks in a climaic chamber during a five-day cold exposure in which the Marines lived in the chamber 24 hours a day. Subjects practived the tasks, each of which was known to load highly on a different psychomotor factor or manual ability, once a day for the first four days and were tested on the fifth day. One group trained at 10 deg to 15 F, and the other group traned at 40 deg to 50 deg F. Both groups were then tested at both temperatures on the fifth day to test the hypothesis that subjects practiced in the cold should perform better on subsequent tests in the cold relative to subjects practiced in the warmer temperatures, and those practiced in the warmer temperatures, and those practiced in the warmer temperatures relative to subjects practiced in the cold. The hypothesis was not confirmed by the data, and methodological and theoretical problems in interpretation of that finding are discussed. Author

N83-13812# Illinois Univ., Urbana. Electromagnetics lab.
ANALYSIS OF DOMINANT AND HIGHER-ORDER MODES IN UNILATERAL FIN LINES Interim Technical Report
Y. HAYASHI, E. FARR, and R. MITTRA Aug. 1982 26 p refs
(Contract DAAG29-82-K-0084)
(AD-A118924; UIEM-82-9; UILU-ENG-82-2548; ARO-18054.3-EL)
Avail: NTIS HC A03/MF A01 CSCL 09E

In this paper, an analysis of dominant and higher-order modes in unilateral fin lines is presented. The network analysis method of electromagnetic fields is used along with Galerkin's method to obtain a determinantal equation. Numerical results are presented. Author (GRA)

54

MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

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

A83-13278
A POSSIBLE APPROACH TO A SYSTEMS CLASSIFICATION OF THE ACTIONS OF A HUMAN OPERATOR [O VOZMOZHNOM PODKHODE K SISTEMNOI KLASSIFIKATSII DESITVII CHELOVEKA-OPERATORA]
G. E. ZHURAVLEV Psikhologicheskii Zhurnal, vol. 3, Mar.-Apr. 1982, p. 100-110. In Russian. refs

Units for describing worker activity are becoming increasingly important in connection with mathematical models of man-machine systems. Industrial psychologists and specialists in ergonomics define an action as the aggregate of the processes occurring in a given time interval under the control of an operator. Leont'ev (1975), on the other hand, distinguishes between actions, which require purposeful control by an operator, and operations, which the operator performs automatically. The systems approach described here shows that any action has physical, technological, and psychological aspects. C.R.

A83-13283
SYSTEMIC APPROACH IN THE PSYCHOLOGICAL ANALYSIS OF MAN-COMPUTER INTERACTION [SISTEMNYI PODKHOD V PSIKHOLOGICHESKOM ANALIZE VZAIMODEISTVIIA CHELOVEKA S MASHINOI]
V. F. VENDA Psikhologicheskii Zhurnal, vol. 3, Jan.-Feb. 1982, p. 85-100. In Russian. refs

Problems regarding the development and the application of the methods of systemic analysis in connection with the organization of aspects of interaction between man and computer are investigated. Gnoseological aspects of problems of man-computer interaction are considered along with the psychological aspects of such problems, the history of the development of methods and languages for the description of the man-computer system, and the transition from external technical factors to internal psychological factors of problem solution. It is pointed out that a solution to critical problems with respect to the study of the man-computer system was found on the basis of the development and application of a systemic approach regarding psychology. Attention is given to psychological factors and integral activity characteristics, the multilevel mutual adaptation of man and computer, the individual adaptation of computer programs to the user, and perspectives regarding the establishment of 'hybrid intelligence' systems. G.R.

A83-13447
TOWARD THE ROBOT EYE - ISOMORPHIC REPRESENTATION FOR MACHINE VISION
P. S. SCHENKER (Brown University, Providence, RI) In: 3-D machine perception; Proceedings of the Conference, Washington, DC, April 23, 24, 1981. Bellingham, WA, SPIE - The International Society for Optical Engineering, 1981, p. 30-47. refs

This paper surveys some issues confronting the conception of models for general purpose vision systems. We draw parallels to requirements of human performance under visual transformations naturally occurring in the ecological environment. We argue that successful real world vision systems require a strong component of analogical reasoning. We propose a course of investigation into appropriate models, and illustrate some of these proposals by a simple example. Our study emphasizes the potential importance of isomorphic representations - models of image and scene which embed a metric of their respective spaces, and whose topological structure facilitates identification of scene descriptors that are invariant under viewing transformations. (Author)

A83-13449* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
APPLICATIONS OF DIGITAL IMAGE ACQUISITION IN ANTHROPOMETRY
B. WOOLFORD and J. L. LEWIS (NASA, Johnson Space Center, Spacecraft Design Div., Houston, TX) In: 3-D machine perception; Proceedings of the Conference, Washington, DC, April 23, 24, 1981. Bellingham, WA, SPIE - The International Society for Optical Engineering, 1982, p. 66-69. refs

A description is given of a video kinesimeter, a device for the automatic real-time collection of kinematic and dynamic data. Based on the detection of a single bright spot by three TV cameras, the system provides automatic real-time recording of three-dimensional position and force data. It comprises three cameras, two incandescent lights, a voltage comparator circuit, a central control unit, and a mass storage device. The control unit determines the signal threshold for each camera before testing, sequences the lights, synchronizes and analyzes the scan voltages from the three cameras, digitizes force from a dynamometer, and codes the data for transmission to a floppy disk for recording. Two of the three cameras face each other along the 'X' axis; the third camera, which faces the center of the line between the first two, defines the 'Y' axis. An image from the 'Y' camera and either 'X' camera is necessary for determining the three-dimensional coordinates of the point. C.R.

A83-13645
METHODS FOR DETERMINING THE MORPHOMETRIC CHARACTERISTICS OF MUSCLES DURING MOVEMENT IN HUMANS [METODIKA OPREDELENIIA MORFOMETRICHESKIKH KHARAKTERISTIK MYSHTS PRI DVIZHENIIAKH CHELOVEKA]
I. M. KOZLOV and A. V. ZVENIGORODSKAIA (Leningradskii Institut Fizicheskoi Kul'tury, Leningrad, USSR) Arkhiv Anatomii, Gistologii i Embriologii, vol. 83, Sept. 1982, p. 78-83. In Russian. refs

A technique is developed for analyzing the movements of the human body by indirect methods in order to obtain morphometric characteristics of the muscles during movement. The technique consists of a combination of photometry, X-ray analysis, and EMG methods which are used to calculate the morphometric characteristics of muscles during movement. The lengths of the muscles and the arms in the case of traction are measured with the greatest precision by methods utilizing models of muscular traction obtained through calculations of the contours of strained muscles. N.B.

A83-14112#
INVESTIGATION OF THE NONLINEAR CONTROL SIGNAL AMPLIFICATION IN THE CASE OF A CONTINUOUS TRACKING PROBLEM [UNTERSUCHUNG DER NICHTLINEAREN BEDIENSIGNALVERSTAERKUNG BEI EINER KONTINUIERLICHEN TRACKINGAUFGABE]
W. KRUEGER Wachtberg, West Germany, Forschungsgesellschaft fuer angewandte Naturwissenschaften (Forschungsinstitut fuer Anthropotechnik, Bericht No. 54), 1982. 27 p. In German. $4.00. refs

In many cases, it does not appear possible or desirable to abolish manual control features entirely in man-machine systems. In connection with the objective to make the control task as easy as possible for the operator, particular attention must be given to the design of the individual components of the man-machine interface. The extent of a control action depends on the characteristics of the control output. High or low gain determines system control sensitivity. A tracking experiment was conducted to evaluate a nonlinear control gain. Small stick outputs were supplied with low gain and large outputs with high gain. It was found that the employment of the considered nonlinear control gain system can improve tracking performance by 10% and reduce the operator's input frequency by 15%. G.R.

A83-14126
INTEGRATION FUNCTION AND MODELING OF THE CENTRAL NERVOUS SYSTEM IN FOREARM MOVEMENT CONTROL
H. TAGUCHI and K. FUJII (Osaka University, Suita, Japan) Electronics and Communications in Japan, vol. 64, Jan. 1981, p. 40-49. Translation. refs

In a description of the function of the CNS in forearm movement control, the structure of the nervous system must be considered, together with the control function produced by that structure. In the present study, it is assumed that the motor signal originates from the brain, and the forearm movement is defined as the combined cooperative processes (integration) of the reflexes in various portions of the CNS, including the brain reflex. Based on this concept, the macroscopic mechanism of the CNS is described insofar as this is possible. The forearm movement induced by visual stimulation is examined, and the response is measured in the frequency domain. A model is developed for the central functions, which describes the frequency response over a relatively wide range. B.J.

A83-14326
A THEORETICAL AND EXPERIMENTAL ANALYSIS OF THE TURNOVER OF SUBSTANCES IN A CLOSED MICROECOSYSTEM. II - THE STABLE STEADY STATES AND THE LIMITING FACTORS OF TURNOVER [TEORETIKO-EKSPERIMENTAL'NYI ANALIZ KRUGOVOROTA VESHCHESTVA V ZAMKNUTOI MIKROEKOSISTEME. II - STATSIONARNYE SOSTOIANIIA I LIMITIRUIUSHCHIE FAKTORY KRUGOVOROTA]
N. S. ABROSOV, V. G. GUBANOV, and B. G. KOVROV (Akademiia Nauk SSSR, Institut Fiziki, Krasnoiarsk, USSR) Akademiia Nauk SSSR, Sibirskoe Otdelenie, Izvestiia, Seriia Biologicheskikh Nauk, Aug. 1982, p. 57-64. In Russian. refs

A83-14329
STATISTICAL SYNTHESIS OF AN ALGORITHM FOR THE COMPUTER-AIDED PROCESSING OF CARDIAC SIGNALS [STATISTICHESKII SINTEZ ALGORITMA AVTOMATICHESKOI OBRABOTKI KARDIOSIGNALOV]
IU. L. PIVOVAROV Meditsinskaia Tekhnika, Sept.-Oct. 1982, p. 25-29. In Russian.

A83-15307
PERFORMANCE TESTING OF A THREE-BED MOLECULAR SIEVE OXYGEN GENERATOR
J. B. TEDOR, T. C. HORCH (USAF, School of Aerospace Medicine, Brooks AFB, TX), and T. J. DANGIERI (Union Carbide Corp., Linde Div., Tarrytown, NY) SAFE Journal, vol. 12, Winter 1982, p. 4-9. refs

The U.S. Air Force School of Aerospace Medicine tested a 3-bed molecular sieve oxygen enrichment system designed for use in tactical aircraft. The unit operated at input air pressures from 10 to 60 pounds per square inch gauge, producing breathing gas flows up to 100 liters per minute from ground level to 50,000 feet altitude. Maximum oxygen concentration in the product gas was 95%. Performance curves show that output oxygen concentration climbs with increasing inlet pressure, increasing altitude, or decreasing product flow. The generator maintained a product gas oxygen concentration greater than 70% while exposed to environmental temperatures from -60 to +130 degrees C. This unit generally exceeded the oxygen generators. (Author)

A83-15381
THE PROGRAMMING LEVEL OF A WALKING MACHINE MOVING AT A SPECIFIED SPEED [PROGRAMMNYI UROVEN' SISTEMY UPRAVLENIIA SHAGAIUSHCHEGO APPARATA PRI DVIZHENII S ZADANNOI SKOROST'IU]
V. E. BERBIUK Akademiia Nauk SSSR, Izvestiia, Mekhanika Tverdogo Tela, Sept.-Oct. 1982, p. 45-50. In Russian. refs

The gait dynamics of a biped machine with actively controlled feet is examined analytically with a view to optimizing the machine motion in terms of energy. An algorithm is obtained in the form of a series of finite formulas for the control moments in the leg

joints and reaction forces arising in walking which correspond to the specified motion of the machine. The energy consumption is calculated for various gait parameters. V.L.

A83-15401
SAFE ASSOCIATION, ANNUAL SYMPOSIUM, 19TH, LAS VEGAS, NV, DECEMBER 6-10, 1981, PROCEEDINGS
Van Nuys, CA, SAFE Association, 1982. 293 p
$25

Various topics in aircrew safety are addressed. The subjects discussed include: the benefits and drawbacks of jettison-canopy and through-the-canopy ejections; human factors in aircraft accidents; ejection flail, windblast, and tumble problems; the measurement of ejection seat performance; ejection propulsion systems; flotation jackets and beacons; parachute safety systems. Other topics considered include: aviation anthropometry; on-board oxygen generation system; hurricane test tracking; improvements in headgear; advanced ejection systems. C.D.

A83-15410
MANUAL PARACHUTE RIPCORD PULL-FORCE CAPABILITY OF FEMALE NAVAL PERSONNEL
H. T. PHEENY, G. F. LAMORA (U.S. Naval Weapons Center, China Lake, CA), J. H. GILBERT, and G. F. VOLLMER In: SAFE Association, Annual Symposium, 19th, Las Vegas, NV, December 6-10, 1981, Proceedings. Van Nuys, CA, SAFE Association, 1982, p. 42-48. refs

The results are presented of a preliminary study to determine whether female military personnel, selected to meet the anthropometric and physical criteria for aircrew status, could manually exert a ripcord pull-force of at least 27 pounds on both NB-7 and NB-8 parachute assemblies. In static ground tests the 16 female test subjects were suspended in an attitude analogous to freefall and instructed to exert maximum pull-forces with right, left, and both hands on parachute ripcord assemblies. Female test parachutists then performed the same operations in live jump tests. Preliminary results show that women lack sufficient strength to consistently deploy the parachute assemblies. It is recommended that aircrew selection and annual physical qualification procedures should include a static muscular strength test, and that a muscular strength training program be required for all aircrew members. C.D.

A83-15411
INVESTIGATION OF THE MOTION OF THE CENTER OF MASS OF AN OCCUPANT UNDER EJECTION ACCELERATIONS
L. A. DAULERIO (U.S. Naval Material Command, Naval Air Development Center, Warminster, PA) and G. D. FRISCH (U.S. Navy, Naval Biodynamics Laboratory, New Orleans, LA) In: SAFE Association, Annual Symposium, 19th, Las Vegas, NV, December 6-10, 1981, Proceedings. Van Nuys, CA, SAFE Association, 1982, p. 49-54. refs

An investigation undertaken to develop and evaluate a mathematical model for the motion of the center of gravity (CG) of an occupant of an ejection seat under ejection acceleration is described. Dummy CG motion was addressed first in order to define the general shape of the CG displacement curve. A model was derived exhibiting the same behavior in which a simple lumped-mass spring damper model was chosen to represent the dummy and its relationship to the seat. The model was then exercised using human biodynamic simulation data in order to assess its effectiveness in replicating the motion of the center of mass of simulated human occupants. Finally, the model was incorporated into an existing six degrees-of-freedom trajectory simulation computer program which is being employed to conduct trajectory analysis. Results for the two simulation runs are shown. C.D.

A83-15412
A STANDARDIZED INSTRUMENTATION METHODOLOGY FOR ASSESSING EJECTION SEAT PERFORMANCE
G. D. FRISCH (U.S. Navy, Naval Biodynamics Laboratory, New Orleans, LA) and L. A. DAULERIO (U.S. Naval Material Command, Naval Air Development Center, Warminster, PA) In: SAFE Association, Annual Symposium, 19th, Las Vegas, NV, December 6-10, 1981, Proceedings. Van Nuys, CA, SAFE Association, 1982, p. 55-61.

Monitored dummy responses during the catapult and rocket phases of simulated ejections are discussed. The effect of occupant response to seat acceleration on the complexity of instrumentation required is addressed, and the influence of changed restraint systems on dummy response is considered. Monitored dummy head and chest GX and Gz responses, dummy vs. seat pitch, roll, and yaw rates, and calculated seat Gx and Gy accleration using dummy vs. seat angular rates are shown. The results of the concept feasibility demonstration of the Maximum Performance Ejection Seat are described. C.D.

A83-15414
THE 1981 NAVAL AND MARINE CORPS AVIATION ANTHROPOMETRY SURVEY AND APPLICATIONS
H. G. GREGOIRE and B. SLOBODNIK (U.S. Navy, Naval Air Test Center, Patuxent River, MD) In: SAFE Association, Annual Symposium, 19th, Las Vegas, NV, December 6-10, 1981, Proceedings. Van Nyus, CA, SAFE Association, 1982, p. 74, 75.

The purpose of this survey was to provide a data base of anthropometric information necessary for the design and modification of cockpits, aircrew stations, ejection seats, life support equipment, and aviator flight clothing. The survey was conducted in four phases: (1) a requirements survey and development of a sampling strategy, (2) equipment development, team training, and pilot study, (3) data acquisition (body measurements) at various Naval and Marine Corps Air Stations, and (4) data analysis and reporting. A total of 108 body-size dimensions for males and 112 dimensions for females were measured on 1,087 males and 351 females. Subjects were selected to representatively sample the various subsets of flying population (i.e., pilot, NFO, enlisted aircrewman, and females). Tabular statistical data is provided for cockpit and aircrew station geometry design applications and also for the design of aircrew-related clothing and body-mounted life support equipment. In addition, an ancillary anthropometric compatibility program for aviation personnel is briefly discussed. (Author)

A83-15417
OPERATIONAL TEST AND EVALUATION OF THE MOLECULAR SIEVE ON-BOARD OXYGEN GENERATION SYSTEM /OBOGS/ IN THE AV-8A 'HARRIER'
M. J. LAMB (U.S. Naval Material Command, Naval Air Development Center, Warminster, PA) In: SAFE Association, Annual Symposium, 19th, Las Vegas, NV, December 6-10, 1981, Proceedings. Van Nuys, CA, SAFE Association, 1982, p. 91-98. refs

Current progress on the Naval program to develop the On-Board Oxygen Generation (OBOG) concept for application aboard tactical naval aircraft is reported on. The Oxygen Enriched Air System (OEAS) is described in terms of its three major components: oxygen concentrator, breathing regulator, and performance monitor. The installation of the OEAS into the AV-8A Harrier aircraft is described, including the structural changes that are made to accommodate the unit. Previous program efforts and testing are reviewed, including man rating, developmental testing and evaluation, and operational deployment. Operational testing and evaluation is discussed. Total flight time for the system is 1944.2 hours. A summary of equipment failure is listed, and future testing is discussed, including more operational testing and evaluation, realiability testing, and maintainability testing. C.D.

A83-15420
USAF AEROSPACE BIOTECHNOLOGY RESEARCH AND DEVELOPMENT PROGRAM
D. I. CARTER (USAF, Aerospace Medical Div., Brooks AFB, TX) In: SAFE Association, Annual Symposium, 19th, Las Vegas, NV, December 6-10, 1981, Proceedings. Van Nuys, CA, SAFE Association, 1982, p. 107-109.

In connection with advances concerning military aviation technology, man can become the limiting factor in determining the performance limits for high-performance aircraft. The Air Force Aerospace Biotechnology Program has the objective to insure that man can keep up with his flying machines. This program is concerned with a human centered technology which enhances man's capabilities to function safely and effectively as an integral part of Air Force systems and operations. The present overview addresses mainly the aircrew safety and life support aspects of the program. The biotechnology program is principally concerned with the human component of weapon systems/operations in the form of aircrew selection and maintenance, crew protection as related to life support and emergency escape systems, and man-machine integration for crew station design. The newest research effort involves chemical defense aspects. G.R.

A83-15422
IMPROVED HEADGEAR FOR ROTARY WING NAVY/MARINE CORPS AIRCREWMEN
D. S. MCCAULEY and J. W. CASTINE (U.S. Naval Material Command, Naval Air Development Center, Warminster, PA) In: SAFE Association, Annual Symposium, 19th, Las Vegas, NV, December 6-10, 1981, Proceedings. Van Nuys, CA, SAFE Association, 1982, p. 135-138.

A multiphase SPH-3B helmet improvement program has been instituted in response to the excessive weight and bulk, poor fit, instability under high vibration, misplaced center of gravity, and communication components incompatibility with aircraft avionics of the helmet's present configuration. An assessment is given of the progress made in the planning, realization and results of the various elements of this development program. O.C.

A83-15426
MISSION SPECIFIC SURVIVAL EQUIPMENT FOR HELICOPTER AIRCREW
G. P. GILLESPIE (U.S. Naval Material Command, Naval Air Development Center, Warminster, PA) In: SAFE Association, Annual Symposium, 19th, Las Vegas, NV, December 6-10, 1981, Proceedings. Van Nuys, CA, SAFE Association, 1982, p. 154-157.

Three mission specific survival ensembles for Naval helicopter aircrewmen, developed by the Naval Air Development Center, are examined. The systems, intended for use by stationary aircrewmen, mobile aircrewmen, and passengers, are designed to meet the diverse requirements of the aircrew, be fully compatible with in-flight duties, and provide the equipment necessary to aid in survival and detection. The specific features of each ensemble and its duties are detailed, and a diagram of each ensemble is presented. N.B.

A83-15427
HELICOPTER PERSONNEL FIRE-RESISTANT FLOTATION JACKET
J. Z. LEWYCKYJ (U.S. Naval Material Command, Naval Air Development Center, Warminster, PA) In: SAFE Association, Annual Symposium, 19th, Las Vegas, NV, December 6-10, 1981, Proceedings. Van Nuys, CA, SAFE Association, 1982, p. 158-160.

Helicopter aircrews are often required to perform physically demanding work while flying in low temperature conditions and hostile environments over water. These crews are currently required to wear the CWU-33/P Antiexposure Suit, which combines features of quick donning garments and off-the-shelf commercial wet suits made of textured nitrogen-expanded foam neoprene. These antiexposure suits are cumbersome and uncomfortable due to heat buildup during the performance of hectic, high stress tasks. A program has accordingly been instituted to provide crews with a constant wear garment providing a limited degree of antiexposure protection and flotation while imposing a negligible degree of discomfort. The result of this program has been a CO2-inflated, fire resistant flotation jacket. O.C.

A83-15430
OBOGS AND OBIGGS - THE APPLICATION OF MOLECULAR SIEVES TO AIRCREW BREATHING AND AIRCRAFT SURVIVABILITY
R. L. CRAMER (Bendix Corp., Flight Systems Div., Davenport, IA) In: SAFE Association, Annual Symposium, 19th, Las Vegas, NV, December 6-10, 1981, Proceedings. Van Nuys, CA, SAFE Association, 1982, p. 180-183.

Pressure swing adsorption processes utilizing packed columns of molecular sieves form the basis for a number of important gas separation applications. The On-Board Oxygen Generator System (OBOGS) and the On-Board Inert Gas Generator System (OBIGGS) are considered. As an outgrowth of the OBOGS development work, the molecular sieve pressure swing adsorption process has been adapted to nitrogen concentration. The concentrator or air separation module used for nitrogen concentration is schematically identical to the OBOGS oxygen concentrator. The primary difference in the two is the use of Type 4A sieve in the nitrogen unit as opposed to Type 5A which is used in the oxygen unit. Type 5A sieve adsorbs both nitrogen and oxygen, but since nitrogen is adsorbed much more strongly, this effect can be used to provide an oxygen enriched product gas. The molecular sieve nitrogen concentration process is presently being developed for airborne inert gas generation applications. Attention is given to an Army, a Navy, and an Air Force program. C.R.

A83-15431
TWO-STAGE PERSONNEL PARACHUTE DELAY CUTTER DEVELOPMENT
A. J. KAPINOS (U.S. Navy, Naval Ordnance Station, Indian Head, MD) In: SAFE Association, Annual Symposium, 19th, Las Vegas, NV, December 6-10, 1981, Proceedings. Van Nuys, CA, SAFE Association, 1982, p. 184-186. refs

The current investigation is concerned with the development of a dual pyrotechnic delay cutter for use in the Two-Stage Personnel Parachute System. Attention is given to performance requirements, cutter design, pull force test results, and various delay compositions. Design verification and service release test plans are considered. Upon successful completion of the two test plans, the pyrotechnic delay cutter will be available for implementation into the personnel parachute system. It is pointed out that designing two cutters within a single body and using aluminum parts whenever possible has produced an inexpensive but highly reliable pyrotechnic delay cutter. At the same time, with the design features provided, a safer cutter has been developed. G.R.

A83-15432
A REVIEW OF NAVAL AVIATION ON-BOARD OXYGEN GENERATING SYSTEMS
C. F. BENTLEY, JR. (U.S. Naval Air Systems Command, Crew Systems Div., Washington, DC) In: SAFE Association, Annual Symposium, 19th, Las Vegas, NV, December 6-10, 1981, Proceedings. Van Nuys, CA, SAFE Association, 1982, p. 187-191. refs

Many operational missions conducted with carrier-based aircraft require the use of supplemental oxygen. In connection with these oxygen requirements, equipment for generating oxygen has been installed aboard the carrier. There are a number of problems associated with this approach. These problems create a major burden on the ship. Additional difficulties arise if aircraft are deployed aboard nonaviation ships or on other bases not suited for the installation of the required equipment for the generation of oxygen. These difficulties can be eliminated by the use of oxygen enriched air (OEA) systems. Conceptually the OEA system is designed as a direct replacement of the liquid oxygen (LOX) systems and for use as the oxygen baseline for new naval aircraft.

OBOGS is designed to meet physiological requirements of breathing gas throughout the performance envelope of the aircraft. The oxygen enriched air system provides a maximum of 95% oxygen and 5% argon as breathing gas in place of the 100% oxygen generated by the current LOX system. G.R.

A83-15443
FLIGHT HELMETS - THE BRITISH APPROACH
M. BRIGGS (Helmets, Ltd., St. Albans, Herts., England) In: SAFE Association, Annual Symposium, 19th, Las Vegas, NV, December 6-10, 1981, Proceedings. Van Nuys, CA, SAFE Association, 1982, p. 261-263.

Design features and procedures for producing a satisfactory aircrew helmet are discussed, with particular regard for the British experience. The helmets are required to offer some protection in the case of a crash, ejection through an unopened canopy, and at the end of a parachute descent. In Britain, the helmet is considered as part of the escape system package, and provides an anchor for the oxygen mask for escape at high altitude. The Mk.4 headpiece features speakers which point away from the ear, in order to produce a flatter signal more discernible from background noise. Comfort has been enhanced by sizing the interior of the helmet to fit the length and breadth of a head, with suspension effected with webbing, which produces a good grip on the heat. The Mk.4 will stay on a pilot's head even during ejection at 650 kn. M.S.K.

A83-15790
A SYSTEM FOR INVESTIGATING THE ACTIVITY OF A HUMAN OPERATOR WHO TRACKS TIME INTERVALS [USTROISTVO DLIA ISSLEDOVANIIA DEIATEL'NOSTI CHELOVEKA-OPERATORA, RABOTAIUSHCHEGO V REZHIME SLEZHENIIA ZA VREMENNYMI INTERVALAMI]
A. I. SOBOL, IU. N. TIKHONOV, N. A. VAINBERG, and S. N. RAEVA (Akademiia Nauk SSSR, Institut Khimicheskoi Fiziki, Moscow, USSR) Fiziologiia Cheloveka, vol. 8, Nov.-Dec. 1982, p. 1041-1044. In Russian. refs

An instrument is developed which permits the investigation of the movement responses of an operator during the tracking of a sequence of rhythmic signals, produced through equal or changing intervals of time, but with a wider range of variations of the parameters of the production of the rhythmic stimuli than used by Bernshtein (1947). The instrument can be used to study the activity of a human operator in conditions of complex forms of purposeful activity, particularly various types of sensorimotor tracking. The instrumental method can be used for evaluating the effectiveness of the treatment of movement disorders in patients suffering from organic illnesses of the central nervous system. The instrument is simple to operate, and the time intervals between the stimuli can be varied. A schematic diagram of the instrument, as well as a block diagram of the entire experiment system, is included. N.B.

A83-15900
ERGONOMIC ASPECTS OF AIRCRAFT KEYBOARD DESIGN - THE EFFECTS OF GLOVES AND SENSORY FEEDBACK ON KEYING PERFORMANCE
R. M. TAYLOR and J. V. F. BERMAN (RAF, Institute of Aviation Medicine, Farnborough, Hants., England) (Ergonomics Society, Annual Conference, University of Sussex, Brighton, England, Mar. 29-Apr. 1, 1982.) Ergonomics, vol. 25, Nov. 1982, p. 1109-1123. refs

Accounts are given of four experiments from a program of research aimed at the development and application of methodologies for assessing factors relevant to keyboard design. The first experiment shows that the effects of various aircrew gloves on a representative aircraft data entry task are highly situation-specific. The second shows that gloves impair performance on a high compatibility continuous keying task, with relatively high keying rates, and that this impairment is not reduced by additional auditory feedback. The third experiment demonstrates that the high compatibility keying task provides a successful methodology for investigating the effects of key displacement and resistance on speed and accuracy. The fourth indicates the relative contributions of reduced tactility and mobility to the effects on keying and manipulative performance caused by aircrew gloves. Taken as a whole, the experiments are seen as suggesting that kinaesthetic and tactile feedback associated with keying are relatively unaffected by aircrew gloves and that restrictions on mobility caused by gloves may be more important for continuous data entry involving relatively high keying rates. C.R.

A83-16045
MACHINES THAT WALK
M. H. RAIBERT (Carnegie-Mellon University, Pittsburgh, PA) and I. E. SUTHERLAND Scientific American, vol. 248, Jan. 1983, p. 44-53.

The mechanics and operation of walking and hopping machines are discussed. A six-legged machine was built which does not require dynamic balance because it is always supported by a tripod of legs. A computer program for such a machine regulates its gait, prevents its center of gravity from moving beyond the base of support, distributes the support load to maximize smoothness of ride, distributes lateral foot forces to keep the machine in motion, and searches for adequate ground support. A gasoline engine provides power and hydraulic actuators move the legs. The driver regulates the amount of oil in the system, the attitude and ground clearance of the machine, and the placement of the feet. The difference between static and dynamic stability is studied with a hopping machine in which servo-control loops control the height of the hopping motion, the balance of the machine, and the attitude of the body. Prospects for multilegged running and hopping machines are assessed. C.D.

N83-12860# National Academy of Sciences - National Research Council, Washington, D. C. Assembly of Behavioral and Social Sciences.
VISION RESEARCH FOR FLIGHT SIMULATION Final Report
W. RICHARDS, ed. and K. DISMUKES, ed. Brooks AFB, Tex. AFHRL Jul. 1982 108 p refs
(Contract F33615-80-C-0009)
(AD-A118721; AFHRL-TR-82-6) Avail: NTIS HC A06/MF A01 CSCL 05H

This report is based on a workshop organized by the Committee on Vision of the National Research Council and by the Operations Training Division of the Air Force Human Resources Laboratory at Williams AFB in June 1980. The workshop brought together vision scientists from academia and government scientists concerned with research on visual displays for flight simulation. The principal objective was to provide recommendations concerning fruitful approaches for the conduct of research on what visual information is needed for simulation and how it might best be presented. Low-level flight was used as a focus for discussion of problem-solving approaches. The technical report prepared by the steering group provides examples of particular research strategies that might help elucidate several of the long-range issues in visual simulation. GRA

N83-12861# Office of Technology Assessment, Washington, D.C.
EXPLORATORY WORKSHOP ON THE SOCIAL OF ROBOTICS: SUMMARY AND ISSUES. A BACKGROUND PAPER
Feb. 1982 139 p refs
(PB82-184862; LC-82-600515) Avail: NTIS HC A07/MF A01 CSCL 05A

An exploratory workshop to examine the state of robotics technology and possible public policy issues of interest to Congress that may arise from its use is discussed. The workshop participants included researchers in robotics technology, representatives from robot manufacturing firms, and representatives from firms that use robotics technology. A summary of the results of the workshop along with copies of four background papers that were used as starting points for the discussion are given. GRA

N83-12862# National Building Research Inst., Pretoria (South Africa).
THE PHYSICAL WORKING ENVIRONMENT AND ITS EFFECT ON PRODUCTIVITY IN OFFICES
R. J. PAGE-SHIPP 1981 20 p refs
(PB82-186461) Avail: NTIS HC A02/MF A01 CSCL 05E

Physical environmental factors that can influence productivity are discussed. Particular attention is paid to acoustics, illumination and thermal environmental conditions, with the emphasis on the role of the building design in creating productive environmental conditions. GRA

N83-13784# Joint Publications Research Service, Arlington, Va.
PREFLIGHT DIET FOR FLIGHT PERSONNEL
I. G. POPOV *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 16 (JPRS-82194) p 1-20 9 Nov. 1982 refs Transl. into ENGLISH from Kosm. Biol. i Aviakosmicheskaya Med. (Moscow), v. 16, no. 5, Sep. - Oct. 1982 p 4-17
Avail: NTIS HC A08

The evolution of the concepts of preflight diets of flight personnel in the USSR and in other countries is discussed from the historical point of view. The main stages in the evolution associated with changes in the physiological-hygienic requirements for the diets and increases in the flight altitude, range, and speed are described. The data on the arrangement of preflight meals, their composition, and nutrient parameters are given. Physiological-hygienic requirements for preflight diets of flight personnel are determined in the light of present-day concepts and their future developments are outlined. Author

N83-13787# Joint Publications Research Service, Arlington, Va.
SAFETY CRITERION FOR PROTECTION OF PILOT'S HEAD AGAINST IMPACTS
A. S. BARER, Y. G. KONAKHEVICH, and L. N. SHOLPO *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 16 (JPRS-82194) p 39-45 9 Nov. 1982 refs Transl. into ENGLISH from Kosm. Biol. i Aviakosmicheskaya Med. (Moscow), v. 16, no. 5, Sep. - Oct. 1982 p 29-33
Avail: NTIS HC A08

In order to determine man's tolerance, clinical symptoms of craniocerebral injuries were compared with physical characteristics of impacts. A ranking scheme of clinical manifestations of craniocerebral injuries as applied to specific flight conditions was developed. With respect to the craniocerebral injury biomechanics, clinical data were examined statistically, which helped to evaluate impact-critical parameters and to propose a graphic scheme that can be used to describe in detail the accident and to estimate the probability of injuries of various degree over the entire range encountered in aviation and clinical practice. Author

N83-13805# Joint Publications Research Service, Arlington, Va.
QUANTITATIVE EVALUATION OF EFFECTS OF PHYSICOCHEMICAL AND TECHNOLOGICAL FACTORS ON WATER REGENERATION PROCESS
N. M. KRIVOBOK, V. B. GAYDADYMOV, V. V. NOSOV, and G. G. TER-MINASYAN *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 16 (JPRS-82194) p 140-143 9 Nov. 1982 refs Transl. into ENGLISH from Kosm. Biol. i Aviaosmicheskaya Med. (Moscow), v. 16, no. 5, Sep. - Oct. 1982 p 92-93
Avail: NTIS HC A08

The effects of physicochemical and technological factors on the process of component-A removal from fluid in an electrolyzer, orthogonal planning were evaluated. The implication of technological development of the creation of space life support systems which operate for a long period of time regenerate water from various water containing products and waste formed right on board a manned space vehicle, as well as constant sediment of existing processes. The parameters of ground based testing of equipment which was developed, are examined. It is suggested that experimental research could be improved substantially by studying the methodology of mathematical experiment planning, which permits obtaining the necessary information with minimum expenditure of time and resources. E.A.K.

N83-13813# Aeronautical Research Labs., Melbourne (Australia).
BRITTLE FRACTURE OF CRASH HELMETS
S. R. SARRAILHE and G. PAUL Feb. 1982 22 p refs
(ARL-STRUC-REPORT-389; AR-002-332) Avail: NTIS HC A02/MF A01

The polycarbonate shell of the protective helmet worn by a police motor cyclist shattered in a fatal accident. The conditions which could cause brittle failure in this normally tough material were investigated with particular reference to the effects of hydrocarbon solvents (including petrol), impact at high speed (about 60 km/h) and the support to the helmet provided by the solid test headform. Comparative impacts were made onto a helmet with a fiberglass (GRP) shell. Author

N83-13814*# National Aeronautics and Space Administration, Washington, D. C.
NASA FACTS: FOOD FOR SPACE FLIGHT
1981 8 p
(NASA-NF-1336-82; NAS 1.20:1336-82) Avail: NTIS HC A02/MF A01

A history of space flight feeding is reviewed. The menu and preparation of food on the space shuttle are described. S.L.

N83-13815# RAND Corp., Santa Monica, Calif.
CREW ROLES IN MILITARY SPACE OPERATIONS
D. LEINWEBER Mar. 1982 42 p refs
(RAND/P-6745) Avail: NTIS HC A03/MF A01 CSCL 05H

Future military roles of crews in space are discussed. It is pointed out that military space goals have not been set, organizations to carry out required training and development activities have not fully emerged, and no commitments have been made. It is concluded that what is needed is a commitment to explore the possibilities, to experiment, and to acquire a sound knowledge base on which to make an informed judgment on the future military role of men in space. L.F.M.

N83-13816# Army Research Inst. for the Behavioral and Social Sciences, Alexandria, Va. Training Research Lab.
TRAINING SIMULATOR FIDELITY GUIDANCE: THE ITERATIVE DATA BASE APPROACH
R. T. HAYS Sep. 1981 37 p refs
(Contract DA PROJ. 2Q1-62717-A-790)
(AD-A119159; ARI-TR-545) Avail: NTIS HC A03/MF A01 CSCL 05A

This paper provides a preliminary organizational framework for a training simulator fidelity data base. Such a data base can provide a starting point for the development of a formal training simulator fidelity decision-making package and can also be the basis for the determination of future research. The organizational structure of the data base is developed in three stages. First, the issue of determining the minimum required fidelity for a training simulator is located in its place within the context of the ISD process. Second, the necessary informational inputs to the fidelity decision process from task analyses are discussed with the goal of obtaining more useful information for making fidelity decisions. Finally, a proposed structure for making fidelity decisions and for conducting future research is presented. This structure is derived from the use of a proposed iterative data base of empirically derived data on the relationship between simulator fidelity and training effectiveness. GRA

N83-13817# Riso National Lab., Roskilde (Denmark). Electronics Dept.
NOTES ON HUMAN PERFORMANCE ANALYSIS
E. HOLLNAGEL, O. M. PEDERSEN, and J. RASMUSSEN Jun. 1981 85 p refs
(DE81-700315; RISO-M-2285; ISBN-87-550-0756-2; ISSN-0418-6435) Avail: NTIS (US Sales Only) HC A05/MF A01; DOE Depository Libraries

The integration of observation and analysis of human performance in nuclear environments - real or simulated is considered. Four main sources of data are identified, and the

characteristic data types and methods of analysis for each source in relation to a common conceptual background are described. The general conclusion is that it is highly useful to combine the knowledge and experience from different contexts into coherent picture of how nuclear operators perform under varying circumstances. DOE

N83-13818# Sheffield Univ. (England). Dept. of Control Engineering.
DYNAMIC MODELLING OF A FOUR-DEGREE-OF-FREEDOM ROBOTIC MANIPULATOR
A. S. MORRIS and F. NEEA May 1982 22 p refs
(RR-190) Avail: NTIS HC A02/MF A01

The equations of motion of a mechanical arm with respect to a nonstationary coordinate system were derived, using the general formula for the absolute acceleration of a moving point in free space. In order to model a robot arm, the general formula for torque applied to a joint was derived in terms of inertia and masses. The resulting model is useful without modification for arm speed control, but the effect of bending movements in the arm links must be included in the analysis before the model can be used for accurate position control. Author (ESA)

55

PLANETARY BIOLOGY

Includes exobiology; and extraterrestrial life.

A83-13403
COMETS AND ORIGIN OF LIFE
C. PONNAMPERUMA and E. OCHIAI (Maryland, University, College Park, MD) In: Comets. Tucson, AZ, University of Arizona Press, 1982, p. 696-703. refs

The observation of carbon compounds in comets is suggestive of chemical evolutions. However, it appears unlikely that prebiological processes would have gone much further than the stage of monomer formation. The proposition that comets may be a vehicle for panspermia is not warranted by currently available data. (Author)

A83-14981
THE INFRARED SPECTRUM OF INTERSTELLAR DUST
F. HOYLE, N. C. WICKRAMASINGHE, and S. AL-MUFTI (University College, Cardiff, Wales) Astrophysics and Space Science, vol. 86, no. 2, Sept. 1982, p. 341-344.

The 2.9-13 micron IR spectrum of GC-IRS 7 is interpreted in terms of interstellar grains which are spectroscopically similar to dried-out diatomaceous organisms. For particles with radii of about 0.3 microns, and for nonresonant absorptions such as those which occur in organic material, the function tau(lambda) is proportional to the measured absorption optical depth of a laboratory sample throughout the IR waveband. O.C.

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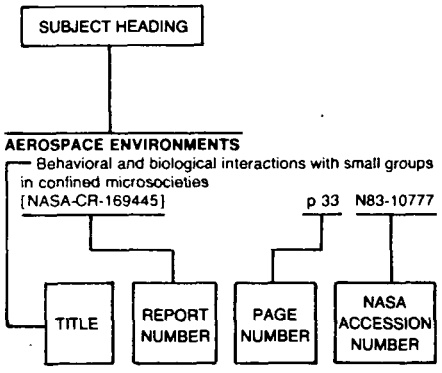

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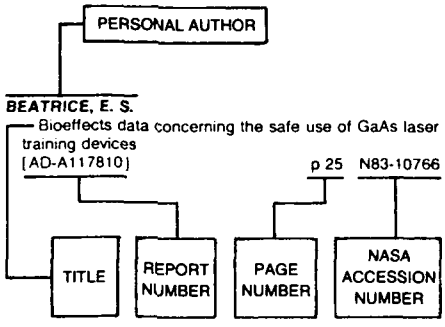

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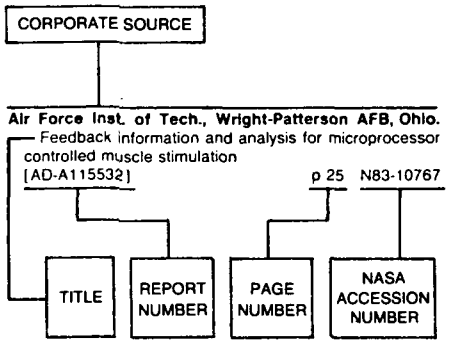

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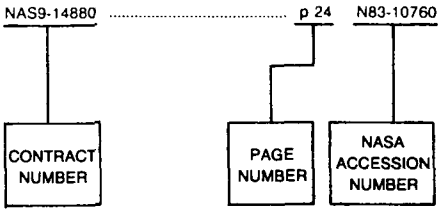

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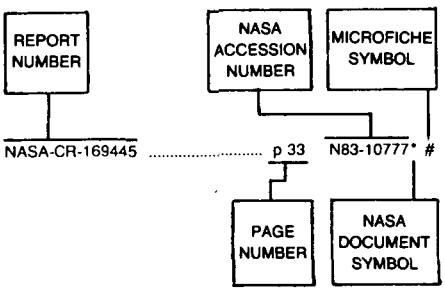

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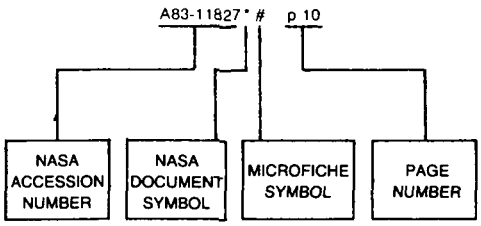

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