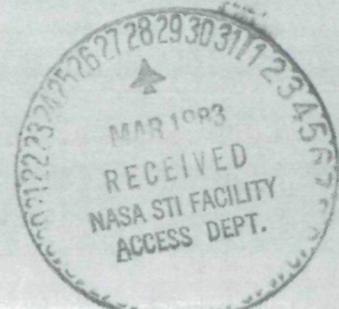




Aerospace Medicine  
and Biology  
A Continuing  
Bibliography  
with Indexes

NASA SP-7011(242)  
February 1983



National Aeronautics and  
Space Administration

(NASA-SP-7011(242)) AEROSPACE MEDICINE AND BIOLOGY: A CONTINUING BIBLIOGRAPHY WITH INDEXES, SUPPLEMENT 242, FEBRUARY 1983 (National Aeronautics and Space Administration) 82 p HC \$7.00 N83-21784 Unclas CACL 06E 00/52 09297

# Aerospace Medicine & Biology space Medicine & Biology Aero e Medicine & Biology Aerospace dicine & Biology Aerospace M ne & Biology Aerospace Medic Biology Aerospace Medicine & gy Aerospace Medicine & Biol erospace Medicine & Biology pace Medicine & Biology Aeros Medicine & Biology Aerospace cine & Biology Aerospace Med & Biology Aerospace Medicine

Aerospace Medicine and Biology  
A Continuing Bibliography with Indexes

Pages 1-40

February 1983

## ACCESSION NUMBER RANGES

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

STAR (N-10000 Series)      N83-10001 - N83-12037

IAA (A-10000 Series)      A83-10001 - A83-13110

# **AEROSPACE MEDICINE AND BIOLOGY**

**A CONTINUING BIBLIOGRAPHY  
WITH INDEXES**

**(Supplement 242)**

*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 January 1983 in*

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

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# INTRODUCTION

This Supplement to *Aerospace Medicine and Biology* lists 299 reports, articles and other documents announced during January 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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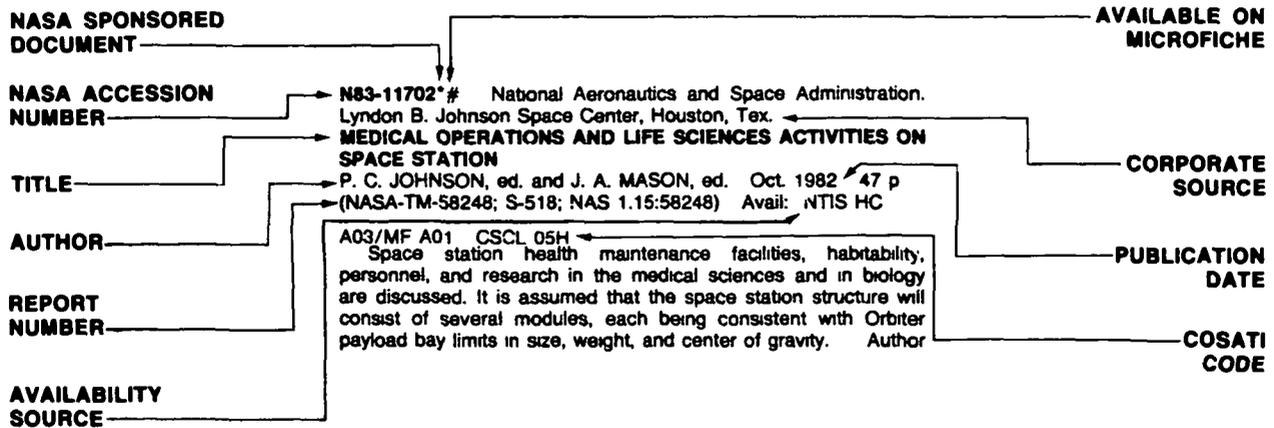
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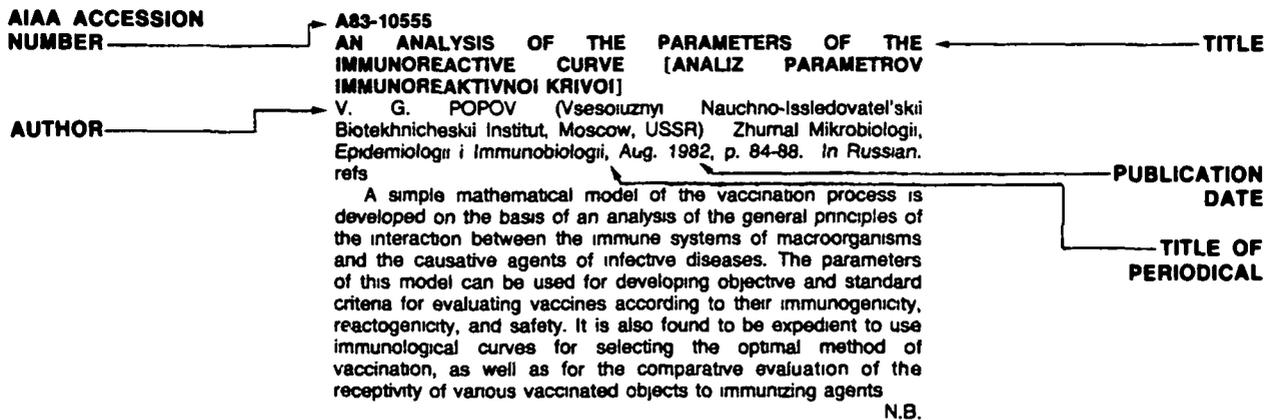
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# AEROSPACE MEDICINE AND BIOLOGY

*A Continuing Bibliography (Suppl. 242)*

FEBRUARY 1983

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## LIFE SCIENCES (GENERAL)

Includes genetics.

**A83-10209\*** Massachusetts Inst. of Tech., Cambridge.  
**MOLECULAR STRUCTURE OF R/GCG/D/TATACGC/ - A DNA-RNA HYBRID HELIX JOINED TO DOUBLE HELICAL DNA**  
A. H.-J. WANG, S. FUJII, A. RICH (MIT, Cambridge, MA), J. H. VAN BOOM, G. A. VAN DER MAREL, and S. A. A. VAN BOECKEL (Leiden, Rijksuniversiteit, Leiden, Netherlands) *Nature*, vol. 299, Oct. 14, 1982, p. 601-604. Research supported by the National Institutes of Health, American Cancer Society, Nederlandse Organisatie voor Zuiver-Wetenschappelijk Onderzoek, and NASA. refs

The molecule r(GCG)d(TATACGC) is self-complementary and forms two DNA-RNA hybrid segments surrounding a central region of double helical DNA, its molecular structure has been solved by X-ray analysis. All three parts of the molecule adopt a conformation which is close to that seen in the 11-fold RNA double helix. The conformation of the ribonucleotides is partly determined by water molecules bridging between the ribose O2' hydroxyl group and cytosine O2. The hybrid-DNA duplex junction contains no structural discontinuities. However, the central DNA TATA sequence has some structural irregularities. (Author)

**A83-10379**  
**PARADOXES OF PARADOXICAL SLEEP [PARADOKSY PARADOKSAL'NOGO SNA]**

V. M. KOVALZON (Akademii Nauk SSSR, Institut Evolutsionnoi Morfologii i Ekologii Zhivotnykh, Moscow, USSR) *Priroda*, Aug 1982, p. 74-79. In Russian. refs

An experiment is described in which rats were deprived of paradoxical sleep by direct electrical stimulation of the reticular formation of the brain stem. The results suggest that the absence of paradoxical sleep affects behavior in that it changes the resistance of animals to stress stimuli. Thus, it is hypothesized that paradoxical sleep controls the stability of the organism, its resistance to powerful external stimuli. B.J.

**A83-10381**  
**THE APPEARANCE OF LIFE IN THE MARINE ENVIRONMENT [O VOZNIKNOVENII ZHIZNI V MORSKOI SREDE]**

F. EGAMI (Mitsubishi-Kasei Institute of Life Sciences, Machida, Tokyo, Japan) *Priroda*, Aug. 1982, p. 95-100. In Russian

A review of geochemical and biological data leads to the conclusion that life originated in the primordial ocean. The composition of inorganic components of the ocean at that time was essentially the same as that of the present-day ocean. Primitive organisms similar to the *Clostridium* developed as the result of chemical and early biological evolution by choosing those substances (chemical elements and compounds) which were present in the environment in relatively large quantities. Experimental data supporting this scenario are presented. B.J.

**A83-10421**  
**INVESTIGATION OF THE LOCALIZATION OF DEHYDROGENASES IN AEROBIC AND ANAEROBIC BACTERIA AT THE SUBMICROSCOPIC LEVEL [IZUCHENIE LOKALIZATSII DEGIDROGENAZ U AEROBNYKH I ANAEROBNYKH BAKTERII NA SUBMIKROSKOPICHESKOM UROVNE]**

A. A. AVAKIAN, L. N. KATS, and E. F. KHARATIAN (Akademii Meditsinskikh Nauk SSSR, Moscow, USSR) *Akademiia Nauk SSSR, Izvestiia, Seria Biologicheskaja*, Sept.-Oct. 1982, p. 686-696. In Russian. refs

**A83-10422**  
**THE UTILIZATION OF CARBON MONOXIDE BY ANAEROBIC BACTERIA [ISPOL'ZOVANIE OKISI UGLERODA ANAEROBNYMI BAKTERIIAMI]**

M. I. BELIAEVA and I. N. RIAZANTSEVA (Akademii Nauk SSSR, Institut Biologii, Kazan, USSR) *Akademiia Nauk SSSR, Izvestiia, Seria Biologicheskaja*, Sept.-Oct. 1982, p. 697-707. In Russian. refs

The paper presents a survey of the literature on the utilization of CO by anaerobic bacteria, including clostridia, and methanogenic, sulfate-reducing, and phototrophic bacteria. Optimal, inhibiting, and lethal concentrations of CO in culture growth are determined. Data on CO oxidation (at 100% saturation) by cell suspensions and by cell extracts of different systematic anaerobes are presented. Properties of CO dehydrogenase are discussed, and possible electron acceptors in CO oxidation are considered. B.J.

**A83-10423**  
**HYBRIDIZATION OF THE DNA OF PURPLE PHOTOTROPHIC BACTERIA [GIBRIDIZATSIIA DNK PURPURNYKH FOTOTROFNYKH BAKTERII]**

T. P. TUROVA, T. L. IVANOVA, and A. S. ANTONOV (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR) *Akademiia Nauk SSSR, Izvestiia, Seria Biologicheskaja*, Sept.-Oct. 1982, p. 763-767. In Russian. refs

**A83-10424**  
**THE EFFECT OF SEROTONIN ON THE SURVIVABILITY OF CANDIDA GUILLIERMONDII CELLS, IRRADIATED BY SHORT-WAVELENGTH ULTRAVIOLET LIGHT [VLIAMI SEROTONINA NA VYZHIVAEMOST' KLETOK CANDIDA GUILLIERMONDII, OBLUCHENNYKH KOROTKOVOLNOVYM UL'TRAVIOLETOVYM SVETOM]**

M. G. STRAKHOVSKAIA, G. IA. FRAIKIN, and E. N. GONCHARENKO (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR) *Akademiia Nauk SSSR, Izvestiia, Seria Biologicheskaja*, Sept.-Oct. 1982, p. 767-770. In Russian.

A83-10425

**COMMON MECHANISM OF THE INTRATISSUE REGULATION OF PROLIFERATION ON THE BASIS OF THE PRINCIPLE OF THE TISSUE-SPECIFIC CONTROL OF THE OXIDATIVE PHOSPHORYLATION OF MITOCHONDRIA [EDINYI MEKHANIZM VNUTRITKANEVOGO REGULIROVANIYA PROLIFERATSII NA PRINTSIPE TKANESPEFICHESKOGO KONTROLIA OKISLITEL'NOGO FOSFORILIROVANIYA MITOKHONDRII]**

G. M. ELBAKIDZE (Nauchno-Issledovatel'skii Institut po Biologicheskim Ispitaniyam Khimicheskikh Soedinenii, Kupavna, USSR) Akademiya Nauk SSSR, Izvestiya, Seriya Biologicheskaya, Sept.-Oct. 1982, p. 785-788. In Russian refs

A83-10456

**THE EFFECT OF BIOSTIMULATION AMPLIFICATION AFTER THE COMBINED ACTION OF LASER IRRADIATION IN THE BLUE AND RED REGIONS OF THE SPECTRUM [EFFEKT USILENIYA BIOSTIMULIATSII PRI KOMBINIROVANNOM VOZDEISTVII LAZERNOGO IZLUCHENIYA V SINEI I KRASNOI OBLASTIYAKH SPEKTRA]**

N. A. BOGUSH, V. A. MOSTOVNIKOV, A. T. PIKULEV, and I. V. KHOKHLOV (Akademiya Nauk Belorusskoi SSR, Institut Fiziki; Belorusskii Gosudarstvennyi Universitet, Minsk, USSR) Akademiya Nauk BSSR, Doklady, vol. 26, no. 10, 1982, p. 951-954. In Russian. refs

The interaction between changes in the adhesive surface properties and the mitotic activity of albino rat tissue cells in a monolayer after the action of laser irradiation is investigated. Results show that low-intensity laser irradiation at 441.6 nm and 632.8 nm stimulated the division of cells and the activity of the cellular enzymes. The stimulating action of the laser light on the mitotic activity of the cells and on the activity of the bioenergetic enzymes is significantly increased by the combined action of laser irradiation in the blue and red regions of the spectrum N.B.

A83-10480

**THE PHYSIOLOGICAL MECHANISMS OF THE REHABILITORY ACTION OF A MOUNTAIN CLIMATE [FIZIOLOGICHESKIE MEKHANIZMY REABILITIRUIUSHCHEGO DEISTVIA GORNOGO KLIMATA]**

V. A. BEREZOVSKII, V. I. BOGOMOLET, V. G. DEINEGA, and V. I. NOSAR (Akademiya Nauk Ukrainskoi SSR, Institut Fiziologii, Kiev, Ukrainian SSR) Fiziologicheskii Zhurnal (Kiev), vol. 28, Sept.-Oct. 1982, p. 515-521. In Russian. refs

A83-10481

**THE BLOOD FLOW IN BRONCHIAL VESSELS DURING HYPOXIA [KROVOTOK PO BRONKHIAL'NYM SOSUDAM V USLOVIYAKH GIPOKSII]**

S. A. SIMBIRTSEV, N. A. BELIAKOV, and O. B. BEGISHEV (Leningradskii Institut Uovershenstvovaniya Vrachei, Leningrad, USSR) Fiziologicheskii Zhurnal (Kiev), vol. 28, Sept.-Oct. 1982, p. 536-541. In Russian. refs

The vascular responses of lungs ventilated with various gas mixtures were investigated in isolated dog lungs that had been perfused separately for the pulmonary and bronchial arteries, as well as during conditions of regional oxygenation and deoxygenation of the perfusing blood. Results show that the hemodynamic resistance of the bronchial vessels, but not of the pulmonary vessels, is reduced during conditions of hypoxia and hypercapnia. It is concluded that the reduction of the hemodynamic resistance of the bronchial vessels is a result of a tissue oxygen deficit and an accumulation of carbon dioxide. N.B.

A83-10483

**THE AGE-RELATED PECULIARITIES OF THE DEVELOPMENT OF HYPOXIA IN SKELETAL MUSCLES DURING ACUTE HYPOXIC HYPOXIA [VOZRASNYYE OSOBNOSTI RAZVITIYA GIPOKSII SKELETNYKH MYSHTS PRI OSTROI GIPOKSICHESKOI GIPOKSII]**

I. N. MANKOVSKAYA and M. M. FILIPPOV (Akademiya Nauk Ukrainskoi SSR, Institut Fiziologii, Kiev, Ukrainian SSR) Fiziologicheskii Zhurnal (Kiev), vol. 28, Sept.-Oct. 1982, p. 548-555. In Russian refs

The distribution of oxygen stress and the mechanisms which affect this distribution are studied in the gastrocnemius muscles of middle-aged and old rats during acute hypoxic hypoxia of various degrees. The distribution of pO<sub>2</sub> in the muscles was determined with the aid of a mathematical model which uses input values based on experimentally determined parameters for the oxygen transport by the blood, the rate of blood flow in the muscles, the capillarization of the muscles, and the oxygen consumption of the muscles. The age-related effects of acute hypoxia on the skeletal muscles of old rats are discussed in relation to the development of hypoxia, the mechanisms of its development, and the compensation of the skeletal muscles. N.B.

A83-10486

**THE FUNCTIONAL DIFFERENTIATION OF THE VASCULAR SMOOTH MUSCLE CELLS AND THE BASAL TONUS OF THE VESSELS [O FUNKTSIONAL'NOI DIFFERENTSIATSII KLETOK SOSUDISTOI GLADKOI MYSHTSY I BAZAL'NOM TONUSE SOSUDOV]**

S. A. BERSHTEIN, M. I. GUREVICH, and A. I. SOLOVEV (Akademiya Nauk Ukrainskoi SSR, Institut Fiziologii, Kiev, Ukrainian SSR) Fiziologicheskii Zhurnal (Kiev), vol. 28, Sept.-Oct. 1982, p. 571-577. In Russian refs

On the basis of experimental results and a review of the literature it is shown that smooth muscles possess cells which have the ability to generate preliminary phase contractions, as well as cells which have the capacity to primarily contract tonically. It is determined that the formation of the vascular basal tonus cannot exclusively be reduced to the integration of the phase contractions of a number of smooth muscle cells, and that it is incorrect to link the basal tonus only with the tonic contraction which is produced by the continuous influx of calcium into the smooth muscle cells through the slow potential-dependent and chemosensitive canals which are found to be stationary in the activated state. It is concluded that the basal tonus of the vessels includes two components, one formed by the integration of the rhythmical phase contractions of smooth muscle cells, and the other resulting from the action of cells which primarily contract tonically. This former component of the basal tonus is shown to be relatively more stable than the latter component, and it is shown that this former component determines the quick adaptive changes in the peripheral blood circulation during changes in the functional activity of organs and tissues. N.B.

A83-10487

**THE CHANGES IN THE STRUCTURAL COMPONENTS OF THE WALLS OF THE SMALL VESSELS AND THE COMPOSITION OF THE PERIPHERAL BLOOD DURING IMMUNE AND HYPOXIC EFFECTS ON THE HEART [IZMENENIYA STRUKTURNYKH KOMPONENTOV STENKI MELKIKH SOSUDOV I SOSTAVA PERIFERICHESKOI KROVI PRI IMMUNNOM I GIPOKSICHESKOM VOZDEISTVII NA SERDTSE]**

M. F. SIROTINA (Akademiya Nauk Ukrainskoi SSR, Institut Fiziologii, Kiev, Ukrainian SSR) Fiziologicheskii Zhurnal (Kiev), vol. 28, Sept.-Oct. 1982, p. 578-582. In Russian. refs

A83-10489

**THE EFFECT OF A NORMOXIC HELIUM-OXYGEN GAS MIXTURE ON THE CONSUMPTION OF OXYGEN BY THE TISSUES OF THE LIVER AND LUNGS IN WHITE RATS [VLIANIE NORMOKSICHESKOI GELIEVO-KISLORODNOI GAZOVOI SMESI NA POTREBLENIE KISLORODA TKANIAMI PECHENI I LEGKIKH BELYKH KRYS]**

A. I. NAZARENKO and T. N. GOVORUKHA (Akademiia Nauk Ukrainiskoi SSR, Institut Fiziologii, Kiev, Ukrainian SSR) Fiziologicheskii Zhurnal (Kiev), vol. 28, Sept.-Oct. 1982, p. 598-602. In Russian. refs

A83-10490

**THE EFFECT OF THE REPLACEMENT OF NITROGEN OF THE AIR BY HELIUM ON EXTERNAL RESPIRATION [VLIANIE ZAMENY AZOTA VOZDUKHA GELIEM NA VNESHNEE DYKHANIE]**

M. M. SEREDENKO and E. V. ROZOVA (Akademiia Nauk Ukrainiskoi SSR, Institut Fiziologii, Kiev, Ukrainian SSR) Fiziologicheskii Zhurnal (Kiev), vol. 28, Sept.-Oct. 1982, p. 603-607. In Russian. refs

Studies concerning the effect of the replacement of nitrogen by helium in normoxic conditions on the external respiration and the gas metabolism of animals and humans are reviewed. It is concluded that helium is not an indifferent gas for living organisms, and that it has an effect on the transport of oxygen in the body

N.B

A83-10510

**A PHARMACOLOGICAL EVALUATION OF ELECTRICAL PROCESSES IN THE MYOCARDIUM [O FARMAKOLOGICHESKOI OTSENKE ELEKTRICHESKIKH PROTSESSOV V MIOKARDE]**

L. SZEKERES (Szeged, Tudományegyetem, Szeged, Hungary) Kardiologia, vol. 22, Aug. 1982, p. 97-103. In Russian. refs

Pharmacological studies of drugs and their modes of action on the heart are reviewed. It is shown that although in vitro studies have predominated, these types of studies are not satisfactory to predict antiarrhythmic activity in vivo since they are generally performed in preparations made from the normal myocardium, the autonomic and hormonal effects are absent in vitro, and arrhythmias generally arise from the interaction of changes in several fundamental electrophysiological parameters which could best be studied in vivo, among other reasons. Recent studies which overcome these limitations are examined, including progress in the in vivo recording of electric events in the heart, prolonged drug treatment that can evoke electrophysiological changes in vitro which are characteristic of the drug in vivo, and donor perfused isolated heart preparations in which certain drugs can evoke responses producing the in vivo effect.

N.B.

A83-10514

**THE ENDOCOCHLEAR POTENTIAL OF THE INNER EAR AND ITS CHANGES UNDER THE INFLUENCE OF DIHYDROSTREPTOMYCIN AND ETACRINIC ACID [ENDOKOKHLEARNYI POTETSIAL VNUTRENNEGO UKHA I EGO IZMENENIIA POD VLIANIEM DIGIDROSTOPTOMITSINA I ETAKRINOVOI KISLOTY]**

B. M. SAGALOVICH and I. L. MAZO (Ministerstvo Zdravookhraneniia RSFSR, Moskovskii Nauchno-Issledovatel'skii Institut Ukha, Nosa i Gorla, Moscow, USSR) Vestnik Otorinolaringologii, July-Aug. 1982, p. 19-23. In Russian. refs

A83-10524

**THE ROLE OF SEROTONIN IN THE PATHOGENESIS OF DISORDERS OF THE BRAIN CIRCULATION /REVIEW/ [ROL' SEROTONINA V PATOGENEZE NARUSHENII MOZGOVOGO KROVOOBRAZHENIIA /OBZOR/]**

A. I. MAKAROV and V. G. PUMNIKOV Zhurnal Nevropatologii i Psikiatrii im. S.S. Korsakova, vol. 82, no. 8, 1982, p. 1238-1246. In Russian. refs

A83-10526

**THE MECHANICAL PROPERTIES OF THE BRAIN IN THE PROCESS OF THE DEVELOPMENT OF POSTISCHEMIC EDEMA [MEKHANICHESKIE SVOISTVA GOLOVNOGO MOZGA V PROTSESE RAZVITIIA POSTISHEMICHESKOGO OTEKA]**

G. I. MCHEDLISHVILI, M. L. ITKIS, and N. V. SIKHARULIDZE (Akademiia Nauk Gruzinskoi SSR, Institut Fiziologii, Tbilisi, Georgian SSR) Voprosy Neirokhirurgii, July-Aug. 1982, p. 17-20. In Russian. refs

A method is developed for examining in vivo the mechanical properties of the brain during the development of postischemic edema in rabbits, in which the effect of the circulatory factor is removed. Results show that ischemia reduces the pliability of the brain, which is indicative of compensatory processes in the tissues, by limiting the entry of water into the brain from the blood of the vascular bed. However, before the edema significantly develops, the pliability diminishes and the brain becomes conducive to edema. It is concluded that the brain consistency index may be an object in vivo criterion of the degree of water accumulation in the brain that is independent of the degree of blood accumulation

N.B

A83-10527

**THE CONTENT AND DISTRIBUTION OF GLYCOGEN IN THE BRAIN FOLLOWING AN EXPERIMENTAL CRANIOCEREBRAL INJURY [SODERZHANIE I RASPREDELENIE GLIKOGENA GOLOVNOGO MOZGA POSLE CHEREPNO-MOZGOVOI TRAVMY V EKSPERIMENTE]**

A. V. SMIRNOV and A. S. AKOPIAN (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Voprosy Neurokhirurgii, July-Aug. 1982, p. 12-16. In Russian. refs

A83-10529

**THE CHANGES IN THE HEMODYNAMICS OF DOGS DURING EXERCISE OF DIFFERENT INTENSITIES IN THE ACUTE ADAPTATION TO HIGH ALTITUDE [IZMENENIE GEMODINAMIKI U SOBAK PRI FIZICHESKIKH NAGRUZKAKH RAZNOI INTENSIVNOSTI V AVARIINNYI PERIOD ADAPTATSII K VYSOKOGOR'IU]**

KH. D. KARKOBATOV (Akademiia Nauk Kirgizskoi SSR, Institut Fiziologii i Eksperimental'noi Patologii Vysokogor'ia, Kirgiz SSR) Akademiia Nauk Kirgizskoi SSR, Izvestiia, May-June 1982, p. 56-61. In Russian. refs

It is found that short periods of exposures to high altitude in the Tian-Shan mountains increases the functional activity of the cardiovascular system of dogs. Running at speeds of 5, 10, and 15 km/hour produced changes in the hemodynamics of the animals which were analogous to the changes produced by the same speeds at low altitudes. However, running at a speed of 20 km/hour at high altitudes produced larger changes in the hemodynamics of the animals than at low altitudes. The recovery times for the hemodynamic changes were found to increase more rapidly with increasing rates of exercise at high altitudes than at low altitudes.

N.B

A83-10531

**PATHOMORPHOLOGICAL CHANGES IN THE BRAIN OF RATS AFTER GENERAL BETA-IRRADIATION AT VARIOUS DOSES [PATOMORFOLOGICHESKIE IZMENENIIA GOLOVNOGO MOZGA KRYS POSLE OBSHCHEGO BETA-OBLUCHENIIA V RAZNYKH DOZAKH]**

V. D. ZHARSKAIA, G. A. LEMESH, and I. I. FIGURINA (Leningradskii Universitet, Vestnik, Biologiya, Aug. 1982, p. 46-52. In Russian. refs

The morphological changes in the nerve elements, the vascular system, and the pia mater of rat brains were investigated at various periods up to 28 days after the animals were exposed to general beta-irradiation (krypton-85) in doses from 2,000-10,000 rad. It was found that beta-irradiation at a dose of 2.00 rad caused an enlargement of the pia mater, as well as slight changes in the blood vessels, nerve cells, and glia, that are typical of the initial phase of acute diseases. Irradiation of the animals at doses from 8,000-10,000 rad produced degenerative and dystrophical injuries of the blood vessels and nerve tissues. In the cerebral cortex

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wide areas of devastation and large sections of markedly hyperchromic cells were observed, while pervascular hemorrhages and infiltrates were observed throughout the brains. No normalization was observed for any dose up to 28 days after irradiation. N.B.

### A83-10532

**THE EFFECT OF AMPHETAMINE AND AMIZYL ON THE INTERACTION OF THE DELAYED REACTION AND THE CONDITIONED REFLEX DIFFERENTIATION IN RHESUS MONKEYS AND CAPUCHINS [VLIANIE FENAMINA I AMIZILA NA VZAIMODESTVIE OTSROCHENNOI REAKTSII I USLOVNOREFLEKTORNOGO DIFFERENTSIROVANIIA U MAKAK REZUSOV I KAPUTSINOV]**

L. A. FIRSOR, I. V. LAPIN, and L. A. MOISEEVA (Akademiiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR) Zhurnal Vysshei Nervnoi Deiatel'nosti, vol. 32, July-Aug. 1982, p. 744-746. In Russian.

### A83-10534

**DISTURBANCES OF CONDITIONED REFLEX ACTIVITY DURING HYPOKINESIA IN RATS AND THE NORMALIZING EFFECT OF MOTOR LOADS [O NARUSHENIIAKH USLOVNOREFLEKTORNOI DEIATEL'NOSTI PRI GIPOKINEZII U KRYSA I NORMALIZUIUSHCHEM VLIANII DVIGATEL'NYKH NAGRUZOK]**

N. G. ZHURAVLEVA (Akademiiia Meditsinskikh Nauk SSSR, Moscow, USSR) Zhurnal, Vysshei Nervnoi Deiatel'nosti, vol. 32, July-Aug. 1982, p. 642-650. In Russian. refs

The effect of a partial limitation of motor activity on conditioned reflex activity was investigated in rats by (1) modelling 'everyday' hypokinesia and moderate motor loads, and (2) as a means of hypokinesia prevention. It was shown that both 1 and 2 facilitated the elaboration of chains of motor-alimentary conditioned reflexes. The alteration of a two-link chain of reflexes into a three-link chain was found to be impeded under the conditions of 1, while it was facilitated by the conditions of 2. A combination of 1 and 2 normalized both types of alterations. It is concluded that the internal inhibition was weakened under conditions of 1, but was enhanced under 2, which provided a normalization of conditioned reflex activity. N.B.

### A83-10535

**THE EFFECT OF EMOTIONAL AND PAIN STRESS ON THE ACTIVITY OF NA,K-ATPASE IN THE HEART MUSCLE [VLIANIE EMOTSIONAL'NO-BOLEVOGO STRESSA NA AKTIVNOST' NA, K-ATF-AZY V SERDECHNOI MYSHTSE]**

F. Z. MEERSON, L. N. MEDVEDEV, L. I. GOLUBEVA, and E. E. USTINOVA (Akademiiia Meditsinskikh Nauk SSSR, Moscow; Krasnoyarskii Meditsinskii Institut, Krasnoyarsk, USSR) Biulleten' Eksperimental'noi Biologii i Meditsiny, vol. 94, Aug. 1982, p. 61-63. In Russian. refs

The changes in the activity of Na, K-ATPase in the heart muscle of rats were studied after subjecting the rats to emotional and pain stress in the form of nervous anxiety, and the possibility of preventing these changes by injecting a beta-adrenal blocker, inderal, before the application of stress was evaluated. It was found that emotional and pain stress results in a 25% decrease in Na, K-ATPase activity in the heart, while an injection of inderal (at a dose of 1 mg/kg body weight) 10 minutes before exposure to stress completely blocks the decrease in the activity of this enzyme. It is proposed that the effect of inderal is due to the inhibition of catecholamines, which are released in large amounts during emotional and pain stress and which can indirectly damage the sarcolemma by means of lipid peroxidation activation. N.B.

### A83-10536

**THE STEROSPECIFICITY OF THE EFFECT OF THE ISOMERS OF FLUPENTIXOLE ON THE SUBSTRATE INHIBITION OF BRAIN TYROSINE HYDROXYLASE [STEREOSPETSIFICHNOST' EFFEKTA IZOMEROV FLUPENTIKSOLA NA SUBSTRATNOE TORMOZHENIE TIROZINGIDROKSILAZY MOZGA]**

M. F. MINEEVA, V. S. KUDRIN, E. A. KUZNETSOVA, and K. S. RAEVSKII (Akademiiia Meditsinskikh Nauk SSSR, Moscow, USSR) Biulleten' Eksperimental'noi Biologii i Meditsiny, vol. 94, Aug. 1982, p. 58-61. In Russian. refs

The stereospecificity of the effect of neuroleptics on the substrate inhibition of isolated brain tyrosine hydroxylase is investigated. Results show that the cis isomer of flupentixole eliminates the substrate inhibition of the enzyme, and this effect is concentration dependent and is clearly evident within the range of tyrosine concentrations from 10 to the -6th to 10 to the -4th M. The trans isomer of flupentixole in the same concentrations is found to have no effect on the substrate inhibition of this enzyme. The reaction rate of the enzyme in the presence of the cis isomer plotted against the tyrosine concentration forms a hyperbola with a plateau at 160-360 micro M tyrosine, while both the control sample and the enzyme in the presence of the trans isomer produce plots of reaction rates vs tyrosine concentrations that are described by a curve with a maximum at 110-140 micro M tyrosine. It is concluded that neuroleptics interact with the tyrosine binding site of the enzyme in the non-catalytic center, and that this interaction with the regulatory area of tyrosine hydroxylase might be important in the molecular mechanism of the action of the enzyme. N.B.

### A83-10537

**THE EFFECT OF POLYMETHYLENE AND POLYOXYETHYLENE-BIS-/2-AMINO-1,3-DIAZEPINIUM/ ES ON CELL AND MODEL MEMBRANES [VLIANIE POLIMETILEN-I**

**II/ IODIDOV NA KLETOCHNYE I MODEL'NYE MEMBRANY]**

A. V. BOGATSKII, N. G. LUKIANENKO, T. A. SAVENKO, V. G. VONGAI, E. I. NAZAROV, T. I. KIRICHENKO, and T. A. AFANASEVA (Akademiiia Nauk Ukrainskoi SSR, Fiziko-Khimicheskii Institut, Odessa, Ukrainian SSR) Biulleten' Eksperimental'noi Biologii i Meditsiny, vol. 94, Aug. 1982, p. 52-54. In Russian. refs

The effect of polymethylene and polyoxyethylene-bis-(2-amino-1,3-diazepinium) iodides on the membranes of neuromuscular synapses and mitochondria, as well as on artificial membranes, was investigated. Results show that these compounds change the amplitude and kinetics of the postsynaptic membrane responses to acetylcholine. Changes in the surface potential of the artificial phospholipid membrane were found to be correlated with the inhibition of end plate potentials and oxidative phosphorylation in mitochondria using several different derivatives of diazepam. It is concluded that these derivatives of diazepam directly interact with ionic channels in the acetylcholine-activated postsynaptic membrane. N.B.

### A83-10538

**THE HEMODYNAMIC RESPONSES OF NORMOTENSIVE AND HYPERTENSIVE RATS TO INJECTIONS OF PROSTAGLANDINS AND INDOMETHACIN [REAKTSIIA GEMODINAMIKI NORMOTENZIVNYKH I GIPERTENZIVNYKH KRYSA NA VVEDENIE PROSTAGLANDINOV I INDOMETATSINA]**

SH. I ISMAILOV and A. V. VALDMAN (Akademiiia Meditsinskikh Nauk SSSR, Moscow, USSR) Biulleten' Eksperimental'noi Biologii i Meditsiny, vol. 94, Aug. 1982, p. 45-48. In Russian. refs

A83-10539

**THE EFFECT OF TRAPIDIL ON THE FORMATION OF PROSTACYCLINE IN RABBIT CARDIAC TISSUE [VLIANIE TRAPIDILA NA OBRAZOVANIE PROSTATSIKLINA TKAN'IU SERD TSA KROLIKA]**N. G. GELING and S. A. KUDRIASHOV (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) *Bulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 94, Aug. 1982, p. 48-50. In Russian refs

The effect of trapidil on the generation and the release of a prostacycline compound (PGI-2) from the myocardium of rabbits was investigated by determining its ability to inhibit platelet aggregation. Results show that trapidil increases the generation of PGI-2 in the rabbit myocardium from  $0.22 \pm 0.03$  to  $0.41 \pm 0.07$  ng/mg net weight of tissue, but has no effect on the radioimmunologically assayed content of the prostaglandins E and F-2 in the incubation medium. It is concluded that the activation effect of trapidil on the generation of PGI-2 in the rat aorta (Kawamura et al, 1980) and rabbit heart, and its inhibitory effects both on the biosynthesis and the action of thromboxan A-2 (Ohnishi et al, 1981), shows that the antiaggregation and coronarolytic actions, as well as the positive inotropic and chronotropic effects, of trapidil on the myocardium are mediated via the local generation of PGI-2 and thromboxan A-2. N.B.

A83-10540

**THE PARTICIPATION OF THE DOPAMINERGIC SYSTEM OF THE BRAIN IN THE REALIZATION OF THE GENERALIZATION FUNCTION [UCHASTIE DOPAMINERGICHESKOI SISTEMY MOZGA V REALIZATSII FUNKTSII OBOBSHCENIYA]**E. I. MUKHIN and O. S. ADRIANOV (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) *Bulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 94, Aug. 1982, p. 37-39. In Russian refs

The effect of several dopaminergic and cholinergic substances on the generalization process was studied in experiments on three different groups of cats (intact, caudate-ablated, and frontal-ablated). Results show that the dopaminergic neuromediator brain system is the primary system in the realization of the higher psychic functions in the animals studied. N.B.

A83-10541

**THE CHANGES IN THE CONTENT OF CORTICOSTERONE IN THE BLOOD PLASMA OF INBRED MICE AFTER EXPOSURE TO STRESS [IZMENENIE SODERZHANIYA KORTIKOSTERONA V PLAZME KROVI INBREDNYKH MYSHEI POSLE STRESSOVOGO VOZDEISTVIA]**S. B. SEREDENIN, B. A. BADYSHTOV, M. M. NIKITINA, and V. B. ROZEN (II Moskovskii Meditsinskii Institut, Moskovskii Gosudarstvennyi Universitet, Moscow, USSR) *Bulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 94, Aug. 1982, p. 36, 37. In Russian. refs

A83-10542

**THE ACTIVITY OF TYROSINE HYDROXYLASE IN THE GANGLIA OF THE VEGETATIVE NERVOUS SYSTEM IN RABBITS DURING ACUTE EXPERIMENTAL EMOTIONAL STRESS [AKTIVNOST' TIROZINGIDROKSILAZY V UZLAKH VEGETATIVNOI NERVNOI SISTEMY KROLIKOV PRI OSTROM EKSPERIMENTAL'NOM EMOTSIONAL'NOM STRESSE]**A. V. GORBUNOVA, V. S. KUDRIN, S. I. KASHTANOV, and V. V. PORTUGALOV (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) *Bulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 94, Aug. 1982, p. 22-24. In Russian. refs

A83-10543

**THE PULMONARY CIRCULATION AND THE RIGHT VENTRICULAR FUNCTION IN EXPERIMENTAL MODELS OF HIGH-ALTITUDE ACUTE EDEMA OF THE LUNGS [LEGOCHNOE KROVOOBRAZHOVENIE I FUNKTSIIA, PRAVOGO ZHELUDUCHKA PRI EKSPERIMENTAL'NOI MODELI VYSOTNOGO OSTROGO OTEKA LEGKIKH]**E. M. ISMAILOV (Kirgizskii Nauchno-Issledovatel'skii Institut Kardiologii, Kirgizskii Meditsinskii Institut, Frunze, Kirgiz SSR) *Bulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 94, Aug. 1982, p. 18-20. In Russian refs

The hemodynamic shifts that occur during the development of high-altitude pulmonary edema in rabbits are investigated. It is found that the primary hemodynamic disturbances occur in pulmonary circulation, while the main functional load falls within the right section of the heart. It is concluded that the increased content of pulmonary blood and the elevated pressure of pulmonary circulation play a pathogenic role in the origin of high-altitude acute edema of the lungs. N.B.

A83-10544

**THE EFFECT OF GLYCOLYSIS BLOCKAGE IN THE VASCULAR WALL ON THE PHASIC ACTIVITY OF THE SMOOTH MUSCLES [VLIANIE BLOKADY GLIKOLIZA V SOSUDISTOI STENKE NA FAZNUIU AKTIVNOST' GLADKIKH MYSHTS]**A. I. SOLOVEV and S. A. BERSHTEIN (Akademiia Nauk Ukrainsoi SSR, Institut Fiziologii, Kiev, Ukrainian SSR) *Bulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 94, Aug. 1982, p. 11-13. In Russian refs

A83-10545

**THE AUTOMATIC STABILIZATION OF PRESSURE IN THE MAIN ARTERIES DURING CHANGES IN THE BLOOD FLOW [AVTOMATICHESKAIA STABILIZATSIIA DAVLENIYA V KRUPNYKH ARTERIIAKH PRI IZMENENIIAKH KROVOTOKA]**I. N. GRISHANOV, I. K. EVSTIFEV, A. M. MELKUMIANTS, and V. M. KHAIUTIN (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) *Bulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 94, Aug. 1982, p. 121-123. In Russian. refs

A method is developed for the automatic stabilization of the perfusion pressure in the main arteries during changes in the blood flow velocity. The method utilizes a variable hydraulic resistance, whose value changes according to the blood flow rate in the artery, in series with the artery in order to achieve pressure stabilization in the artery. The application of this method to the femoral artery in cats showed that pressure stabilization could be provided for any pressure level from 10-200 mm Hg. N.B.

A83-10546

**THE USE OF CHROMATOGRAPHY FOR DETERMINING KALLIKREIN AND PREKALLIKREIN IN CANINE BLOOD SERUM [ISPOL'ZOVANIE KHROMATOGRAFICHESKOGO METODA DLIA OPREDELENIYA KALLIKREINA I PREKALLIKREINA V SYVOROTKE KROVI SOBAKI]**

V. L. DOTSENKO, V. N. SAIAPIN, E. A. NESHKOVA, and G. A. IAROVAIA (Tsentral'nyi Institut Uovershenstvovaniia Vrachei, Moscow, Volgogradskii Meditsinskii Institut, Volgograd, USSR) Aug. 1982 4 p refs In RUSSIAN

A83-10547

**AN INCREASE IN THE EFFECTIVENESS OF THE TRANSPLANTATION OF ALLOGENIC BONE MARROW [POVYSHENIE EFEKTIVNOSTI TRANSPLANTATSII ALLOGENNOGO KOSTNOGO MOZGA]**A. G. FEDOTENKOV, L. A. DANILOVA, and L. P. IGNASHEVA (Ministerstvo Zdravookhraneniia SSSR, Tsentral'nyi Institut Gematologii i Perelivaniia Krovi, Moscow, USSR) *Bulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 94, Aug. 1982, p. 104-108. In Russian. refs

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**A83-10548**

**THE SIGNIFICANCE OF CELLULAR CONTACTS FOR THE DIFFERENTIATION OF PRECURSOR CELLS OF HEMOPOIETIC STROMA IN LONG-TERM BONE MARROW CULTURES [ZNACHENIE KLETOCHNYKH KONTAKTOV DLIA DIFFERENTSIROVKI KLETOK-PREDSHESTVENNIKOV KROVETVORNOI STROMY V DLITEL'NYKH KUL'TURAKH KOSTNOGO MOZGA]**

O. A. GUREVICH, N. I. DRIZE, and I. L. CHERTKOV (Ministerstvo Zdravookhraneniia SSSR, Tsentral'nyi Institut Gematologii i Perelivaniia Krovi, Moscow, USSR) *Biulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 94, Aug. 1982, p. 97-100. In Russian refs

**A83-10549**

**THE EFFECT OF T-ACTIVIN AND HYDROCORTISONE ON TRANSPLANTATION IMMUNITY [VLIANIE T-AKTIVINA I GIDROKORTIZONA NA TRANSPLANTATSIONNYI IMMUNITET] V. F. SEMENKOV, A. N. CHEREDEEV, V. IA. ARION, and M. N. KOROTKOVA (II Moskovskii Meditsinskii Institut, Moscow, USSR) *Biulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 94, Aug. 1982, p. 84-86. In Russian refs**

**A83-10550**

**THE DISTRIBUTION OF FUNCTIONALLY DIFFERENT CELLS IN IMMUNOCOMPETENT ORGANS AFTER AN INJECTION OF HALOPERIDOL [RASPREDELЕНИЕ FUNKSIONAL'NO OTLICHAIUSHCHIKHSIA KLETOK V IMMUNOKOMPETENTNYKH ORGANAKH PRI VVEDENII GALOPERIDOLA]**

M. A. CHEIDO, G. V. IDOVA, and L. V. DEVOINO (Akademiia Meditsinskikh Nauk SSSR, Novosibirsk, USSR) *Biulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 94, Aug. 1982, p. 82-84. In Russian. refs

**A83-10551**

**A COMPARISON OF THE NEURAL AND IMMUNOLOGICAL MODULATOR PROPERTIES OF LOW MOLECULAR WEIGHT NEUROPEPTIDES [SOPOSTAVLENIE NEIRO- I IMMUNOMODULIATORNYKH SVOISTV NIZKOMOLEKULARNYKH NEIRODEPTIDOV]**

E. M. KUKAIN, R. K. MUTSENIETSE, and V. E. KLUSHA (Akademiia Nauk Latvskoi SSR, Institut Organicheskogo Sintez, Riga, Latvian SSR) *Biulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 94, Aug. 1982, p. 79-82. In Russian refs

The effect of several low molecular weight neuropeptides - leucine and methionine enkephalins, thyroliberin (TRH), and the C-terminal tripeptides gastrin (MAF) and oxytocin (TRH) - on the content of biogenic monoamines and their metabolites, as well as on the production of humoral antibodies to sheep red blood cells, was investigated. The action of these peptides was compared to that of peptide immunostimulant, tuftsin. Results show that all of these peptides, with the exception of tuftsin, affect the content of brain biogenic monoamines or their metabolites. In addition, upon intravenous injection these neuropeptides, except methionine enkephalin, are found to exert a modulating action on the immune response pattern and intensity. Leucine enkephalin, MIF, and MAF have immunostimulant activity similar to tuftsin, while TRH given in high doses (100-150 mg/kg) provokes an almost two-fold decrease in the antibody titer, and also has an immunosuppressant effect when administered both intravenously and intracisternally. It is concluded that the neural and immunological modulator effects have much in common at the level of cell receptors. N.B.

**A83-10552**

**THE PECULIARITIES OF DNA METABOLISM IN RAT BRAINS IN THE PROCESS OF THE ELABORATION OF A CONDITIONED REFLEX [OSOBENNOSTI METABOLIZMA DNK MOZGA KRYSA V PROTSESSE VYRABOTKI USLOVNOGO REFLEKSA]**

V. K. VASILEV and F. Z. MEERSON (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) *Biulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 94, Aug. 1982, p. 63, 64. In Russian. refs

The time course of the methylation and the repair synthesis of DNA in the large hemispheres was investigated in rats which had been trained to show a conditioned reflex of active avoidance. It is concluded that the reversible methylation of DNA, including the excision of 5-methylcytosine, participates in the expression of the genome of cells of higher organisms, in particular the genome of the cells of the cerebral cortex. In addition, it is proposed that the excision demethylation of brain DNA may play a role in the formation of the systemic structural track that forms the basis for temporary links. N.B.

**A83-10553**

**THE SIMULTANEOUS MEASUREMENT OF FOUR FUNCTIONAL PARAMETERS OF BLOOD PLATELETS [ODNOVREMENNAIA REGISTRATSIYA 4 FUNKSIONAL'NYKH PARAMETROV TROMBOTSITOV]**

R. A. MARKOSIAN, E. IA. POZIN, E. G. POPOV, Z. A. GABBASOV, and A. IU. RADIN (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) *Biulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 94, Aug. 1982, p. 123-125. In Russian.

A method is developed for the simultaneous measurement of four functional parameters of blood platelets - aggregation, cell shape, adenine nucleotide release, and the redistribution of intracellular  $Ca^{2+}$ . The method combines the parallel measurement of the aggregation and form together with the use of fluorescein dye, which is linked with intracellular  $Ca^{2+}$ . N.B.

**A83-10555**

**AN ANALYSIS OF THE PARAMETERS OF THE IMMUNOREACTIVE CURVE [ANALIZ PARAMETROV IMMUNOREAKTIVNOI KRIVOI]**

V. G. POPOV (Vsesoiuznyi Nauchno-Issledovatel'skii Biotekhnicheskii Institut, Moscow, USSR) *Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii*, Aug. 1982, p. 84-88. In Russian refs

A simple mathematical model of the vaccination process is developed on the basis of an analysis of the general principles of the interaction between the immune systems of macroorganisms and the causative agents of infective diseases. The parameters of this model can be used for developing objective and standard criteria for evaluating vaccines according to their immunogenicity, reactogenicity, and safety. It is also found to be expedient to use immunological curves for selecting the optimal method of vaccination, as well as for the comparative evaluation of the receptivity of various vaccinated objects to immunizing agents. N.B.

**A83-10556**

**IMMUNOBIOLOGICAL PROPERTIES OF TEICHOIC ACIDS [IMMUNOBIOLOGICHESKIE SVOISTVA TEIKHOEVYKH KISLOT]**

A. E. VERSHIGORA and V. K. POZUR (Kievskii Gosudarstvennyi Universitet, Kiev, Ukrainian SSR) *Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii*, Aug. 1982, p. 31-38. In Russian. refs

Data on the immunological properties of teichoic acids (TA) are reviewed, with emphasis on physical and chemical properties, the adsorption of TA on the surfaces of mammal cells, toxic properties, factors of nonspecific resistance, antibodies to TA, the effect on the immune response, and the sensitizing effect. It is noted that TA can enhance or inhibit the immune response to different antigens. Antibodies to TA can have either a damaging or protective effect. Investigations of human blood serum in the presence of antibodies to TA can be used for early diagnosis of staphylococcal infections. B.J.

A83-10560

**CONCERNING THE INTERRELATIONSHIP BETWEEN PROTEIN, FAT, AND CARBOHYDRATE METABOLISMS [K PROBLEME VZAIMOSVIAZI MEZH DU OBMENOM BELKOV, ZHIROV I UGLEVODOV]**

T. SH. SHARMANOV and E. K. MUKHAMEDZHANOV (Akademiya Meditsinskikh Nauk SSSR, Moscow, USSR) Voprosy Pitaniya, July-Aug 1982, p. 10-16. In Russian refs

Biochemical processes occurring in the human body in various physiological and pathological conditions are examined in terms of the relationship between protein, fat, and carbohydrate metabolisms, particularly in regard to the maintenance of glucose homeostasis. The influence of disruptions in this relationship on such diseases as diabetes and obesity is considered. Particular emphasis is placed on the role of the alanine-glucose cycle, and on the use of information about this cycle to predict biochemical changes in regard to the protein, fat, and carbohydrate metabolisms B.J.

A83-10561

**THE EFFECT OF MEBICAR ON PHYSICAL AND PSYCHOLOGICAL WORK CAPACITY [VLIANIE MEBIKARA NA FIZICHESKUIU I PSIKHICHESKUIU RABOTOSPOSOBNOST']**

I. E. ZIMAKOVA, A. M. KARPOV, and R. A. KAMBURG (Kazanskiy Meditsinskiy Institut, Kazan, USSR) Kazanskiy Meditsinskiy Zhurnal, vol. 63, July-Aug. 1982, p. 59-61. In Russian refs

Investigations of the effect of the tranquilizer mebicar on patients with neuroses and on healthy individuals, as well as in experiments with animals, show that this drug does not decrease the muscular strength and the physical work capacity of these subjects, and also does not disturb their motor coordination. Mebicar also normalizes the mental work capacity of individuals with low initial parameters of mental work capacity. Individual and long-term doses of this drug have only an insignificant effect on the blood pressure and the heart rate of the subjects tested. In addition, the effects of mebicar, as determined from a series of indicators, are found to be different from those of the benzodiazepan tranquilizers N.B.

A83-10916

**THE REGULATION OF ERYTHROPOIESIS /STATUS OF THE PROBLEM/ [REGULIATSIIA ERITROPOEZA /SOSTOIANIE PROBLEMY/]**

V. N. CHERNIGOVSKII and O. I. MOISEEVA (Akademiya Nauk SSSR, Institut Fiziologii, Leningrad, USSR) Uspekhi Fiziologicheskikh Nauk, vol. 13, Oct.-Dec 1982, p. 27-44. In Russian refs

Data on the influence of erythropoietin on the erythron under physiological conditions and in the presence of certain effects accompanying the activation and inhibition of erythropoiesis are surveyed. The role played by the functional interaction of systems figuring in the transport of oxygen and in the regulation of the endogenous erythropoietin level is analyzed. Attention is also given to the part played by mechanisms within the erythrocytes in changing the oxygen-binding properties of hemoglobin. The functional interaction of systems involved in the transport of oxygen is seen as having primary importance in the regulation of erythropoiesis. C.R.

A83-10917

**LONG-TERM POSTTETANIC POTENTIATION IN THE HIPPOCAMPUS [DLITEL'NAIA POSTTETANICHESKAIA POTENTSIATSIIA V GIPPOKAMPE]**

L. L. VORONIN (Akademiya Meditsinskikh Nauk SSSR, Moscow, USSR) Uspekhi Fiziologicheskikh Nauk, vol. 13, Oct.-Dec. 1982, p. 45-73. In Russian refs

The characteristics of long-term potentiation are described. These include significant duration, low-frequency depression and spontaneous restoration of the potentiated response, specificity with regard to the tetanized aditus, the necessity of activating a sufficient number of nerve elements, and the probable involvement of supporting systems in the brain during tetanization. It is shown that these properties not only distinguish hippocampal long-term

potentiation from the short-term posttetanic potentiation known for other formations, they also support the contention that the cellular mechanisms underlying long-term potentiation are identical with those at work in memory and conditioned reflex phenomena. C.R.

A83-10918

**MOLECULAR MECHANISMS FOR THE PARTICIPATION OF PEPTIDES IN THE FUNCTIONS OF NERVE CELLS [MOLEKULIARNYE MEKHAZIMY UCHASTIIA PEPTIDOV V FUNKTSIIAKH NERVNYKH KLETOK]**

S. A. OSIPOVSKII and M. M. POLESSKAIA (Akademiya Meditsinskikh Nauk SSSR, Moscow, USSR) Uspekhi Fiziologicheskikh Nauk, vol. 13, Oct.-Dec. 1982, p. 74-99. In Russian refs

Recent work on the mechanisms governing the action of certain oligopeptides on nerve cells and on the participation of these cells in the integration functions of neurons is surveyed. The molecular aspects of peptide action are discussed in relation to the views of P. K. Anokhin on the decisive importance of intracellular neurochemical processes in the integration action of a neuron. Arguments are presented to support the contention that peptides are agents ensuring both interneuronal and intraneuronal integration of qualitatively different signals arriving at a particular neuron. C.R.

A83-10919

**FIBRILLATION OF THE HEART AT LOW TEMPERATURES [FIBRILLIATSIIA SERDTSA PRI NIZKIKH TEMPERATURAKH]**

E. N. VAINER (Lipetskii Gosudarstvennyi Pedagogicheskii Institut, Lipetsk, USSR) Uspekhi Fiziologicheskikh Nauk, vol. 13, Oct.-Dec 1982, p. 100-119. In Russian refs

Theoretical and experimental data on the genesis and mechanisms of the fibrillation observed with hypothermia and with cardioplegia related to low temperatures are analyzed. It is noted that cold brings about noticeable changes in the functional state of the heart, especially as regards metabolic processes. In response to the nonuniformity of such changes, which are related to the temperature asymmetry of the heart, a functional and metabolic heterogeneity of myocardial cells is observed. A trigger zone able to spontaneously reproduce pulses is formed at the boundaries of the various regions. The pulses here act as a starting mechanism for fibrillation. A three-phase structure for the development of fibrillation is proposed. C.R.

A83-11033

**EXPECTED FREQUENCIES OF CODON USE AS A FUNCTION OF MUTATION RATES AND CODON FITNESSES**

G. B. GOLDING and C. STROBECK (Alberta, University, Edmonton, Canada) Journal of Molecular Evolution, vol. 18, Oct. 1982, p. 379-386. Natural Sciences and Engineering Research Council refs

(Contract NSERC-5546897)

A method is shown to determine the expected pattern of codon use for any given set of mutation rates between nucleotides and any set of fitnesses for the codons. If it is assumed that mutations to stop codons are lethal then those codons which can mutate in one step to a stop codon tend to be used less frequently. This tendency is however, a very small one and is not likely to be observable within a single gene. Nor is it necessarily a general tendency. For example, the leucine pretermination codons may be used preferentially when mutations to proline are deleterious. It is shown that different mutation rates (e.g., transitions occurring more frequently than transversions) may have as large an effect on codon usage as would strong selection for particular codons. For the model presented, an increase in the rate of transitions strongly decreases the expected frequency of UGG and CRR codons. Other codes are moderately affected by such a change in the mutation rates. Many other models can be examined using this method. (Author)

A83-11034

**AN EVOLUTIONARY MODEL FOR THE INSECT VITELLINS**

D. G. HARNISH and B. N. WHITE (Queen's University, Kingston, Ontario, Canada) *Journal of Molecular Evolution*, vol. 18, Oct. 1982, p. 405-413. refs

Insects can be divided into three groups based on the sizes of the polypeptide constituents of their vitellogenins and vitellins. In order to determine the relationships between these groups, antisera to the vitellins of seven insects from six taxonomic orders were used to assess immunological cross-reactivity. Antigenic relatedness was observed only between vitellins from species within the same family. Amino acid compositional data for vitellins from nine species were used to assess homology by difference matrices. The S Delta Q values were similar for both intra-order and inter-order comparisons and strongly suggested relatedness. The S Delta n comparisons supported the immunological data that indicated that the vitellins were evolving rapidly. For most insect vitellins there are two distinct size classes of polypeptides that seem to be derived from a single asymmetric proteolytic cleavage of a precursor. A model is proposed that suggests that the different size polypeptides represent distinct domains and that in the evolution of the vitellogenin genes of the Diptera and Hymenoptera there has been domain elimination. (Author)

A83-11390

**THE PATHOLOGICAL ANATOMY OF SHOCK LUNG [K PATOLOGICHESKOI ANATOMII SHOKOVOGO LEGKOGO]**

I. K. ESIPOVA, N. M. KHARCHENKO, A. L. VLADIMIRTSEVA, and S. P. BOIKOVA (Universitet Druzhby Narodov, Moscow, USSR) *Arkhiv Patologii*, vol. 44, no. 8, 1982, p. 43-47. In Russian. refs

A83-11394

**ELECTRON-MICROSCOPIC ASPECTS OF THE SELECTION OF ULTRASOUND INTENSITY IN ULTRASONIC THERAPY [ELEKTRONNO-MIKROSKOPICHESKIE ASPEKTY PODBORA INTENSIVNOSTI UL'TRAZVUKA PRI UL'TRAZVUKOVOI TERAPII]**

IA. G. BIK (L'vovskii Gosudarstvennyi Meditsinskii Institut, Lvov, Ukrainian SSR) *Voprosy Kurortologii, Fizioterapii i Lechebnoi Fizicheskoi Kul'tury*, July-Aug. 1982, p. 47-49. In Russian. refs

A83-11398

**THE COMBINED ACTION OF PHYSICAL FACTORS OF GASES RELEASED FROM POLYMERS USED ON SHIPS [KOMBINIROVANNOE I SOCHETANNOE DEISTVIE FIZICHESKIKH FAKTOROV GAZOVYDELENII IZ POLIMERNYKH MATERIALOV NA SUDAKH]**

IA. G. DVOSKIN (Ministerstvo Zdravookhraneniia SSSR, Nauchno-Issledovatel'skii Institut Gigieny Vodnogo Transporta, Moscow, USSR) *Gigiena i Sanitaria*, Aug. 1982, p. 17-20. In Russian.

The separate and joint action of complex polymers used in ship-building was investigated on white rats in combination with the effects of a water temperature of 28 + or - 2 C and a noise level of 85 dB(A). Results show that the gases released from these polymers were hazardous to the health of the animals, and that both the temperature and noise heightened the effect of the gases more than the action of the polymers alone. The joint action of the polymers and the physical factors was found to be generally similar to their separate effects. It is concluded that the absence of an additive effect shows that physical factors have a greater influence on the animals than chemical factors. N.B.

A83-11401

**METHODS FOR STUDYING THE SURVIVAL CAPACITY OF MICROORGANISMS IN WATER RESERVOIRS [O METODIKE IZUCHENIIA ZHIZNESPOSOBNOSTI MIKROORGANIZMOV V VODOEME]**

V. V. ALESHNIA, A. A. TSATSKA, V. V. VLODAVETS, and E. P. ALESHNIA (Rostovskii-na-Don' Nauchno-Issledovatel'skii Institut Epidemiologii, Mikrobiologii i Gigieny, Rostov-on-Don; Moskovskii Nauchno-Issledovatel'skii Institut Gigieny, Moscow, USSR) *Gigiena i Sanitaria*, Aug. 1982, p. 55-57. In Russian

A83-11406

**THE ROLE OF FC-RECEPTORS OF LYMPHOCYTES, MACROPHAGES, AND OTHER MAMMALIAN CELLS DURING THE IMMUNE PROCESSES [ROL' FC-RECEPTOROV LIMFOTSITOV, MAKROFAGOV I DRUGIKH KLETOK MLEKOPITAIUSHCHIKH PRI IMMUNNYKH PROTSESSAKH]**

I. M. LIAMPERT (Akademii Meditsinskikh Nauk SSSR, Moscow, USSR) *Uspekhi Sovremennoi Biologii*, vol. 94, July-Aug. 1982, p. 67-82. In Russian. refs

A83-11407

**THE COMPLEMENT AND ITS ROLE IN THE REGULATION OF IMMUNOLOGICAL REACTIONS [KOMPLEMENT I EGO ROL' V REGULIATSII IMMUNOLOGICHESKIKH REAKTSII]**

N. I. BAKHOV and V. M. ZEMSKOV (Akademii Meditsinskikh Nauk SSSR, Moscow, USSR) *Uspekhi Sovremennoi Biologii*, vol. 94, July-Aug. 1982, p. 51-66. In Russian. refs

Recent data about the cascade reactions of the classical and the alternate paths for the activation of the complement are reviewed. The processes for the formation of the cytolytic structures on the surfaces of the target cells which lead to the death of these cells are examined in detail. Also discussed are the role of the complement in the regulation of immunological reactions, the solubilization of the immune complexes by the complement and its mechanism, and the identity and biological significance of the solubilization of the immune complexes in the body. N.B.

A83-11408

**IMMUNOGLOBULIN GENES [GENY IMMUNOGLOBULINOV]**

E. V. SIDOROVA (Akademii Meditsinskikh Nauk SSSR, Moscow, USSR) *Uspekhi Sovremennoi Biologii*, vol. 94, July-Aug. 1982, p. 38-50. In Russian. refs

The structures of the immunoglobulin molecules and the genes which code for the light and the various heavy chains of immunoglobulins are reviewed. The mechanisms of the recombination of the DNA segments, which participate in forming the complete expression of the immunoglobulin genes, are examined. Also considered are the mechanisms for the switching of the synthesis of immunoglobulin heavy chains from one class to another, and the methods for the realization of genetic information. N.B.

A83-11518

**AN INVESTIGATION OF THE ROLE OF DEEP BRAIN STRUCTURES IN THE REGULATION OF INTRACEREBRAL MICROCIRCULATION [IZUCHENIE ROLI GLUBINNYKH MOZGOVYKH STRUKTUR V REGULIATSII INTRATSEREBRAL'NOI MIKROTSIRKULIATSII]**

A. V. SHOTTER and P. O. ROOSAAR (Tartuskii Gosudarstvennyi Universitet, Tartu, Estonian SSR) *Fiziologicheskii Zhurnal SSSR*, vol. 68, Sept. 1982, p. 1196-1205. In Russian. refs

The effect of electrical stimulation on the diameters of the microvessels of the rabbit cerebral cortex, thalamus, hypothalamus, septum pellucidum, amygdala, hippocampus, and globus pallidus were investigated in order to determine the vasomotor reactions of the microcirculatory bed of the cerebral cortex. Results show that stimulation of the amygdala elicited vasoconstrictive reactions, while the stimulation of the hypothalamus and septum pellucidum produced vasodilative reactions. The stimulation of the thalamus, hippocampus, and globus pallidus caused a vasoconstriction in the motor cortex and a vasodilation in the subcortex. It is concluded

that deep brain structures participate in the regulation of the microcirculation of the brain. N.B.

**A83-11519**  
**INTRACEREBROVENTRICULAR INJECTIONS OF CHOLECYSTOKININ DECREASES THE ACTIVITY OF THE DOPAMINERGIC AND SEROTONINERGIC SYSTEMS IN THE BRAIN [INTRATSEREBROVENTRIKULIARNOE VVEDENIE KHOLESISTOKININA UGNETAET AKTIVNOST' DOFAMIN- I SEROTONINERGIKESKOI SISTEM MOZGA]**  
 E. E. VASAR, M. IA. OTTER, and L. K. RIAGO (Tartuskii Gosudarstvennyi Universitet, Tartu, Estonian SSR) Fiziologicheskii Zhurnal SSSR, vol. 68, Sept. 1982, p. 1218-1222. In Russian refs

**A83-11520**  
**THE EFFECT OF CHOLINESTERASE INHIBITORS ON THE ELECTRICALLY EXCITABLE MEMBRANES OF FROG MUSCLE FIBERS [O VLIANII ANTIKHOLINESTERAZNYKH PREPARATOV NA ELEKTROVOZBUDIMUIU MEMBRANU MYSHECHNOGO VOLOKNA LIAGUSHKI]**  
 I. A. SHABUNOVA, I. I. KRIVOI, V. I. KULESHOV, V. I. SANOTSKII, and D. P. MATIUSHKIN (Leningradskii Gosudarstvennyi Universitet, Leningrad, USSR) Fiziologicheskii Zhurnal SSSR, vol. 68, Sept. 1982, p. 1223-1228. In Russian. refs

**A83-11521**  
**THE ANTIHYPOXIC EFFECTIVENESS OF ALIMENTARY FASTING [ANTIGIPOKSICHESKAIA EFFEKTIVNOST' ALIMENTARNOGO GOLODANIIA]**  
 A. IU. KATKOV (Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR) Fiziologicheskii Zhurnal SSSR, vol. 68, Sept. 1982, p. 1282-1286. In Russian refs

The effect of alimentary fasting for 14 days on the endurance to acute hypoxia (until a breathing standstill of up to 10 sec) was investigated in experiments on cats during exposures to pressures equivalent to an altitude of 12,000 m. In addition, the effect of alimentary fasting on the writing performance of seven humans while breathing nitrogen was studied. Results show that the fasting increased the reserve time for these subjects during conditions of acute hypoxia by more than a factor of two. After subsequent feeding, the acquired resistance to hypoxia was lost. It is concluded that the main physiological mechanisms responsible for the large antihypoxic effectiveness of alimentary fasting are related to a decrease in the oxygen consumption of the subjects and also to the delayed release of oxygen during acute hypoxic conditions.

N.B.

**A83-11522**  
**CHANGES IN THE DEPTH OF MODULATION OF SPATIAL GRATINGS FOR THE DETERMINATION OF THE CONTRAST SENSITIVITY OF RECEPTOR FIELDS [IZMENENIE GLUBINY MODULIATSII PROSTRANSTVENNYKH RESHETOK DLIA OPREDELENIIA KONTRASTNOI CHUVSTVITEL'NOSTI RETSCEPTIUNYKH POLEI]**  
 IU. I. LEVKOVICH (Akademiiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR) Fiziologicheskii Zhurnal SSSR, vol. 68, Sept. 1982, p. 1300-1303. In Russian. refs

A method is developed for reproducing on photographic film the spatial gratings with sinusoidal changes of the optical density, which are used in experiments of the spatial-frequency filtration in the neural receptor fields of the visual cortex of cats, as well as for the determination of their contrast sensitivity. This method can be used for the preparation of any half-tinted picture of several gradations of contrast taken from one original. N.B.

**A83-11632**  
**FORMATION AND CATALYTIC ACTIVITY OF HIGH MOLECULAR WEIGHT SOLUBLE POLYMERS PRODUCED BY HEATING AMINO ACIDS IN A MODIFIED SEA MEDIUM**  
 H. OKIHANA (St. Marianna University, Sugao, Japan) Origins of Life, vol. 12, June 1982, p. 153-163. refs

**A83-11633**  
**EVOLUTIONARY ROOTS OF CATALYSIS BY NICOTINAMIDE AND FLAVINS IN C-H OXIDOREDUCTASES AND IN PHOTOSYNTHESIS**  
 C. M. VISSER Origins of Life, vol. 12, June 1982, p. 165-179. refs

The evolutionary information obtained from sequencing proteins and RNA's fades out completely for early periods in evolution. Information for tracing evolution even further could stem from the analysis of coenzyme mechanisms. Likewise, placing cofactors in their proper evolutionary context gives new hints concerning their actual mechanisms of catalysis (Author)

**A83-11634**  
**THE POSSIBLE ROLE OF ASSIGNMENT CATALYSTS IN THE ORIGIN OF THE GENETIC CODE**  
 V. BEDIAN (New York, State University, Buffalo, NY) Origins of Life, vol. 12, June 1982, p. 181-204. refs

A model is presented for the emergence of a primitive genetic code through the selection of a family of proteins capable of executing the code and catalyzing their own formation from polynucleotide templates. A kinetic description of a system of assignment catalysts is constructed, such that assignment probabilities are expressed in terms of concentrations and activities of existing catalysts, and all possible codes are explicitly accounted for. It is assumed that the primitive code recognized only a few amino acids and codons. The polynucleotide-based production of polypeptides maintains colinearity between template and product, but does not necessarily maintain a coded relationship between codons and amino acids. The model is analytically applied to the simple case of two letter codon and amino acid alphabets. A linear decay term represents nonspecific hydrolysis, and a constant production term represents the contribution from random processes. An explicit expression is derived for the fraction of polypeptides produced along the template that satisfy the structural requirements for the desired functional protein. C.D.

**A83-11635**  
**REMARKS ON ORIGINS OF BIOMOLECULAR ASYMMETRY**  
 L. WEI-MIN (Chinese Academy of Sciences, Biochemistry Institute, Shanghai, People's Republic of China) Origins of Life, vol. 12, June 1982, p. 205-209. refs

A simple criterion for mirror symmetry breaking in a non-linear chemical system is presented. The selection effect of external asymmetric agents in the process of generation and amplification of biomolecular asymmetry is studied. It is pointed out that this effect will play an important role at bifurcation point, but when the asymmetry of a system has been amplified to a certain extent, a weak asymmetric agent will no longer be able to change the chirality of the system. (Author)

**A83-11636**  
**AMINO ACIDS FROM THE LATE PRECAMBRIAN THULE GROUP, GREENLAND**  
 M. AKIYAMA, A. SHIMOYAMA, and C. PONNAMPERUMA (Maryland, University, College Park, MD) Origins of Life, vol. 12, June 1982, p. 215-227. refs  
 (Contract NSF DPP-79-00991-A01)

Amino acids were recovered at a concentration level of 10 to the -9th M/g from the interior of chert and dolomite of the Late Precambrian Thule Group. Examination of the stability of amino acids in chert under dry-heating conditions suggests that these amino acids have been preserved with a predominance of L-enantiomers in the Precambrian chert. Enantiomer analysis of amino acids in dolomite showed a thermal effect resulting from a late Precambrian igneous intrusion. This evidence indicates that the amino acids isolated from the Thule samples were chemical fossils and not recent contaminants. (Author)

A83-11650

**DISTURBANCE OF CELL DIFFERENTIATION DURING MICROSPOROGENESIS IN TRADESCANTIA PALUDOSA DUE TO THE CHANGE IN ORIENTATION OF THE MITOTIC SPINDLE IN THE FIRST POSTMEIOTIC MITOSIS UNDER THE EFFECT OF SPACE FLIGHT FACTORS [NARUSHENIE DIFFERENTSIROVKI KLETOK PRI MIKROSPOROGENEZE U TRADESCANTIA PALUDOSA VSLEDSTVIE IZMENENIIA ORIENTATSII MITOTICHESKOGO VERETENA V PERVOM POSTMEIOTICHESKOM MITOZE PRI VOZDEISTVII FAKTOROV KOSMICHESKOGO POLETA]**

N. L. DELONE and V. V. ANTIPOV (II Moskovskii Gosudarstvennyi Meditsinskii Institut, Moscow, USSR) Akademiia Nauk SSSR, Doklady, vol. 266, no. 2, 1982, p. 507, 508. In Russian. refs

A83-11661

**HEART AND LIVER ENERGETICS IN MOUNTAIN VOLES OF THE GENUS MICROTUS JULDASCHI-CARRUTHERSI /MAMMALIA/ [ENERGETIKA SERD TSA I PECHENI GORNYKH POLEVOK GRUPPY MICROTUS JULDASCHI-CARRUTHERSI /MAMMALIA/]**

V. N. BOLSHAKOV and L. A. KOVALCHUK (Akademiia Nauk SSSR, Institut Ekologii Rastenii i Zhivotnykh, Sverdlovsk, USSR) Akademiia Nauk SSSR, Doklady, vol. 266, no. 3, 1982, p. 748-752 In Russian. refs

The heart and liver energetics of mountain voles have been investigated under the conditions of acute and chronic hypoxia. The species studied were represented by animals from three different mountain systems, those from Lake Kara Kul area, Pamirs, 3900 m asl, Ala Tau, 3000 m asl, and Turkestan, 3300 m asl. Analysis of the data obtained, combined with the results of craniological, chromosome, morphological, morphophysiological, and metabolic studies, indicate that the species from Ala Tau is essentially different from the other two species which are very similar to each other. V.L.

**A83-11823\*** State Univ of New York, Stony Brook  
**CLONING HIGHER PLANTS FROM ASEPTICALLY CULTURED TISSUES AND CELLS**

A. D. KRIKORIAN (New York, State University, Stony Brook, NY) Biological Reviews, vol. 57, 1982, p. 151-218. refs (Contract NSG-7270)

A review of aseptic culture methods for higher plants is presented, which focuses on the existing problems that limit or prevent the full realization of cloning plants from free cells. It is shown that substantial progress in clonal multiplication has been made with explanted stem tips or lateral buds which can be stimulated to produce numerous precocious axillary branches. These branches can then be separated or subdivided and induced to root in order to yield populations of genetically and phenotypically uniform plantlets. Similarly, undifferentiated calluses can sometimes be induced to form shoots and/or roots adventitiously. Although the cell culture techniques required to produce somatic embryos are presently rudimentary, steady advances are being made in learning how to stimulate formation of somatic or adventive embryos from totipotent cells grown in suspension cultures. It is concluded that many problems exist in the producing and growing of totipotent or morphogenetically competent cell suspensions, but the potential benefits are great. N.B.

**A83-11827\*** Jet Propulsion Lab., California Inst of Tech., Pasadena.

**APPLICATIONS OF MUTANT YEAST STRAINS WITH LOW GLYCOGEN STORAGE CAPABILITY**

G. R. PETERSEN, W. W. SCHUBERT, and B. O. STOKES (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA) Biotechnology and Bioengineering Symposia, no. 11, 1981, p. 631-639. NASA-supported research. refs

Several strains of *Hansenula polymorpha* were selected for possible low glycogen storage characteristics based on a selective I2 staining procedure. The levels of storage carbohydrates in the mutant strains were found to be 44-70% of the levels in the parent strain for cultures harvested in stationary phase. Similar

differences generally were not found for cells harvested in exponential phase. Yeast strains deficient in glycogen storage capability are valuable in increasing the relative protein value of microbial biomass and also may provide significant cost savings in substrate utilization in fermentative processes. (Author)

**A83-11834\*** San Jose State Univ., Calif.  
**IS CELL AGING CAUSED BY RESPIRATION-DEPENDENT INJURY TO THE MITOCHONDRIAL GENOME**

J. E. FLEMING, L. S. YENGOYAN (San Jose State University, San Jose, CA), J. MIQUEL (NASA, Ames Research Center, Moffett Field, CA), S. F. COTTRELL (Brooklyn College, Brooklyn, NY), and A. C. ECONOMOS (Louvain, Universite Catholique, Louvain-la-Neuve, Belgium) Gerontology, vol. 28, 1982, p. 44-53. refs

Though intrinsic mitochondrial aging has been considered before as a possible cause of cellular senescence, the mechanisms of such mitochondrial aging have remained obscure. In this article, the hypothesis of free-radical-induced inhibition of mitochondrial replenishment in fixed postmitotic cells is expanded. It is maintained that the respiration-dependent production of superoxide and hydroxyl radicals may not be fully counteracted, leading to a continuous production of lipoperoxides and malonaldehyde in actively respiring mitochondria. These compounds, in turn, can easily react with the mitochondrial DNA which is in close spatial relationship with the inner mitochondrial membrane, producing an injury that the mitochondria may be unable to counteract because of their apparent lack of adequate repair mechanisms. Mitochondrial division may thus be inhibited leading to age-related reduction of mitochondrial numbers, a deficit in energy production with a concomitant decrease in protein synthesis, deterioration of physiological performance, and, therefore, of organismic performance. (Author)

A83-11835

**PLANTS, GRAVITY, AND MECHANICAL STRESSES**

F. B. SALISBURY (Utah State University of Agriculture and Applied Science, Logan, UT), R. M. WHEELER (U.S. Forest Service, Intermountain Station, Logan, UT), J. E. SLIWINSKI, and W. J. MUELLER (Utah Science, Spring 1982, p. 14-21. refs

A review of recent research about the effects of gravity on plants is presented, which focuses on the problems of mechanical stresses for the simulation of weightless conditions. In order to test whether leaf flopping on a clinostat produces a mechanical stress that causes the production of ethylene, which in turn causes leaf epinasty, experiments were conducted in which ethylene production was inhibited, mechanical stresses approximately equal to those caused by leaf flopping on a clinostat were produced, and by the reduction of mechanical stresses of leaf flopping without eliminating gravity compensation. Among other results, it was found that ethylene seems to be involved in gravitropic bending as well as in clinostat-induced leaf epinasty; ethylene production increases on the bottom of a horizontal stem during bending, but stays the same on the top as for vertical nonbending stems; and more ethylene appears on the bottom of horizontal stems than on the top. In addition, it is shown that the stem perceives gravity in the part that is capable of bending. N.B.

A83-11836

**HOW STEMS BEND UP**

F. B. SALISBURY (Utah State University of Agriculture and Applied Science, Logan, UT), J. E. SLIWINSKI, W. J. MUELLER, and C. S. HARRIS (Utah Science, Summer 1982, p. 42-49. refs

The results of experiments to determine the source of plant gravitropism are reported. The investigation was pursued to identify the means by which vegetation perceives its orientation in a gravity field, communicates the data to the plant cells, and responds by bending. Initial trials eliminated the possibility that the tension/compression of top and bottom cells, respectively, of a plant forced to bend over caused the stem to reorient itself upwards. Growth was found to continue if the plant was restrained from standing upright, although growth of cells in specific areas of the plants altered their rate of growth during and after restraint. Growing

cells were found to actually elongate, and studies were performed to find the relationship between amyloplast location in different plant orientations and plant orientation. It was observed that the amyloplasts in the starch sheath on the top of a cell fall toward cell walls that neighbor conducting cells, while amyloplasts on the bottom of a cell in a leafy stem fall toward the cortex cells. Cells on the bottom of a restrained stem then continue to grow, allowing the stem to curve upward. M.S.K.

**A83-11876**  
**THE EFFECT OF SOLAR ACTIVITY ON THE BIOSPHERE [VLIANIE SOLNECHNOI AKTIVNOSTI NA BIOSFERU]**  
 M. N. GNEVYSHEV, (ED.) and I. A. OL. Moscow, Izdatel'stvo Nauka (Problemy Kosmicheskoi Biologii. Volume 43), 1982. 233 p. In Russian.

Results of investigations concerning the effects of solar activity on the biosphere of the earth are presented. The first section contains clinical-statistical studies of the influence of natural geomagnetic disturbances caused by solar activity on humans. In the second section, the effects on animals of artificial electromagnetic fields that are analogous in their frequencies and field strengths to natural geomagnetic disturbances are investigated. In the final section, various possible mechanisms for a linkage of solar and biological effects are examined, as well as experiments with solutions which are related to these mechanisms. Also considered are methods for the selection of time periods which can be used for investigations of the solar-biological linkages, and the methods for the evaluation of the results obtained through these approaches. N.B.

**A83-11877**  
**INVESTIGATIONS OF ADAPTATION AND SOLAR ACTIVITY [VOPROSY ADAPTATSII I SOLNECHNAIA AKTIVNOST']**  
 K. F. NOVIKOVA, V. M. BIAKOV, I. P. MIKHEEV, N. P. POVOLOTSKAIA, N. P. TOLKACHEVA, and L. I. PLIUTO. In: The effect of solar activity on the biosphere. Moscow, Izdatel'stvo Nauka, 1982, p. 9-47. In Russian. refs

The influence of solar activity on the human body, sensitized by the transformations that occur in new climatic conditions, and the use of local environmental factors in healing treatments are examined. Results of clinical and physiological investigations of the processes of adaptation, along with medical and statistical data, are presented. Among other results, it is shown that the incidence of illness and death from cardiac infarcts increases during periods of magnetic activity, the fibrinolytic activity of blood decreases and the contractile capability of the heart weakens during periods of geomagnetic perturbations, the thermal balance of patients reacts sensitively to geomagnetic perturbations, solar-physiological factors participate in the formation of temporary circadian and seasonal rhythms in the human body, and geomagnetic activity has a distinct influence on the energy metabolism in humans. N.B.

**A83-11881**  
**THE EFFECT OF THE SOLAR-GEOMAGNETIC SITUATION ON MONOLAYERS OF CELLS AND THE DISTANT INTERCELLULAR INTERACTIONS AT HIGH LATITUDES [VLIANIE GELIOGEOMAGNITNOI OBSTANOVKI NA MONOSLOI KLETOK I DISTANTNYE MEZHKLETOCHNYE VZAIMODEISTVIA V USLOVIAKH VYSOKIKH SHIROT]**  
 V. P. KAZNACHEEV, L. P. MIKHAILOVA, I. F. RADAIEVA, K. F. NOVIKOVA, B. M. VLADIMIRSKII, I. V. NEMTSOV, M. P. IVANOVA, and A. V. MATASOVA. In: The effect of solar activity on the biosphere. Moscow, Izdatel'stvo Nauka, 1982, p. 63-73. In Russian. refs

The vital activity of monolayers of identical cells, the peculiarities of their growth, and the appearance of distant intercellular interactions were compared in Norilsk and Novosibirsk, USSR, with the occurrence of solar-geomagnetic phenomena. It was found that a correlation exists between biological processes on the cellular level and the parameters of solar-geomagnetic situations, the time and location of the experiment, the K index, the sign of the interplanetary magnetic field, and the index of solar flares. In

addition, the effects of solar magnetic activity on parameters of cell growth, development, and viability were found to be more pronounced for cells in experiments conducted in Norilsk than for those in Novosibirsk, which is located at a lower latitude. N.B.

**A83-11883**  
**LOW-STRENGTH ULF MAGNETIC FIELDS AND THE CONDITION OF THE ADAPTIVE RESERVE IN EXPERIMENTAL ANIMALS [MAGNITNOE POLE SVERKHNIZKIKH CHASTOT MALYKH NAPRIAZHENNOSTEI I SOSTOIANIE ADAPTATSIONNOGO REZERVA U PODOPYTNYKH ZHIVOTNYKH]**  
 N. I. MUZALEVSKAIA. In: The effect of solar activity on the biosphere. Moscow, Izdatel'stvo Nauka, 1982, p. 82-98. In Russian. refs

The effects of low-strength ULF magnetic fields, which imitate disturbances of the geomagnetic field, on the most important systems in the regulation of homeostasis (the central nervous system, the neuroendocrine system, and the blood) are investigated. Experiments on male white rats and rabbits show that these fields primarily affect the systems which participate in the regulation of homeostasis, and also lower the adaptive reserves of the animals. It is concluded that these fields can be considered a significant adaptive load for humans and that they can be viewed as a risk factor. N.B.

**A83-11884**  
**THE CHANGES IN THE NERVE AND CARDIAC ACTIVITY IN ANIMALS OF VARIOUS AGES DURING THE APPLICATION OF ELECTROMAGNETIC FIELDS OF LOW FREQUENCY AND LOW VOLTAGE [IZMENENIIA NERVNOI I SERDECHNOI DEIATEL'NOSTI U ZHIVOTNYKH RAZLICHNOGO VOZRASTA PRI VOZDEISTVII ELEKTROMAGNITNYMI POLIAMI NIZKOI CHASTOTY I MALOI NAPRIAZHENNOSTI]**  
 A. M. VOLYNSKII. In: The effect of solar activity on the biosphere. Moscow, Izdatel'stvo Nauka, 1982, p. 98-108. In Russian. refs

**A83-11885**  
**THE BIOLOGICAL EFFECT OF NONIONIZING RADIATION AND THE QUESTION OF THE EFFECT OF SOLAR ACTIVITY ON ORGANISMS [BIOLOGICHESKOE DEISTVIE NEIONIZIRUIUSHCHEI RADIATSII I PROBLEMA VLIANIIA SOLNECHNOI AKTIVNOSTI NA ORGANIZMY]**  
 I. N. ACHKASOVA, N. I. BRYZGUNOVA, L. I. KLIMENKO, and N. P. NOVGORODOV. In: The effect of solar activity on the biosphere. Moscow, Izdatel'stvo Nauka, 1982, p. 109-116. In Russian. refs

The effects of magnetic field frequencies at field strengths similar to those occurring in nature on the reproduction and metabolism of large microorganisms are investigated using the intestinal bacillus *E. coli* as a representative microorganism. Results show that the greatest effect of the magnetic fields was an inhibition of the rate of reproduction at field frequencies of 0.01, 1, and 6 Hz. It is concluded that the conditions of these experiments mimic the action of geomagnetic pulsations of the Pc-4 type. N.B.

**A83-11886**  
**AN INVESTIGATION OF THE FREQUENCY DEPENDENCE OF THE BIOLOGICAL EFFECTIVENESS OF A MAGNETIC FIELD IN THE RANGE OF THE MICROPULSATIONS OF THE GEOMAGNETIC FIELD /0.01-100 HZ/ [ISSLEDOVANIE CHASTOTNOI ZAVISIMOSTI BIOLOGICHESKOI EFFEKTIVNOSTI MAGNITNOGO POLIA V DIAPAZONE MIKROPUL'SATSI GEOMAGNITNOGO POLIA /0,01-100 GTS/]**  
 V. B. MAKEEV and N. A. TEMURIANTS. In: The effect of solar activity on the biosphere. Moscow, Izdatel'stvo Nauka, 1982, p. 116-128. In Russian. refs

The effect of magnetic fields which imitate the pulsations of the geomagnetic field on male white rats is investigated. Results show that the effect of an artificial magnetic field of 0.02 Hz produces an increase in the nonspecific resistance of the animals, but an 8 Hz magnetic field gives rise to the opposite changes. At frequencies of 0.5-0.6 and 9-10 Hz, changes were observed only

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in individual parameters of the nonspecific resistance. It is concluded that these experiments using the frequencies and intensities characteristic for the natural pulsations of the geomagnetic field show the biochemical significance of geomagnetic pulsations. N.B.

### A83-11887

#### THE BIOLOGICAL EFFECTIVENESS OF A WEAK ELECTROMAGNETIC FIELD OF INFRALOW FREQUENCY [O BIOLOGICHESKOI EFFEKTIVNOSTI SLABOGO ELEKTROMAGNITNOGO POLIA INFRANIZKOI CHASTOTY]

N. A. TEMURIANTS In: The effect of solar activity on the biosphere. Moscow, Izdatel'stvo Nauka, 1982, p. 128-139. In Russian. refs

The biological effects of electromagnetic fields having a frequency of 8 Hz and field strengths of 0.07-7 V/m on the peripheral blood of young and adult animals (dogs and rabbits) are investigated, using single, multiple, and continuous exposures of the animals to the electromagnetic fields. Results show that the effects of the electromagnetic fields give rise to reversible changes of the correlations of the various white blood cells, and decreases in the activity of the oxidation-reduction enzymes and alkaline phosphatase, as well as decreases in the content of glycogen in the animals. N.B.

### A83-11888

#### THE PATHOLOGICAL AND ANATOMICAL CHARACTERISTICS OF EXPERIMENTAL MYOCARDIAL INFARCTION UNDER THE EFFECT OF ELECTROMAGNETIC FIELDS OF LOW FREQUENCIES AND LOW STRENGTHS [PATOLOGOANATOMICHESKAIA KHARAKTERISTIKA EKSPERIMENTAL'NOGO INFARKTA MIOKARDA V USLOVIYAKH VOZDEISTVIA ELEKTROMAGNITNYKH POLEI NIZKOI CHASTOTY I MALOI NAPRIAZHENNOSTI]

V. A. ARTISHCHENKO, S. A. VINOGRADOV, A. M. VOLYNSKII, and V. G. PEREDERII In: The effect of solar activity on the biosphere. Moscow, Izdatel'stvo Nauka, 1982, p. 139-147. In Russian. refs

The effects of an electromagnetic field at a frequency of 8 Hz and a field strength of 0.8 V/m on the development of experimentally induced myocardial infarctions were investigated using guinea pigs and rabbits as the experimental animals. The effect of such an electromagnetic field on the myocardium resulted in the development of dystrophic necrobiotic processes in the experimental animals, even up to necrosis. These processes were characterized by the vacuolization of the cytoplasm of the muscle fibers, and a functional degeneration which resulted in the destruction of the structures and the lysosomes of the individual muscle cells. These processes were expressions of the edema of the interstitial tissues due to peripheral infarctions and the plasmatic saturation of the vascular walls. N.B.

### A83-11889

#### THE REACTION OF A BIOLOGICAL SYSTEM TO ADEQUATE OR WEAK LOW-FREQUENCY ELECTROMAGNETIC FIELDS [REAKTSII BIOLOGICHESKOI SISTEMY NA ADEKVATNYE EI SLABYE NIZKOCHASTOTNYE ELEKTROMAGNITNYE POLIA]

L. D. KISLOVSKII In: The effect of solar activity on the biosphere. Moscow, Izdatel'stvo Nauka, 1982, p. 148-166. In Russian. refs

Biological systems of widely varying complexities (from isolated mitochondria up to whole organisms and populations of organisms) are found to show an identical nonlinear phase response to aging stimuli. It is found that the longer the time a system exists in an excited condition, the greater the potential sensitivity of the system to weak signals. The cooperativeness of the system, extending the time of the excited condition, increases the sensitivity of the system. Aqueous systems of organisms are essentially cooperative. It is shown in what way these systems may play a key role in the reaction of organisms to weak low-frequency fields. N.B.

### A83-11890

#### THE SOLAR-TERRESTRIAL LINKS IN BIOLOGY AND THE PHENOMENON OF FREQUENCY 'CAPTURE' [SOLNECHNO-ZEMNYE SVIAZI V BIOLOGII I IAVLENIE 'ZAKHVATA' CHASTOTY]

B. M. VLADIMIRSKII In: The effect of solar activity on the biosphere. Moscow, Izdatel'stvo Nauka, 1982, p. 166-174. In Russian. refs

A high degree of correlation of the statistics of the incidence of infectious diseases and several other phenomena has been found with the cyclical variations of solar activity, but these correlations are difficult to find in the indices of the solar activity itself. Results show that these phenomena may be interpreted with the help of the nonlinear theory of oscillations as a frequency 'capture' which occurs at the higher harmonics. This hypothesis explains not only the coincidence of periods of macrorhythms of various biological phenomena with oscillations in the outer environment, but also the high sensitivity of organisms to the periodic effects of frequencies which are similar to the frequencies of important biological oscillations. N.B.

### A83-11891

#### ATMOSPHERIC INFRASOUND AS A POSSIBLE FACTOR IN THE TRANSFERRING OF THE EFFECT OF SOLAR ACTIVITY TO THE BIOSPHERE [ATMOSFERNYI INFRAZVUK KAK VOZMOZHNYI FAKTOR, PEREDAUSHCHII VLIANIE SOLNECHNOI AKTIVNOSTI NA BIOSFERU]

B. M. VLADIMIRSKII In: The effect of solar activity on the biosphere. Moscow, Izdatel'stvo Nauka, 1982, p. 174-179. In Russian. refs

The changes in the level of atmospheric acoustical noise at very low frequencies (1 Hz), infrasonic oscillations of natural origins, are shown to be linked with variations of solar activity. Especially closely linked with solar activity are the infrasonic signals which are generated in the atmosphere during auroras. It is proposed that the infrasonic disturbances may be a physical agent which transfers the effect of solar activity to the biosphere. Although the biological effect of infrasonic oscillations of low amplitude are largely unknown, the available data suggest that infrasound does have biological effects. N.B.

### A83-11892

#### THE BIOCHEMICAL MECHANISM OF THE REACTIONS OF LIVING ORGANISMS TO CHANGES OF SOLAR ACTIVITY [O BIOKHIMICHESKOM MEKHANIZME REAKTSII ZHIVYKH ORGANIZMOV NA IZMENENIIA SOLNECHNOI AKTIVNOSTI]

V. V. SOKOLOVSKII In: The effect of solar activity on the biosphere. Moscow, Izdatel'stvo Nauka, 1982, p. 180-193. In Russian. refs

The possible effects of solar activity on the biological functions of land organisms by means of influences on the chemical activity of thiol containing compounds (for example, enzymes) are examined. The oxidation reactions of sodium dimercaptopropane sulfonate by sodium ions are used as an example to show the possibility of this hypothesis. In addition, the distribution of thiol containing compounds within the cells of organisms and the possible effects of their oxidation are discussed. N.B.

### A83-11893

#### THE ACCELERATION OF THE OXIDATION OF THIOL COMPOUNDS DURING INCREASING SOLAR ACTIVITY [USKORENIE OKISLENIIA TIOLOVYKH SOEDINENII PRI VOZRASTANII SOLNECHNOI AKTIVNOSTI]

V. V. SOKOLOVSKII In: The effect of solar activity on the biosphere. Moscow, Izdatel'stvo Nauka, 1982, p. 194-197. In Russian. refs

The daily changes in the rate of the oxidation of sodium dimercaptopropane sulfonate during 34 months (1974-1977) are used to show the dependence of this parameter on outbreaks of solar activity. It is proposed that the changes in the rate of the oxidation of thiol-containing compounds may play a role in the molecular mechanisms that are responsible for the ability of living organisms to react to changes in solar activity. N.B.

A83-11894

**THE POSSIBLE MECHANISM OF THE SOLAR-BIOSPHERE CONNECTIONS [O VOZMOZHNOE MEKHAHIZME SVIAZEI SOLNTSE-BIOSFERA]**

V. E. ZHVIRBLIS In The effect of solar activity on the biosphere Moscow, Izdatel'stvo Nauka, 1982, p. 197-211. In Russian refs

It is proposed that the basic causes of the bioeffectiveness of weak natural electromagnetic fields may be due to their chirality (asymmetry), since the activity of such fields on polychiral biopolymers (for example, enzymes) must be expressed in changes of the conformation and the corresponding functional activity of the macromolecules. Results are presented of experiments on observations of the zero-point drift of a visual polarimeter, and this effect is linked with the primary solar geophysical indices, as well as with the conformational variations, of creatine kinase.

N.B.

A83-11895

**INVESTIGATIONS OF THE VARIATIONS IN THE TRANSMISSION SPECTRA OF AQUEOUS SOLUTIONS AND THEIR CORRELATIONS WITH THE PARAMETERS OF A NEUTRON COUNTER [ISLEDOVANIIE VARIATSII SPEKTROV PROPUSKANIIA VODNYKH RASTVOROV I IKH KORRELIATSIIA S POKAZANIAMI NEITRONNOGO MONITORA]**

V. S. TSAPLIN, IU I. LOGACHEV, and E. L. KONDRATEV In The effect of solar activity on the biosphere. Moscow, Izdatel'stvo Nauka, 1982, p. 211-215 In Russian refs

The connections of the long-term variations of the optical transmissivity of aqueous solutions with the variations of geophysical and solar-activity parameters are investigated. The measurements were made at a wavelength of 810 nm. The correlation coefficient of the variation of the transmissivity and the count rate of the neutron counter for the measurement period is about 0.63, which serves as an indication of the possibility of the existence of a connection between the processes occurring in near-earth space and the structure of aqueous solutions. N.B.

A83-11950

**METABOLISM DURING HYPODYNAMIA [OBMEN VESHCHESTV PRI GIPODINAMII]**

I. V. FEDOROV Moscow, Izdatel'stvo Nauka (Problemy Kosmicheskoi Biologii, Volume 44), 1982 256 p. In Russian. refs

Investigations concerning the changes in protein, carbohydrate, lipid, nucleic acid, and the water-salt metabolism, and the system of their regulation, during extended periods of immobilization are reviewed. The sequences and interrelations of the changes in these metabolic pathways during extended periods of immobilization are also examined. The biochemical bases for the pathogenesis of the hypodynamic syndrome are discussed, as well as the recovery of these biochemical systems following the end of periods of immobilization. N.B.

A83-12149

**ELECTROPHYSIOLOGICAL ANALYSIS OF DELAYED-RESPONSE BEHAVIOR [ELEKTROFIZIOLOGICHESKII ANALIZ OTSROCHENNOGO POVEDENIIA]**

E. F. MORDVINOV Leningrad, Izdatel'stvo Nauka, 1982. 184 p In Russian. refs

A review is presented of studies concerning the brain organization of the short-term memory in models of the delayed-response behavior of animals (monkeys and cats). A wide variety of different methodological examples, including the consequences of the electrostimulation of the brain and directed experiments, are used to outline the patterns of activity of the intact brain during conditions of delayed-response behavior both in normal subjects and in subjects with local brain damage. The remote synchronization of the brain biopotentials and the spatial-temporal distribution of the frequencies of EEG parameters during delayed-response behavior are also examined. N.B.

A83-12260#

**EFFECTS OF HYPERBARIC OXYGEN ON ANAEROBIC ORGANISMS**

S. K. ADAVAL (Indian Air Force, Institute of Aviation Medicine, Bangalore, India) Aviation Medicine, vol. 26, June 1982, p 61-63. refs

Attention is given to the effects of hyperbaric oxygen on anaerobic organisms, noting the work of Ross and McAllister (1965), Schreiner (1965), Bornside (1967) and Brown et al. (1969, 1979). A possible mechanism for altering bacterial growth is the formation of superoxide ion inducing oxygen toxicity in bacteria.

S.C.S.

A83-12261#

**OXYGEN TOXICITY**

R. KUMAR (Indian Air Force, New Delhi, India) Aviation Medicine, vol 26, June 1982, p. 64-67.

Three forms of oxygen toxicity are crises of the central nervous system, toxicity on the lungs, and toxic effects on such tissues as the eyes and the blood/hemopoietic system. The mechanism of oxygen toxicity is felt to be interference with cellular metabolism causing a disturbed tissue function. The possible important precipitating factors include: oxidation of sulfhydryl containing co-enzymes such as lipoic acid and co-enzyme A, damage to cellular membranes by lipid peroxidation, and oxidation of glutathion, ascorbic acid and possibly other oxidisable tissue components. In vitro experiments have suggested a number of factors that may influence oxygen toxicity. They include: carbon dioxide, hyperthermia, hormones, and anaesthetic agents. The basic treatment for oxygen toxicity is reducing the partial pressure of oxygen to normal levels. S.C.S.

N83-10749\*# National Aeronautics and Space Administration, Washington, D C.

**MORPHOLOGICAL STUDIES OF THE SKELETAL MUSCLES OF RATS DURING HYPOKINESIA**

Y. PETROV, G. KOVACHEV, and L. CHERESHAROV Jun. 1982 13 p refs Transl. into ENGLISH from Veterinarnomeditsinski Nauki (USSR), v 17, no 9-10, 1980 p 72-83 Transl by Kanner (Leo) Associates, Redwood City, Calif. (Contract NASW-3541)

(NASA-TM-76887; NAS 1 15 76887) Avail: NTIS HC A02/MF A01 CSDL 06C

The skeletal musculature of two groups of Wistar strain rats were studied. A group of 60 day old members were kept in individual cells for physiologic immobilization, while the control group was raised under normal conditions. All animals were killed for tests at 450 days. Skeletal muscles of rats kept 390 days immobilized had a lower weight, muscle fiber diameter of m. semitendinosus was smaller in immobilized rats while variability in muscle fiber thickness was greater in the test group. It is found that degenerative processes involved light and dark fibers. E.A.K.

N83-10750\*# Emory Univ., Atlanta, Ga. Dept of Physiology. **CARDIOVASCULAR ADAPTATIONS DURING LONG-TERM ALTERED GRAVITY Final Report**

V. P. POPOVIC 30 Sep. 1982 41 p refs

(Contract NGR-11-001-009)

(NASA-CR-169438, NAS 1.26:169438) Avail: NTIS HC A03/MF A01 CSDL 06C

Cardiovascular studies were performed on unrestrained, unanesthetized rats and on the same animals in head-down hypokinetic conditions as well as during readaptation of the same animals to free activity. Possible circulatory mechanisms that evolved in mammals during long-lasting gravity exposure are considered. These mechanisms are likely to be affected during exposure to 0-g forces. Author

## 51 LIFE SCIENCES (GENERAL)

**N83-10751#** Oak Ridge National Lab, Tenn.  
**HEALTH EFFECTS OF DIELECTRIC GASES: PRELIMINARY REPORT Final Report**

C. E. EASTERLY, C. S. DUDNEY, G. D. GRIFFIN, and P. J. WALSH Aug 1982 28 p refs  
(Contract W-7405-ENG-26)  
(DE82-019724; ORNL/TM-8353) Avail. NTIS HC A03/MF A01

The toxicity of various dielectric gases was assayed in two in vitro systems. Chinese hamster V79 (lung) cells (mammalian) and yeast (*Saccharomyces cerevisiae*). Exposures were carried out in small tubes which were constantly rotated, so that cells were exposed to the gas with only a thin layer of cell culture liquid covering them. Results indicate that SF<sub>6</sub> is essentially without cytotoxic effect on both systems. After discharge of 16 kJ total spark energy in 60 cu cm of SF<sub>6</sub>, the sparked samples were found to be cytotoxic to the mammalian cells, but not to the yeast. The toxicity of these sparked samples to the mammalian system was observed within 15 min of exposure of the cells and the degree of toxicity increased with time of exposure. In addition, increasing spark energy produced samples with increased cytotoxic activity. Yeast cells were unresponsive to octafluorocyclobutane (c-C<sub>4</sub>F<sub>8</sub>) and sparked SF<sub>6</sub>. However, as little as 10% perfluoro-2-butyne (PFB) resulted in 100% toxic response to the yeast, and 95% hexafluorocyclobutene (c-C<sub>4</sub>F<sub>6</sub>) prevented their normal exponential growth, but did not result in mortality. DOE

**N83-10752#** Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Biology.

**STUDY OF BIOFOULING AND ITS CONTROL IN SRP COOLING WATER SYSTEMS Final Technical Report**

D. H. POPE Apr. 1982 78 p  
(Contract DE-AC09-76SR-00001)  
(DE82-016299, DP-MS-82-43) Avail. NTIS HC A05/MF A01

The dynamics of biofouling and biocorrosion to find a control solution are examined. The following metabolic activities of organisms in a biofilm that can produce harmful conditions are identified. consumption of oxygen to produce anaerobic zones, production of organic and mineral acids; production of H<sub>2</sub>S both from inorganic sulfate by the anaerobic sulfate reducing bacteria and from the degradation of organosulfur compounds by anaerobic or facultatively anaerobic microorganisms, removal of protective films along the corrosion process at the metal surface to continue; and depolarization of cathodic sites by the removal of the substances causing polarization. DOE

**N83-10753#** Sheffield Univ (England). Dept. of Control Engineering.

**MODE ANALYSIS OF A TUBULAR STRUCTURE OF COUPLED NON-LINEAR OSCILLATORS FOR SMALL-INTESTINAL MODELLING**

S. E. D. ALIAN and D. A. LINKENS May 1982 64 p refs  
(RR-186) Avail: NTIS HC A04

Mathematical modeling of small-intestinal electrical activity is described. Mode analysis of one-dimensional chains and two-dimensional arrays of nonlinear oscillators was extended to consider a tubular structure. It is shown that this structure is capable of producing stable single modes, nonresonant double modes and degenerate modes. General expressions are obtained for an  $m \times n$  structure where  $m$  = number of oscillators in each ring,  $n$  = number of rings. Examples of two special conditions of  $3 \times 4$  (i.e., odd numbers of oscillators in a ring) and  $4 \times 3$  cases are given. The analytical results obtained for these cases were verified experimentally, using an electronic implementation of coupled van der Pol oscillators. Author (ESA)

**N83-10754#** Sheffield Univ. (England). Dept. of Control Engineering.

**MODE ANALYSIS OF A TUBULAR STRUCTURE OF COUPLED FIFTH-POWER NON-LINEAR OSCILLATORS FOR LARGE-INTESTINAL MODELLING**

S. E. D. ALIAN and D. A. LINKENS May 1982 43 p refs  
(RR-187) Avail: NTIS HC A03/MF A01

A matrix Krylov-Bovoloubov linearization technique was used to extend mode analysis to a tubular structure of oscillators, representing human large-intestinal electrical behavior. The method of averaging was used to calculate the stationary amplitude values. Mode stability was investigated for zero state, single modes, and double nonresonant modes. Theoretical results for a case with four rings each having three oscillators compare favorably with an experimental investigation, using electronic implementation of van der Pol oscillators. Author (ESA)

**N83-10755#** New York Sea Grant Inst., Albany.

**MARINE BIOMASS: NEW YORK STATE SPECIES AND SITE STUDIES Annual Report, 1 Dec. 1980 - 30 Nov. 1981**

D. F. SQUIRES and L. MCKAY 1 Mar. 1982 150 p refs  
Prepared in cooperation with Cornell Univ., Albany, N.Y.  
(PB82-216136; GRI-81/0023) Avail: NTIS HC A07/MF A01  
CSCL 08A

Nine species of indigenous New York seaweeds were surveyed for potential as feedstock for methanogenesis. *Laminaria* and *Gracilaria* are primary candidates on the basis of growth studies and gas yield data provided by General Electric. *Agardhiella*, *Codium*, and *Fucus* merit further study. A two species (warm and cool water) cropping system appears feasible in terms of year-round sustained yield. Initial data suggest nitrogen is not limiting in New York coastal waters. Technical gains were made in affixing attached-growth-mode species to substrates. Sites for use in larger scale experimental structures around Long Island were evaluated for their environmental and use-conflict parameters. Several sites in Smithtown Bay have the requisite features. The New York Bight was evaluated for potential sites for ocean farms. Environmental and use-conflict features for this area were identified on overlay maps. Five novel biomass farm designs were engineered and tested by computer models for survivability. Novel mooring, anchoring and wave-dampening devices were also considered. Author (GRA)

**N83-10756#** Virginia Polytechnic Inst. and State Univ., Blacksburg.

**MICROBIOLOGICAL STUDIES TOWARDS OPTIMIZATION OF METHANE FROM MARINE PLANT BIOMASS Annual Report, 1 Jul. 1980 - 30 Jun. 1981**

J. G. FERRY and J. S. CHEN Jul 1981 15 p  
(PB82-214362; GRI-81/0009) Avail: NTIS HC A02/MF A01  
CSCL 06M

The microbiological conversion of marine plant biomass was studied with stabilized kelp-degrading methane-producing enrichment cultures. Mannitol and alginate are used concurrently. Ethanol is produced shortly after feeding kelp and subsides rapidly. Dissolved hydrogen ranged from 5 nM to 1.2 uM. The appearance of ethanol correlates with increased hydrogen levels which is expected if interspecies hydrogen transfer functions to maintain low concentrations of the more reduced fermentation products. An improved method was developed for measurement of volatile fatty acids in sea water medium based on gas chromatography of the phenyl ester derivatives. Acetate and propionate were found in the greatest concentrations with formate, butyrate and isobutyrate in lower concentrations. The pool sizes will be used with turnover rate constants to determine total flux of each intermediate. A strain of *Methanococcus mazei* has been isolated that degrades acetate to methane. Also, a highly enriched culture of a previously unreported acetate-degrading methanogen was obtained. New strains of hydrogen and formate-utilizing methanogens were isolated. Mannitol and alginate degrading strains were isolated that resemble *Cytophaga* sp. Formate dehydrogenase from *Methanobacterium formicicum* was purified.

71-fold and initially characterized. The isolated enzyme contains a cofactor not previously reported in methaogens. Author

**N83-10757#** Rhode Island Univ., Kingston. Marine Ecosystems Research Lab.

**A SIMPLE PLUTOMETER FOR PRECISE DETERMINATION OF DISSOLVED OXYGEN CONCENTRATION BY THE WINKLER METHOD WITH RECOMMENDATIONS FOR IMPROVING RESPIRATION RATE MEASUREMENTS IN AQUATIC ORGANISMS**

S. L. VARGO and R. K. FORCE Mar. 1982 7 p refs Sponsored by EPA (PB82-181843; EPA-606/J-81-531, ERLN-X33) Avail: NTIS HC A02/MF A01 CSCL 08A

A photometer designed for Winkler titration end point detection is described. The precision of replicate dissolved oxygen measurements using this instrument was 0.06-0.22%. The high precision is needed to measure the small changes in dissolved oxygen concentration for determining the respiration rate of small aquatic organisms. Other recommendations for improving precision are also presented. GRA

**N83-11701#** Council for Scientific and Industrial Research, Pretoria (South Africa).

**SOUTH AFRICAN ANTARCTIC BIOLOGICAL RESEARCH PROGRAMME**

Jul 1981 65 p refs (REPT-50; ISBN-0-7988-2128-0) Avail: NTIS HC A04/MF A01

Biological research activities in the sub-Antarctic and Antarctic regions are described. Paleo-ecological and biogeographical studies, ecosystem studies, autecological studies, studies on alien biota, and monitoring studies comprise the research program. Author

**N83-11702\*#** National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, Tex.

**MEDICAL OPERATIONS AND LIFE SCIENCES ACTIVITIES ON SPACE STATION**

P. C. JOHNSON, ed. and J. A. MASON, ed. Oct 1982 47 p (NASA-TM-58248; S-518, NAS 1.15:58248) Avail: NTIS HC A03/MF A01 CSCL 05H

Space station health maintenance facilities, habitability, personnel, and research in the medical sciences and in biology are discussed. It is assumed that the space station structure will consist of several modules, each being consistent with Orbiter payload bay limits in size, weight, and center of gravity. Author

**N83-11703#** Medical Biological Lab RVO-TNO, Rijswijk (Netherlands).

**THE POSSIBLE ROLE OF CATECHOLAMINES IN THE PROTECTIVE EFFECT OF GENERAL ANESTHETICS AGAINST KIDNEY LESIONS IN RATS SUBJECTED TO HEMORRHAGIC HYPOTENSION**

C. VANDERMEER, W. C. M. CRAMER, J. A. M. VERSLUYS-BROERS, P. W. VALKENBURG, and P. M. SNIJDERS Dec 1981 14 p refs Prepared in cooperation with Amsterdam Univ (Contract A76/K/095) (MBL-1981-16, TDCK-76175) Avail: NTIS HC A02/MF A01

Dibenzamine, 15 mg/kg, injected in rats anesthetized with ketamine, 60 min before bleeding for 60 min against 40 mm Hg, significantly reduced the severity of kidney lesions. The maximum bleeding volume was reduced by 14%. Adrenalectomy also reduced the bleeding volume but all animals died within 24 hr. In unanesthetized rats bled against 40 mm Hg, plasma adrenaline and nor-adrenaline rose approximately tenfold as compared with unbled animals. It is concluded that vasoconstriction due to the release of catecholamines is an important factor in the generation of kidney lesions during hypotension in rats and that the protective effect of a number of general anesthetics largely depends on their ability to suppress the release of catecholamines. Author (ESA)

**N83-11704#** Medical Biological Lab RVO-TNO, Rijswijk (Netherlands).

**DISTURBANCES IN THE GLUCOSE METABOLISM IN INTESTINAL ISCHEMIA SHOCK**

C. VANDERMEER, P. W. VALKENBURG, and J. A. M. VERSLUYS-BROERS Dec 1981 22 p refs Prepared in cooperation with Amsterdam Univ. (Contract A76/K/095)

(MBL-1981-17; TDCK-76176) Avail: NTIS HC A02/MF A01

Intestinal ischemia shock was obtained in fasted rats by 40-minute splanchnic arterial occlusion or by 35-minute portal vein occlusion (PVO). Survival was prolonged by plasma treatment; further prolongation was obtained by additional administration of glucose. Surgical treatment is described. It is concluded that the sympathetic nervous system is stimulated by a substance, possibly related to VIP, released from the intestines. After PVO hyperglycemia is less marked. Plasma adrenalin as well as insulin are increased. During late and fatal hypoglycemia after PVO plus plasma treatment, the liver still appears to be functionally intact. It is assumed that gluconeogenesis is reversibly inhibited by as yet unknown factors. The hypoglycemia cannot be abolished by injection of common substrates of gluconeogenesis, but the combination fructose plus glucagon plus NAD is highly effective. Author (ESA)

**N83-11705#** Medical Biological Lab. RVO-TNO, Rijswijk (Netherlands)

**THE EFFECT OF ATP ON SURVIVAL IN INTESTINAL ISCHEMIA SHOCK, HEMORRHAGIC SHOCK, AND ENDOTOXIN SHOCK IN RATS**

C. VANDERMEER, P. M. SNIJDERS, and P. W. VALKENBURG Jan. 1982 23 p refs Prepared in cooperation with Amsterdam Univ.

(Contract A76/K/095)

(MBL-1982-1; TDCK-76177) Avail: NTIS HC A02/MF A01

A dose of Mg-ATP (72 micro/mole/kg) was injected into anesthetized rats, subjected to intestinal ischemia shock, hemorrhagic shock, or endotoxin shock, shock models in which all untreated animals died. Administration of Mg-ATP in no instance improved survival rate. It is concluded that any beneficial effect of ATP is probably small while the occurrence of adverse effects cannot be neglected. Author (ESA)

**N83-11706#** Medical Biological Lab RVO-TNO, Rijswijk (Netherlands)

**BEHAVIORAL EFFECTS IN THE RAT OF A SINGLE ADMINISTRATION OF TRIMETHYLITIN**

O. L. WOLTHUIS Mar. 1982 34 p refs (MBL-1982-2, TDCK-76388) Avail: NTIS HC A03/MF A01

The behavioral sequelae, following a single oral administration of 5 or 10 mg/kg trimethyltin (TMT), were investigated in rats in two procedurally almost identical experiments. Repeated measurements of open field behavior during 6 weeks were followed by active avoidance in a two-way shuttle box and passive avoidance testing in a light-dark discrimination test. An attempt is made to explain the monophasic effects of 5 mg/kg and the biphasic effects of 10 mg/kg TMT. It is assumed that at lower brain-levels of TMT, after 5 mg/kg or during the early wash-in phase after 10 mg/kg, this chemical has a stimulating effect on the amygdaloid complex and the hippocampus which causes aggressive behavior and behavioral inhibition, respectively. At the 10 mg/kg level, this stimulation phase is followed by neuronal death; aggressive behavior subsides and hippocampal response-breaking mechanisms are lost. The behavioral pattern that emerges closely resembles that of hippocampectomized rats. Author (ESA)

## 51 LIFE SCIENCES (GENERAL)

**N83-11707#** Joint Publications Research Service, Arlington, Va.  
**USSR REPORT: LIFE SCIENCES. BIOMEDICAL AND BEHAVIORAL SCIENCES, NO. 23**  
25 Oct. 1982 137 p refs Transl. into ENGLISH from various Russian articles  
(JPRS-82060) Avail: NTIS HC A07

Progress in Soviet research in the areas of life science, biomedical sciences, and behavioral sciences is reported. Topics discussed include: biology, biotechnology, epidemiology, genetics, laser effects, marine mammals, medical demography, medicine, microbiology, and physiology.

**N83-11709#** Joint Publications Research Service, Arlington, Va.  
**MODERN BIOTECHNOLOGY: FRONTIERS AND FUTURE**  
V. M. ZHDANOV and T. I. TIKHONENKO *In its* USSR Rept. Life Sci. Biomed. and Behavioral Sci., No 23 (JPRS-82060) p 21-25 25 Oct. 1982 Transl into ENGLISH from Vopr. Virusol. (USSR), no. 3, May-Jun. 1982 p 4-7  
Avail: NTIS HC A07

Basic and applied scientific research, and science and industry which also involves the biological sciences are discussed. The microbiological industry has emerged, biological catalysts are used extensively in industry, the achievements of genetics are recognized in breeding antibiotic producers and other useful microorganisms, biological methods are used extensively in the control of agricultural pests and many others. Further development in physicochemical biology and biotechnology and its advances in medicine, agriculture and industry, by the formation of a new scientific applied sector, biotechnology, which is the organic blend of technical biochemistry, microbiology, genetic engineering, combined with the use of animal and plant cell cultures and immobilized enzymes is discussed. Included are both age old processes and new technological processes. Developments in biology are outlined. The microbiological industry, contributes much to agriculture and public health like agricultural fertilizers, as well as antibiotics. E A K.

**N83-11715#** Joint Publications Research Service, Arlington, Va.  
**USSR REPORT: LIFE SCIENCES. EFFECTS OF NONIONIZING ELECTROMAGNETIC RADIATION, NO. 8**  
25 Oct. 1982 80 p refs Transl. into ENGLISH from various Russian articles  
(JPRS-82061) Avail: NTIS HC A05

The biological effects of nonionizing electromagnetic radiation are considered.

**N83-11716#** Joint Publications Research Service, Arlington, Va.  
**STANDARDIZATION OF PHYSICAL CONDITIONS FOR STUDYING BIOLOGICAL EFFECTS OF ELECTROMAGNETIC FIELDS**

H. PFUTZNER *In its* USSR Rept.: Life Sci. (JPRS-82061) p 1-3 25 Oct. 1982 refs Transl. into ENGLISH from *Sobshch. Akad. Nauk Gruzinsk. (Tbilisi, USSR)*, v. 105, no. 1, Jan 1982 p 145-148  
Avail: NTIS HC A05

Experimentation in the biological effects of electromagnetic fields is reviewed. Standardization of physical conditions is discussed. N.W.

**N83-11722#** Joint Publications Research Service, Arlington, Va.  
**UNIT FOR EXPOSURE OF BIOLOGICAL OBJECTS TO STATIC MAGNETIC FIELD**

M. S. GOLINSKAYA and G. D. KIZLOV *In its* USSR Rept.: Life Sci. (JPRS-82061) p 37-39 25 Oct 1982 Transl. into ENGLISH from *Vopr. Kurortol. i Fizioterapii i Lechebnoy Fiz. Kultury (Moscow)*, no. 3, May - Jun. 1982 p 65-66  
Avail: NTIS HC A05

A simple device was developed which enabled us to localize the effect of static magnetic fields (SMF) to a specific region in a small laboratory animal. Two ferrite magnets, and conical concentrators of magnetic flux made of magnetically soft brand 341 steel were used. The concentrators of magnetic flux made of magnetically soft brand 341 steel were used. The concentrators were appropriately magnetized under the effect of the magnets'

magnetic field and the required magnetic field was then generated in the space between them. The degree of magnetization of the concentrators and, consequently, induction of magnetic field between them was varied by introducing nonmagnetic (paper) liners of different thickness between the magnets and concentrators.

Author

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### AEROSPACE MEDICINE

Includes physiological factors, biological effects of radiation, and weightlessness

**A83-10212\*** National Aeronautics and Space Administration  
Ames Research Center, Moffett Field, Calif.  
**REDUCTION IN PLASMA CALCIUM DURING EXERCISE IN MAN**

V. A. CONVERTINO, E. R. MOREY, and J. E. GREENLEAF (NASA, Ames Research Center, Biomedical Research Div., Moffett Field, CA) *Nature*, vol. 299, Oct. 14, 1982, p. 658; Reply, p. 658 refs

**A83-10482**  
**THE EFFECT OF A MOUNTAIN CLIMATE ON THE CONDITION OF THE RESPIRATORY-HEMODYNAMIC FUNCTION IN MINERS SUFFERING FROM THE INITIAL STAGES OF PNEUMOCONIOSIS [VLIANIE GORNOGO KLIMATA NA SOSTOIANIE RESPIRATORNO-GEMODINAMICHESKOI FUNKTSII U SHAKHTEROV S NACHAL'NOI STADIEI PNEVMOKONIOZA]**

V. G. DEINEGA, V. A. BEREZOVSKII, G. A. BONDARENKO, V. I. BOGOMOLET, A. F. DENISENKO, and S. A. NIKITINA (Akademiia Nauk Ukrainkoï SSR, Institut Fiziologii, Kiev, Ukrainian SSR) *Fiziologicheskii Zhurnal (Kiev)*, vol. 28, Sept.-Oct. 1982, p. 542-547. In Russian. refs

**A83-10484**  
**THE STAGES OF HYPOXIC LOADS [STADII GIPOKSIÏ NAGRUKKI]**

M. M. FILIPPOV (Akademiia Nauk Ukrainkoï SSR, Institut Fiziologii, Kiev, Ukrainian SSR) *Fiziologicheskii Zhurnal (Kiev)*, vol. 28, Sept.-Oct. 1982, p. 561-566. In Russian refs

The extent of the development of hypoxia and the inclusion of compensatory mechanisms are used to determine four stages of hypoxic loads: latent; compensated; partially compensated with the expression of venous and arterial hypoxemia with the formation of an oxygen debt, underoxidized products of metabolism, and a surplus of expired CO<sub>2</sub>; and a noncompensated stage during which the accumulated oxygen debt forces a cessation of work. The characteristics of each of these stages of hypoxic loads are examined. It is proposed that the relations between the consumption of oxygen and its demand for work, and between the rate of oxygen delivery and consumption, may serve as criteria of the compensation of hypoxic loads. N.B.

**A83-10485**  
**A STUDY OF THE LOCAL IRREGULARITY OF THE VENTILATION OF THE LUNGS [K VOPROSU O LOKAL'NOI NERAVNOMERNOSTI VENTILIATSII LEGKOGO]**

E. B. KOBZAR (Akademiia Nauk Ukrainkoï SSR, Institut Fiziologii, Kiev, Ukrainian SSR) *Fiziologicheskii Zhurnal (Kiev)*, vol. 28, Sept.-Oct. 1982, p. 567-570. In Russian. refs

The functional nonuniformity of ventilation in different areas of the lungs was investigated in 30 healthy individuals who were between 18-50 years of age. The method of pulmonography, a variant of objectivized bronchophony, was utilized to quantitatively determine the functional nonuniformity of ventilation in these individuals. It is proposed that the hyperventilation of the symmetrical areas of the lungs is linked with the opening of the

reserve alveolar network and with changes in the local blood circulation N.B

**A83-10488**

**THE PECULIARITIES OF THE EXTERNAL RESPIRATION AND GAS EXCHANGE DURING THE RESPIRATION OF HELIUM-OXYGEN MIXTURES HAVING VARIOUS CONCENTRATIONS OF OXYGEN [OSOBENNOSTI VNESHNEGO DYKHANIIA I GAZOOBMENA ORGANIZMA PRI DYKHANII GELIEVO-KISLORODNYMI SMESIAMI S RAZLICHNYM SODERZHANIEM KISLORODA]**

E. V. ROZOVA (Akademiia Nauk Ukrainsoi SSR, Institut Fiziologii, Kiev, Ukrainian SSR) Fiziologicheskii Zhurnal (Kiev), vol. 28, Sept.-Oct. 1982, p. 588-592. In Russian refs

The effect of decreases in the density of expired gas mixtures which contain various concentrations of oxygen on the system of external respiration and the gas metabolism is investigated in healthy middle-aged humans. Results show that during hypoxic conditions the external respiration and gas metabolism of these individuals are greatly affected by changes in the density of the gas mixture, but not by changes in the density of oxygen concentration, and leads to a less stressed functioning of the respiratory system. During normoxic conditions, the decrease in the density of the expired gas mixture promotes the improvement of oxygen transport in the lungs even during changes in the conditions of ventilation and gas metabolism. By increasing the concentration of oxygen in the mixture, the hyperoxic effect becomes predominant and a lesser role is played by the lowering of the density, which promotes only the strengthening or weakening of the hyperoxic effect. N.B.

**A83-10491**

**THE PROGNOSTIC SIGNIFICANCE OF SEVERAL TRAITS IN STUDYING THE FUNCTIONING OF THE OXYGEN HOMEOSTASIS SYSTEM OF HUMANS IN THE GENETIC ASPECT [O PROGNOSTICHESKOI ZNACHIMOSTI NEKOTORYKH PRIZNAKOV V IZUCHENII FUNKTSIONIROVANIIA SISTEMY KISLORODNOGO GOMEOSTAZISA ORGANIZMA V GENETICHESKOM ASPEKTE]**

P. I. LIPSKII (Cherkasskii Pedagogicheskii Institut, Cherkassy, Ukrainian SSR) Fiziologicheskii Zhurnal (Kiev), vol. 28, Sept.-Oct. 1982, p. 608-610. In Russian. refs

**A83-10492**

**THE GAS COMPOSITION AND THE ACID-BASE STATE OF THE BLOOD IN TWINS WHEN BREATHING A HYPOXIC GAS MIXTURE [GAZOVIY SOSTAV I KISLOTNO-OSNOVNOE SOSTOIANIE KROVI BLIZNETSOV PRI DYKHANII GIPOKSICHESKOI GAZOVOI SMESI]**

T. A. MELNIK (Akademiia Nauk Ukrainsoi SSR, Institut Fiziologii, Kiev, Ukrainian SSR) Fiziologicheskii Zhurnal (Kiev), vol. 28, Sept.-Oct. 1982, p. 611, 612. In Russian refs

**A83-10505**

**PHANTOM IMAGES OF BINOCULAR VISION IN THE SYSTEM OF HEMISPHERIC RELATIONS [FANTOMNYE OBRAZY BINOKLIARNOGO ZRENIIA V SISTEME MEZHPOLOUSHARNYKH OTNOSHENII]**

V. V. SUVOROVA and M. A. MATOVA Voprosy Psikhologii, July-Aug. 1982, p. 116-123. In Russian. refs

A special type of visual images, called phantom images, has been found during a study of binocular vision conceptualized as a function of an analyzer which possesses pair receptors and paired brain centers. It is determined that images are produced by the brain and, thus, they belong to the category of visualized images, and are also related to the efferent activity of the visual analyzer. However, unlike the visualized image proper, the phantom image develops in the process of stimulus perception and, similar to the perceptual image, it is a component of the fusion image. A special characteristic of a phantom image is its sensitivity to external influences. Phantom images appear when one of the two corresponding zones of the central and peripheral vision is

stimulated separately, and these images are located in the space of the second, non-stimulated, corresponding zone. It is concluded that the appearance of phantom images in both central and peripheral vision is determined by the projection of the stimulus onto receptors which are connected with the neurons of the ipsilateral hemisphere. N.B.

**A83-10506**

**THE PRACTICAL APPLICATION OF HYPNOSIS IN THE ATHLETIC ACTIVITY OF YOUNG ATHLETES [PRAKTICHESKOE PRIMENENIE VNUSHENNOGO SNA V SPORTIVNOI DEIATEL'NOSTI IUNYKH SPORTSMENOV]**

V. A. DOSKIN, N. A. LAVRENTEVA, and V. B. GORSKII Voprosy Psikhologii, July-Aug. 1982, p. 70-74. In Russian refs

It is shown that periods of hypnosis self-induced directly during physical activity contributes to the faster recovery of the functional activity of young athletes than without self-hypnosis, and more importantly, allows the athletes to overcome unfavorable psychological states which are characteristic for the early stages of fatigue. Evidently, this effect is mainly due to muscular relaxation and to a lower rate of bodily processes during which the natural recovery processes are intensified. It is concluded that the application of self-hypnosis during athletic training can lead to improved athletic results by delaying the onset of fatigue. N.B.

**A83-10507**

**THE ONTOGENY OF THE FUNCTIONAL ASYMMETRY OF THE HUMAN BRAIN [ONTOGENEZ FUNKTSIONAL'NOI ASIMMETRII MOZGA CHELOVEKA]**

T. A. MESHKOVA Voprosy Psikhologii, July-Aug. 1982, p. 144-151. In Russian. refs

**A83-10509**

**THE EFFECT OF TOBACCO SMOKING ON THE MICROCIRCULATION IN THE VESSELS OF THE BULBAR CONJUNCTIVA IN HEALTHY YOUNG INDIVIDUALS [VLIANIE KURENIIA TABAKA NA MIKROTSIRKULIATSIIU V SOSUDAKH BUL'BARNOI KON'IUNKTIVY U PRAKTICHESKI ZDOROVYKH LIUDEI MOLODOGO VOZRASTA]**

I. M. DAVIDOVICH and S. L. ZHARSKII (Khabarovskii Meditsinskikh Institut, Khabarovsk, USSR) Kardiologiya, vol. 22, Aug. 1982, p. 115, 116. In Russian.

**A83-10511**

**THE ELECTRICAL POSITION OF THE HEART AND VARIANTS OF A NORMAL CARTOGRAM OF 35 LEADS [ELEKTRICHESKAIA POZITSIIA SERD TSA I VARIANTY NORMAL'NOI KARTOGRAMMY 35 OTVEDENII]**

G. V. RIABYKINA, I. F. IGNATEVA, and Z. Z. DOROFEEVA (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Kardiologiya, vol. 22, Aug. 1982, p. 80-85. In Russian refs

**A83-10512**

**ARTERIAL HYPERTENSION AND THE LEVEL OF PROFESSIONAL WORK CAPACITY OF INDUSTRIAL WORKERS [ARTERIAL'NIIA GIPERTENZIIA I UROVNI PROFESSIONAL'NOI RABOTOSPOBNOСТИ PROMYSHLENNYKH RABOCHIKH]**

A. N. BRITOV, S. M. BAIDA, V. A. EVDAKOV, and A. A. ALEKSANDROV (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Kardiologiya, vol. 22, Aug. 1982, p. 59-63. In Russian. refs

The influence of arterial hypertension on the level of the professional work capacity of industrial workers was studied through the biophysiological characteristics of the subjects which reflected the functional state of the cardiovascular system, the central nervous system, and the type of fatigue. Characteristics for a total of 307 men, 40-54 years of age, were collected for subjects in two groups, the main group comprising subjects with systolic pressures over 160 mm Hg and/or diastolic pressures over 95 mm Hg, and a control group with normal blood pressure. Among other results, it was found that workers who suffered from arterial hypertension exhibited lengthened times for reflex reactions to sound and light irritations, showed decrease indicators for the

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intensity and steadiness of attention, and became fatigued toward the end of the working day and week. It is concluded that arterial hypertension leads to functional changes which decrease the work capacity of industrial workers N.B.

**A83-10513**

**THE DETERMINATION OF THE NORMAL /DESIRABLE/ BODY WEIGHT FOR MALES 40-59 YEARS OF AGE ACCORDING TO THE FINDINGS OF AN EPIDEMIOLOGICAL STUDY OF CARDIOVASCULAR DISEASES [OPREDELENIE NORMAL'NOI /ZHELATEL'NOI/ MASSY TELA DLIA MUZHCHIN V VOZRASTE 40-59 LET PO DANNYM EPIDEMIOLOGICHESKOGO ISSLEDOVANIYA SERDECHNO-SOSUDISTYKH ZABOLEVANIY]**  
E. D. KHALTAEVA, N. G. KHALTAEV, and G. S. ZHUKOVSKII (Akademiya Meditsinskikh Nauk SSSR, Moscow, USSR) *Kardiologiya*, vol. 22, Aug. 1982, p. 43-48. In Russian. refs

**A83-10515**

**EXTRATYMPANAL ELECTROCOCHLEOGRAPHY IN CLINICAL PRACTICE [EKSTRATYMPANAL'NAIA ELEKTROKOKHLEOGRAFIYA V KLINIKE]**  
I. A. SAPOZHNIKOV (II Moskovskii Meditsinskii Institut, Moscow, USSR) *Vestnik Otorinolaringologii*, July-Aug. 1982, p. 31-35. In Russian. refs

**A83-10516**

**LIQUORRHEA VIA FISTULA IN THE AREA OF THE COCHLEAR WINDOW [LIKVOREIA CHEREZ FISTULU V OBLASTI OKNA ULITKI]**  
N. A. PREOBRAZHENSII and I. I. GOLDMAN (I Moskovskii Meditsinskii Institut, Moscow, USSR) *Vestnik Otorinolaringologii*, July-Aug. 1982, p. 44-48. In Russian. refs

**A83-10517**

**A STUDY OF THE LOCALIZATION FUNCTION AND DIFFERENTIAL SENSITIVITY OF THE AUDITORY SYSTEM IN PATIENTS WITH BRAIN LESIONS [ISSLEDOVANIE LOKALIZATSIONNOI FUNKTSII I DIFFERENCIAL'NOI CHUVSTVITEL'NOSTI SLUKHOVOI SISTEMY U BOL'NYKH S PORAZHENiyAMI GOLOVNOGO MOZGA]**  
I. A. ALTMAN, V. G. LVOVA, G. M. PETROVA, and A. S. ROZENBLIUM (Leningradskii Nauchno-Issledovatel'skii Institut po Bolezniam Ukha, Gorka, Nose i Rechi; Akademiya Nauk SSSR, Institut Fiziologii, Leningrad, USSR) *Vestnik Otorinolaringologii*, July-Aug. 1982, p. 50-55. In Russian. refs

**A83-10518**

**THE ENSEMBLE OF CIRCADIAN RHYTHMS AND THE EFFECTIVENESS OF TRAINING ACTIVITIES CONDUCTED AT VARIOUS TIMES OF THE DAY [ANSAMBL' TSIRKADNYKH RITMOV I EFEKTIVNOST' TRENIROVOCHNYKH ZANIATII, PROVODIMYKH V RAZNOE VREMIA SUTOK]**  
V. P. ZUBANOV, M. P. MOSHKIN, and S. I. PETUKHOV (Novokuznetskii Gosudarstvennyi Pedagogicheskii Institut, Novokuznetsk; Akademiya Meditsinskikh Nauk SSSR, Novosibirsk, USSR) *Teoriya i Praktika Fizicheskoi Kul'tury*, July 1982, p. 26, 27. In Russian. refs

**A83-10519**

**SPORT GASTROENTEROLOGY - SOME RESULTS AND PROSPECTS OF DEVELOPMENT [SPORTIVNAIA GASTROENTEROLOGIIA - NEKOTORYE ITOGI I PERSPEKTIVY RAZVITIYA]**  
A. P. KUZNETSOV (Kurganskii Gosudarstvennyi Pedagogicheskii Institut, Kurgan, USSR) *Teoriya i Praktika Fizicheskoi Kul'tury*, July 1982, p. 24-26. In Russian. refs

**A83-10520**

**THE CONTENT OF GLYCOGEN IN MUSCLES AND THE EFFECT OF THE CARBOHYDRATE SATURATION METHOD ON THE PHYSICAL AEROBIC WORK CAPACITY OF ATHLETES AND NONATHLETES [SODERZHANIE GLIKOGENA V MYSHTSAKH I VLIYANIE METODA UGLEVODNOGO NASYCHSHENIYA /MUN/ NA FIZICHESKUII AEROBNIUI RABOTOSPOSOBNOST' SPORTSMENOV I NESPORTSMENOV]**  
I. A. M. KOTS, L. I. ALIKHANOVA, O. L. VINOGRADOVA, and V. D. GORODETSKII (Gosudarstvennyi Tsentral'nyi Institut Fizicheskoi Kul'tury, Leningrad, USSR) *Teoriya i Praktika Fizicheskoi Kul'tury*, July 1982, p. 21-23. In Russian. refs

**A83-10521**

**A COMPARATIVE ANALYSIS OF THE MOVEMENT OF TRAUMATIZED AND HEALTHY EXTREMITIES DURING RUNNING ON A TREADMILL [SRAVNITEL'NYI ANALIZ DVIZHENII TRAVMIROVANNYKH I ZDOROVYKH KONECHNOSTEI PRI BEGE NA TREDBANE]**  
I. P. RATOV, O. V. PAVLOV, V. D. KRIAZHEV, V. F. BASHKIROV, V. M. GRACHEV, G. I. POPOV, and S. M. SLOBUNOV (Vsesouiznyi Nauchno-Issledovatel'skii Institut Fizicheskoi Kul'tury, USSR) *Teoriya i Praktika Fizicheskoi Kul'tury*, July 1982, p. 18-21. In Russian. refs

**A83-10523**

**THE ACTIVE AND PASSIVE FLEXIBILITY OF ATHLETES OF VARIOUS SPECIALTIES [AKTIVNAIA I PASSIVNAIA GIBKOST' U SPORTSMENOV RAZLICHNYKH SPETSIALIZATSII]**  
A. V. IASHVILI (Goriiskii Gosudarstvennyi Pedagogicheskii Institut, Gori, Georgian SSR; Gosudarstvennyi Institut Fizicheskoi Kul'tury, Leningrad, USSR) *Teoriya i Praktika Fizicheskoi Kul'tury*, July 1982, p. 51, 52. In Russian.

**A83-10525**

**A METHOD FOR ADAPTIVE BIOCONTROL IN THE MULTIFACETED TREATMENT OF PATIENTS WITH CEREBRAL ARACHNOIDITIS [METOD ADAPTIVNOGO BIOUPRAVLENIYA V KOMPLEKSNOM LECHENII TSEREBRAL'NOGO ARAKHNOIDITA]**  
N. V. CHERNIGOVSKAIA, S. A. MOVSISIANTS, E. A. KAIDANOVA, and A. A. VERESHCHAGINA (Akademiya Meditsinskikh Nauk SSSR, Moscow, Akademiya Nauk SSSR, Institut Fiziologii, Leningrad, USSR) *Zhurnal Nevropatologii i Psikhiiatrii im S.S. Korsakova*, vol. 82, no. 8, 1982, p. 1154-1159. In Russian. refs

**A83-10528**

**AN INVESTIGATION OF THE EFFECT OF LOCAL VIBRATION AT FRAGMENTED DOSES FOR THE SUBSTANTIATION OF A MODEL OF A SPARING REGIME [IZUCHENIE VLIYANIYA LOKAL'NOI VIBRATSII PRI DROBLENII DOZY DLIA OBOSNOVOVANIYA MODELI SHCHADIASHCHEGO REZHIMA]**  
L. P. SVETITSKAIA (Institut Sanitarii, Gigieny i Profzabolevaniy, Tashkent, Uzbek SSR) *Gigiena Truda i Professional'nye Zabolevaniya*, Aug 1982, p. 33-36. In Russian.  
The effect of a constant dose of local vibration of varying duration on the human body was investigated using a vibration table which simulated a wide-band spectrum chopping hammer. A variety of physiological parameters was examined, including vibration and pain sensitivity, skin temperature, plethysmographic index, and muscular strength. Results showed that the physiological effect of the vibration could be reduced if the dose was fragmented. For example, the effect of a constant (40 min) dose was found to be 5 times that of a fragmented dose (8 periods of 5 min each) of vibration. The additive effect of longer doses of vibration was determined and the optimal variant of its alteration was established. N.B.

A83-10530

**AN ELECTROENCEPHALOGRAPHIC INVESTIGATION OF THE HUMAN CEREBRAL CORTEX DURING THE PROCESSING OF THE SOLUTION OF VISUAL-MOTOR PROBLEMS WITH TRAINING** [ELEKTROENTSEFALOGRAFICHESKOE

ISSLEDOVANIE KORY MOZGA CHELOVEKA PRI OVLADENII NAVYKOMI RESHENIIA ZRITEL'NO-MOTORNOI ZADACHI]

O. A. POKOLIUKHINA and N. Z. KAIGORODOVA Leningradskii Universitet, Vestnik, Biologiya, Aug 1982, p. 59-67. In Russian. refs

The individual peculiarities of the dynamics of the changes in the cortex activation structures in the human brain during the processing of visual-motor problems was investigated using the system indices of electroencephalography. Results show a dependency between the formation of the cortex activation working regime of the initial dominant type of the cortex activation structure (CAS) and the processing of simple visual-motor problems in trained subjects, which was not present in untrained subjects. It is shown that the efficiency in the solving of such simple visual-motor problems agrees with the degree of the usual individual CAS preservation in the processing of the decision. N B

A83-10554

**ANTIBODIES TO STREPTOCOCCAL LIPOPROTEINASE IN THE BLOOD OF HEALTHY PERSONS [ANTITELA K STREPTOKOKKOVOMU LIPOPROTEINAZE V KROVI ZDOROVYKH LIUDEI]**

I. A. KRASILNIKOV (Voenno-Meditsinskaya Akademiya, Leningrad, USSR) Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii, Aug. 1982, p. 91-94. In Russian. refs

A83-10557

**INCIDENCE OF A DISEASE WITH A TEMPORARY LOSS OF WORK CAPACITY IN MINERS IN THE NORTHEASTERN USSR [ZABOLEVAEMOST' S VREMENNOI UTRATOI TRUDOSPOSOBNOSTI GORNORABOCHIKH ROSSYPNYKH SHAKHT SEVERO-VOSTOKA STRANY]**

I. A. LESHCHENKO, M. P. DIAKOVICH, S. F. SHAIKHMETOV, and A. V. MIKHAILOV (Angarskii Nauchno-Issledovatel'skii Institut Gigieny Truda i Profzabolevani, Angarsk, USSR) Zdravookhranenie Rossiiskoi Federatsii, no. 8, 1982, p. 25, 26. In Russian.

A83-11138

**ASSESSMENT OF CENTRAL HEMODYNAMICS DURING ARM-CRANK EXERCISE**

D. S. MILES, M. N. SAWKA, R. M. GLASER, S. W. WILDE, B. M. DOERR, and M. A. B. FREY (Wright State University, Dayton, OH) In: NAECON 1982; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 18-20, 1982. Volume 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1982, p. 442-448. Research supported by the Dayton Area Heart Association, American Heart Association, and U S Veterans Administration. refs

Cardiac output and ventricular function was assessed using the impedance cardiography technique during upper body exercise. Ten female subjects completed a discontinuous, progressive intensity exercise test using an arm-crank ergometer, during which a 10 min exercise at each power output level (60, 120, and 180 kpm/min) was followed by 10 min of rest. Results show that oxygen uptake and pulmonary ventilation increased progressively with power output reaching three times resting values at 180 kpm/min. Both systolic and diastolic pressures were found to increase with exercise intensity, while cardiac output increased as a result of an increase in the heart rate, with stroke volume maintained at resting values. In addition, myocardial performance was found to be enhanced with increments in the exercise intensity, as indicated by increases in the Heather Index and the first derivative of the impedance change during the cardiac cycle with increments in exercise intensity, while the respiration-impedance interval and left ventricular ejection time decreased. N B

A83-11139

**A COMPARISON OF THE CARDIOVASCULAR RESPONSES TO ISOMETRIC EXERCISE OF THREE DIFFERENT SIZED MUSCLE GROUPS**

D. M. HENDERSHOT, J. S. PETROFSKY, D. B. REYNOLDS, and R. M. GLASER (Wright State University, Dayton, OH) In: NAECON 1982, Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 18-20, 1982. Volume 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1982, p. 457-563. refs

(Contract NIH-1-R01-HL-25977-01)

Blood pressure and heart rate responses were determined during fatiguing isometric contractions of the handgrip, adductor pollicis and quadriceps muscles in 3 college age subjects at tensions of 25, 40 and 70% maximum voluntary contraction (MVC) with the circulation free and occluded. The results show the maximum heart rate recorded at the end of exercise to be directly related to the tension exerted during the contraction. However, the blood pressure response was independent of the tension exerted by any muscle group. The pressure and heart rate responses were found to be identical when compared between large muscle groups while the pressure response was reduced for the smaller muscle groups. It therefore appears that different muscles show different cardiovascular responses to isometric exercise. (Author)

A83-11259

**RECOVERY CURVES IN PARTIALLY FATIGUED MUSCLE**

S. M. MONDSCHNEIN, J. S. PETROFSKY, R. M. GLASER, D. E. STAFFORD, and D. M. HENDERSHOT (Wright State University, Dayton, OH) In: NAECON 1982; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 18-20, 1982. Volume 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1982, p. 1415-1417. USAF-supported research refs

During flight maneuvers, the work load, while fatiguing in nature, is rarely carried to true muscle fatigue. In contrast, most of the basic research that has been done has examined such parameters as blood pressure, heart rate and other physiological parameters during exercise conducted fully to fatigue. Therefore, the purpose of the current investigation was to examine the recovery of endurance in muscle in man which was not fully fatigued. To accomplish this end, 6 male subjects were examined during partially fatiguing isometric contractions of the hand grip muscles at tensions of 25 and 40% of their maximum isometric strength (MVC). The results of these experiments showed that even partially fatiguing contractions could dramatically reduce isometric endurance in subsequent work. The relationship of these findings to aircraft pilot performance will be discussed. (Author)

A83-11281

**MAJOR MEDICAL RESULTS OF THE SALYUT-6 - SOYUZ 185-DAY SPACE FLIGHT**

O. G. GAZENKO, A. M. GENIN, and A. D. EGOROV (Ministerstvo Zdravookhraneniya SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR) In: Space: Mankind's fourth environment; International Astronautical Congress, 32nd, Rome, Italy, September 1981, Selected Papers. Oxford, Pergamon Press, 1982, p. 275-293. refs

In-flight and postflight medical observations of the vital health characteristics of two Soviet cosmonauts who stayed on board the Salyut-6 space station for 185 days are reported. Several kilograms of increase in body weight were observed over time, as well as increases in heart rate, cardiac output, pulse wave propagation, and jugular vein pressure. Decreases were detected in the leg volume, isometric contraction time, ejection time, systolic and mean pressure, leg pulse blood filling, the tone of small cerebral vessels, the venous pressure in the legs, the venous gradient in the upper and lower body, and arterial inflow to the leg vessels. Postflight, the size, velocity, and strength of the long muscles of the back, chest, and abdominal muscles were found to have undergone atrophic changes. Active exercises were determined

to have inhibited the calcium-loss problem. It is concluded that longer duration flights are medically acceptable. M.S.K.

## A83-11385

**THE TREATMENT OF TRAUMA OF THE LOCOMOTOR SYSTEM IN ATHLETES /STUDY OF THE WORK OF THE ATHLETIC CLINIC FOR TRAUMA IN AUSTRIA/ [LECHENIE TRAVM OPORNO-DVIGATEL'NOGO APPARATA U SPORTSMENOV /OPYT RABOTY KLINIKI SPORTIVNOI TRAVMY AVSTRII/]**

S. M. MIRONOV (Ministerstvo Zdravookhraneniia SSSR, Tsentral'nyi Nauchno-Issledovatel'skii Institut Travmatologii i Ortopedii, Moscow, USSR) Teoriia i Praktika Fizicheskoi Kul'tury, July 1982, p. 53, 54. In Russian.

## A83-11386

**AN EVALUATION OF THE EFFECTS OF AEROBICS ON PATIENTS WITH BORDER-LINE STATES WITH THE HELP OF INVESTIGATIONS OF THE SYMPATHETIC-ADRENAL SYSTEM [OTSENKA VLIANIIA AEROBIKI NA BOL'NYKH S POGRANICHNYMI SOSTOIANIAMI S POMOSHCH'IU IZUCHENIIA SIMPATO-ADRENALOVOI SISTEMY]**

V. N. VASILEV, V. S. CHUGUNOV, and T. N. SHCHERBA (8 Klinicheskaiia Spetsializirovannaia Bol'nitsa im. Z. P. Solov'eva, USSR) Teoriia i Praktika Fizicheskoi Kul'tury, July 1982, p. 48, 49. In Russian.

The effects of aerobic exercises and training on the cardiovascular system of individuals with physiological states on the border between the normal and the pathological (e.g., quick fatigue, weakness, irritability, and low work capacity) are investigated in order to determine effective treatments for this condition. Results for both male and female patients show that aerobics reduces anxiety and nervousness, and also stimulates the reserves of the sympathetic-adrenal system. In addition, aerobics also helps restore the diurnal rhythms of the sympathetic-adrenal system in patients with border-line states, especially when these rhythms have been nearly level. Using aerobics, the characteristic rhythms of the sympathetic-adrenal system having maxima in the morning and evening can be gradually restored in these patients. N.B.

## A83-11387

**THE DEPENDENCE OF IMMUNOLOGICAL CHANGES IN ATHLETES IN POLAR REGIONS ON THE INTENSITY OF THE PHYSICAL LOAD [ZAVISIMOST' IMMUNOBIOLOGICHESKIKH IZMENENII U SPORTSMENOV ZAPOLIAR'IA OT INTENSIVNOSTI FIZICHESKOI NAGRUZKI]**

V. S. NOVIKOV and A. A. ARZUMANOV (Voenno-Meditsinskaiia Akademiia, Leningrad, USSR) Teoriia i Praktika Fizicheskoi Kul'tury, July 1982, p. 29. In Russian.

## A83-11388

**THE EFFECT OF PHYSICAL EXERCISE ON CHANGES OF LYSOZYME IN THE BLOOD OF ATHLETES [VLIANIE FIZICHESKIKH NAGRUZOK NA IZMENENIIA LIZOTSIMA KROVI SPORTSMENOV]**

M. IA. LEVIN (Leningradskii Veterinarnyi Institut, Leningrad, USSR) Teoriia i Praktika Fizicheskoi Kul'tury, July 1982, p. 24-26. In Russian. refs

## A83-11389

**THE W170 DIFFERENTIATING TEST [DIFFERENTSIROVOCHNYI TEST W170]**

V. I. FILIMONOV and IU. R. VLADOVA (Cheliabinskii Gosudarstvennyi Institut Fizicheskoi Kul'tury, Chelyabinsk, USSR) Teoriia i Praktika Fizicheskoi Kul'tury, July 1982, p. 22, 23. In Russian.

The W170 differentiating test makes it possible to assess the aerobic work capacity of athletes who exercise separately their arms and legs on a bicycle ergometer. This makes it possible to clarify the character of the 'prime mover' (arms or legs) of an athlete and the correspondence of this character with a model representation for a given type of athletic activity. B.J.

## A83-11391

**A CORRELATION ANALYSIS OF MACROMETRIC PARAMETERS OF THE PULMONARY HEART DURING CHRONIC NONSPECIFIC DISEASES OF THE LUNGS [KORRELIATSIONNYI ANALIZ MAKROMETRICHESKIKH PARAMETROV LEGOCHNOGO SERD TSA PRI KHRONICHESKIKH NESPETSIFICHESKIKH ZABOLEVANIIAKH LEGKIKH]**

A. N. ZUBRITSKII (Akademiia Meditsinskikh Nauk SSSR, Sverdlovsk, USSR) Arkhiv Patologii, vol. 44, 1982, p. 38-43. In Russian. refs

The relationships between the macrometric parameters of the right ventricle in individuals with a normal heart and in those with various stages of the development of pulmonary heart due to chronic nonspecific diseases of the lungs are examined in both patients and apparently healthy individuals who died at ages of 8-90 years. It is found that as the decompensation of the pulmonary heart develops, an increase in the mean values of these macrometric parameters takes place. In addition, the correlation relations between the mass of the right ventricle myocardium and its linear and planimetric parameters become rearranged, and these values tend to decrease under conditions of compensation. However, the stage of the pulmonary heart decompensation is characterized by an increase in the linkage of the linear and planimetric parameters of the right ventricle with the mass of the myocardium, due to the exhaustion of reserves. N.B.

## A83-11392

**THE EFFECTIVENESS OF VARIOUS METHODS OF REFLEX THERAPY FOR THE POSTNEURITIC CONTRACTION OF MIMIC MUSCLES [EFFEKTIVNOST' RAZLICHNYKH METODOV REFLEKSOTERAPII POSTNEVRITICHESKOI KONTRAKTURY MIMICHESKIKH MYSHTS]**

A. A. IAKOVENKO (Tsentral'nyi Institut Uovershenstvovaniia Vrachei, Moscow, USSR) Voprosy Kurortologii, Fizioterapii i Lechebnoi Fizicheskoi Kul'tury, July-Aug. 1982, p. 52-54. In Russian. refs

## A83-11393

**HETEROTOPIC OSSIFICATIONS IN REGIONS OF THE ELBOW JOINT AND THEIR TREATMENT WITH ULTRASOUND [GETEROTOPICHESKIE OSSIFIKATY V OBLASTI LOKTEVOGO SUSTAVA I IKH LECHENIE S PRIMENENIEM UL'TRAZVUKA]**

V. V. GUREV, IU. A. TOPOROV, M. A. ABDULKHABIROV, and N. N. RAZENKOV (Ministerstvo Zdravookhraneniia SSSR, Tsentral'nyi Nauchno-Issledovatel'skii Institut Travmatologii i Ortopedii, Moscow, USSR) Voprosy Kurortologii, Fizioterapii i Lechebnoi Fizicheskoi Kul'tury, July-Aug. 1982, p. 49, 50. In Russian. refs

## A83-11395

**THE CHANGES OF SEVERAL CEREBRAL HEMODYNAMIC INDICATORS DURING THE ACTION OF PHYSICAL FACTORS [IZMENENIIA NEKOTORYKH GEMODINAMICHESKIKH TSEREBRAL'NYKH POKAZATELEI PRI VOZDEISTVII FIZICHESKIMI FAKTORAMI]**

CH. I. MERDZHANOV and S. G. MERDZHANOVA (Meditsinskaiia Akademiia, Sofia, Bulgaria) Voprosy Kurortologii, Fizioterapii i Lechebnoi Fizicheskoi Kul'tury, July-Aug. 1982, p. 31-34. In Russian. refs

The use of two methods of quantitative rheoencephalography for determining the effects of physiotherapeutic factors on the functions of the cardiovascular system were examined in 411 individuals. It was found that the effects of an UHF electrical field, microwaves, novocaine and vitamin B-1 electrophoresis, didynamic currents, and ultrasound produced an increased hemispherical blood flow and a decreased duration of the brain circulation. N.B.

A83-11397

**AN EXPERIMENTAL STUDY OF THE DOSE DEPENDENCE OF THE EFFECT OF NOISE [EKSPERIMENTAL'NOE IZUCHENIE DOZNOI ZAVISIMOSTI VLIANIIA SHUMA]**E. I. DENISOV and V. G. SHINEV (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) *Gigiena i Sanitariia*, Aug. 1982, p. 12-15. In Russian. refs

The effect of noise at various doses on humans was investigated by combining noise levels of 90 and 100 dB(A) with varying lengths of time (15 and 150 minutes) to produce noise doses between 10-100% of the permissible noise dose of 85 dB(A) per 8 hours. Temporary deviations in the hearing threshold, as well as in the cerebral hemodynamics, were determined by rheoencephalography, and the visual-motor reactions were used as psychophysiological loads. The dose-effect relationship for noise was established according to specific and nonspecific reactions which can be expressed as  $1000 \text{ Hz} = 4.84 + 132 \text{ ND}$ , where ND is the noise dose in parts from the permissible dose. It is concluded that the evaluation of noise by energy levels is more accurate than by pressure levels in the ranges of noise levels tested, and that the dependence of temporary deviations in the threshold of hearing on the level, time, and dose can be used to predict the harmful effects of noise. N.B.

A83-11399

**THE PHYSIOLOGICAL OPTIMIZATION OF THE WORK OF MINERS [K VOPROSU O FIZIOLOGICHESKOI OPTIMIZATSII TRUDA GORNORABOCHIKH]**N. I. TARAPATA (Donetskii Meditsinskii Institut, Donetsk, Ukrainian SSR) *Gigiena i Sanitariia*, Aug. 1982, p. 25-27 In Russian refs

A83-11400

**A METHOD FOR THE QUANTITATIVE INTEGRAL EVALUATION OF FATIGUE [METODIKA KOLICHESTVENNOI INTEGRAL'NOI OTSENKI UTOMLENIIA]**G. I. KUTSENKO, E. I. SOSHNIKOV, B. N. MINCHIN, and V. S. VASIUKOVA (Vsesoiuznyi Nauchno-Issledovatel'skii Institut Sotsial'noi Gigieny i Organizatsii Zdravookhraneniia, Moscow, USSR) *Gigiena i Sanitariia*, Aug. 1982, p. 53-55 In Russian. refs

A formula is obtained for determining an individual integral index of work-related fatigue. The proposed approach makes it possible to give a quantitative characterization of the fatigue of different types of medical workers, independently of the type of method used to investigate this fatigue. This approach also makes it possible to evaluate the dominant trend and mean value of the dynamics of each physiological function investigated for an arbitrary work-shift. It is suggested that this approach can be used to optimize the work-rest conditions of medical workers. B.J.

A83-11402

**THE YEARLY INDIVIDUAL DOSES OF RADIATION FOR PERSONNEL WHO WORK WITH SOURCES OF IONIZING RADIATION [GODOVYE INDIVIDUAL'NYE DOZY OBLUCHENIIA PERSONALA, RABOTAUSHCHEGO S ISTOCHNIKAMI IONIZIRUIUSHCHIKH IZLUCHENII]**K. K. POPLAVSKII (Ministerstvo Zdravookhraneniia RSFSR, Leningradskii Nauchno-Issledovatel'skii Institut Radiatsionnoi Gigieny, Leningrad, USSR) *Gigiena i Sanitariia*, Aug 1982, p. 74, 75. In Russian.

A83-11403

**CERTAIN BIOCHEMICAL INDICES IN HEALTHY HUMANS UNDER THE EFFECT OF HIGH CONCENTRATIONS OF CARBON MONOXIDE AND CARBON DIOXIDE IN A SEALED CHAMBER [NEKOTORYE BIOKHEMICHESKIE POKAZATELI U ZDOROVOGO CHELOVEKA PRI VOZDEISTVII NA NEGO VYSOKIKH KONTSENTRATSII OKISI I DVUOKISI UGLERODA V USLOVIAKH GERMOOB'EMA]**A. V. SEDOV, G. E. MAZNEVA, G. E. MAZNEVA, G. F. VOROBEV, T. A. LUKICHEVA, and S. V. BYCHKOV *Gigiena i Sanitariia*, Aug. 1982, p. 77, 78. In Russian refs

A83-11405

**THE ADAPTATION OF THE NEURO-PSYCHIC SYSTEM IN SAILORS OF THE MARINE AND INLAND WATERWAY FLEETS TO THE CONDITIONS OF SAILING [ADAPTATSIIA NERVNO-PSIKHICHESKOI SFERY PLAVSOSTAVA MORSKOGO I RECHNOGO FLOTA K USLOVIAM PLAVANIIA]**I. U. L. ZABIN *Sovetskaia Meditsina*, no 8, 1982, p. 80, 81. In Russian

A83-11826\* National Aeronautics and Space Administration, Ames Research Center, Moffett Field, Calif.

**THE BASAL GANGLIA-CIRCA 1982 - A REVIEW AND COMMENTARY**W. R. MEHLER (NASA, Ames Research Center, Biomedical Research Div., Moffett Field, CA) *Applied Neurophysiology*, vol. 44, 1981, p. 261-290. refs

A review is presented of recent studies which utilize new anterograde and retrograde axon transport methods in order to improve knowledge of the projection of the basal ganglia and to clarify their sites of origin. These studies have thrown new light on certain topographic connective relationships and have revealed several new reciprocal connections between constituent nuclei of the basal ganglia. Also examined are the many new histochemical techniques that are now providing regional biochemical overlays for connective maps of the central nervous system, especially regions in or interconnecting with the basal ganglia. N.B.

A83-11878

**THE EFFECT OF GEOMAGNETIC DISTURBANCES ON HUMAN BIORHYTHMS [VLIANIE GEOMAGNITNOI VOZMUSHCHENOSTI NA BIORITMY CHELOVEKA]**

A. M. CHERNUKH, L. I. VINOGRADOVA, B. M. GEKHT, and K. F. NOVIKOVA In: The effect of solar activity on the biosphere. Moscow, Izdatel'stvo Nauka, 1982, p. 47-50. In Russian. refs

Results are presented of studies concerning the effects of geomagnetic activity on parameters of biological rhythms and on the formation of acute conditions in patients who suffer from disruptions of their vegetative regulation due to functional and organic causes. The relationships between the changes in the level of geomagnetic activity and the frequency of the appearance of vegetative-vascular paroxysms in groups of these patients are evaluated. It is concluded that geomagnetic activity and the dynamics of the interplanetary magnetic field severely affect the adaptive mechanisms of individuals with diseases of the hypothalamus. N.B.

A83-11879

**THE SECTOR STRUCTURE OF THE INTERPLANETARY MAGNETIC FIELD AND DISTURBANCES OF THE CENTRAL NERVOUS SYSTEM [SEKTORNAIA STRUKTURA MEZHPLANETNOGO MAGNITNOGO POLIA I NARUSHENIIA DEIATEL'NOSTI TSENTRAL'NOI NERVNOI SISTEMY]**

I. U. S. NIKOLAEV, I. A. RUDAKOV, S. M. MANSUROV, and L. G. MANSUROVA In: The effect of solar activity on the biosphere. Moscow, Izdatel'stvo Nauka, 1982, p. 51-59. In Russian. refs

The effect of solar activity on the biosphere is investigated by comparing the occurrence of solar-affected geophysical phenomena with the condition of patients suffering from nerve and psychic diseases. It is shown that during a period of low solar activity the rate of the appearance of psychopathological syndromes in patients with nerve and psychic disorders is closely correlated with the interplanetary magnetic field. For two days before the earth intersects the boundaries between the sectors of the interplanetary magnetic field this effect is at a minimum, while for two days following the intersection it is at a maximum. The relationship between the micropulsations of the geomagnetic field of the Pc2-4 type and the interplanetary magnetic field show that these micropulsations are an important ecological factor and that temporary decreases in their amplitude during daylight hours (or their disappearance during some magnetic storms) have an adverse effect on humans. N.B.

A83-11880

**AN INVESTIGATION OF THE CONNECTION BETWEEN SOLAR ACTIVITY AND THE SEVERITY OF THE CONSEQUENCES OF TRAFFIC ACCIDENTS IN MOSCOW [ISSLEDOVANIE SVIAZI SOLNECHNOI AKTIVNOSTI I TIAZHESTI POSLEDSTVII DOROZHNO-TRANSPORTNYKH PROISSHESTVII V MOSKVE]**

IU S. ZAGUSKIN and V. N. IVANOV In: The effect of solar activity on the biosphere. Moscow, Izdatel'stvo Nauka, 1982, p 59-63. In Russian. refs

A comparison of the daily compilations of the number of traffic accidents in Moscow with solar-activity data for 1973-1974 shows that on the days of magnetic disturbances the number of traffic accidents was 12-30% greater than on either the preceding or following three days. In addition, it is found that increases in the magnetic disturbances were correlated with growths in the number of victims, in which the largest increase occurred among children up to 16 years of age. A comparison of the yearly number of victims for every 10,000 people in Moscow during the years 1946-1974 with the Kp index and with the corresponding Wolf numbers shows an 11-year cycle in the number of traffic accidents. N.B

A83-11882

**THE STATE OF THE ADRENAL CORTEX FUNCTION IN HEALTHY INDIVIDUALS DURING CHANGES IN GEOMAGNETIC ACTIVITY [SOSTOIANIE KORTIKOIDNOI FUNKTSII NADPOCHECHNIKOV U ZDOROVYKH LIUDEI V USLOVIAKH IZMENENIIA GEOMAGNITNOI AKTIVNOSTI]**

E. A. ZAGORSKAIA, T. A. BELOVA, K. P. ANDREEV, and V. N. BENEVOLENSKII In: The effect of solar activity on the biosphere. Moscow, Izdatel'stvo Nauka, 1982, p 73-81. In Russian. refs

A correlation has been found between the levels of the urinary excretion of corticosteroid compounds in humans and the fluctuations of geomagnetic disturbances. The experiments were conducted on 16 clinically healthy males from 20-40 years of age who were placed in stationary conditions for 10-15 days. The experiments identified several groups of corticosteroids, as well as their precursors and metabolites, which gave a total representation of the functional activity of the adrenal glands. It was found, however, that the directions of the changes in corticosteroid activity were not identical throughout the group as a whole. It is concluded that geomagnetic disturbances act to increase or decrease the urinary excretion of adrenal corticosteroid hormones. N.B

A83-12067

**COLOR VISION IS ALTERED DURING THE SUPPRESSION PHASE OF BINOCULAR RIVALRY**

E. L. SMITH, III, D. M. LEVI, R. S. HARWERTH, and J. M. WHITE (Houston, University, Houston, TX) Science, vol. 218, Nov. 19, 1982, p. 802-804. refs

(Contract NIH-EY-03611; NIH-EY-01139, NIH-EY-01728)

Increment-threshold spectral sensitivity functions were determined during the dominance and suppression phases of binocular rivalry. The shapes of the functions obtained during the dominance phase exhibited three maxima at approximately 440.530, and 610 nanometers and resembled functions obtained for nonrivalrous control conditions. However, the functions measured during suppression had a single broad peak near 555 nanometers and were adequately described by functions measured with flicker methods during nonrivalrous conditions. The results indicate that binocular rivalry differentially attenuates opponent-color information relative to achromatic information. (Author)

A83-12089

**EFFECTS OF CARBON DIOXIDE INHALATION ON PSYCHOMOTOR AND MENTAL PERFORMANCE DURING EXERCISE AND RECOVERY**

J. B. SHEEHY, E. KAMON, and D. KISER (Pennsylvania State University, University Park, PA) Human Factors, vol. 24, Oct. 1982, p. 581-588 U.S. Bureau of Mines refs (Contract USBM-JO-100092)

Psychomotor and mental tests involving reaction time, rotor pursuit, short-term memory for digits and letters, and reasoning ability were administered to subjects inhaling up to 5% CO<sub>2</sub> in air and in gas mixtures containing 50% O<sub>2</sub>. The psychomotor and mental tests were given during the 6 min of recovery following 10 min of treadmill running at 80% of aerobic capacity. Although the subjects inhaled the CO<sub>2</sub> during the entire exercise and recovery period there was no difference in performance between the CO<sub>2</sub> inhalation condition and the control condition for any of the performance measures (Author)

A83-12212

**THE OMEGA-POTENTIAL - A QUANTITATIVE INDICATOR OF THE CONDITION OF THE STRUCTURE OF THE BRAIN AND THE ORGANISM. II - THE POSSIBILITIES AND LIMITATIONS OF THE USE OF THE OMEGA-POTENTIAL FOR RAPID EVALUATIONS OF THE CONDITION OF THE HUMAN BODY [OMEGA-POTENTIAL-KOLICHESTVENNYI POKAZATEL' SOSTOIANII STRUKTUR MOZGA I ORGANIZMA. II - VOZMOZHNOSTI I OGRANICHENIIA ISPOL'ZOVANIIA OMEGA-POTENTIALA DLIA EKSPRESS-OTSENKI SOSTOIANII ORGANIZMA CHELOVEKA]**

V. A. ILIUKHINA, A. G. SYCHEV, N. I. SHCHERBAKOVA, G. I. BARYSHEV, and V. V. DENISOVA (Akademiia Meditsinskikh Nauk SSSR, Leningrad, Krasnodarskii Vrachebno-Fizkul'turnyi Dispanser, Krasnodarskii Gosudarstvennyi Universitet, Krasnodar, USSR) Fiziologiya Cheloveka, vol. 8, Sept-Oct. 1982, p. 721-733. In Russian. refs

The use of the omega-potential during the discrete recording from the surface of the brain for the rapid evaluation of the human body both in normal and pathological states is examined. On the basis of experimental data and a review of the literature, the various types of very-slow processes are shown to be universal for the brain, and for the secretory and effector organs and tissues. Using this information, a method for the rapid evaluation of the human body is developed using the changes in the omega-potential as the indicator. The method consists of the evaluation of the initial values of the omega-potential during its discrete recording from the surface of the brain and from the body of a human subject. The stability and the limits of the variation of this indicator during repeated investigations in the same and similar conditions are then observed. The size and direction of the displacements of the omega-potential are determined at various time intervals after the production of a single functional load in the course of completing physical or athletic activity, and also during the recovery process at a hospital. N.B.

A83-12217

**THE CHANGES IN THE MONOSYNAPTIC REFLEX EXCITABILITY IN THE PERIOD OF THE ORGANIZATION AND FULFILLMENT OF VOLUNTARY MOTOR RESPONSES [IZMENENIE MONOSINAPTICHESKOI REFLEKTORNOI VOZBUDIMOSTI V PERIOD ORGANIZATSII I VYPOLNENIIA PROIZVOL'NYKH DVIGATEL'NYKH OTVETOV]**

L. GERILOVSKII, A. GIDIKOV, A. KOSEV, and N. RADICHEVA (B'lgarska Akademiia na Naukite, Sofia, Bulgaria) Fiziologiya Cheloveka, vol. 8, Sept.-Oct. 1982, p. 861-867. In Russian. refs

The changes in the amplitude and form of H-potentials measured using monopolar electrodes were studied in humans during the organization and fulfillment of voluntary motor responses to a light signal. The presence of a period of silence in conditions when the H-potential arose before the initiation of the voluntary motion was determined, and was found to lead to an imprecision in the determination of this initiation. The actual initiation of the voluntary EMG response was determined with significantly more

accuracy in conditions when the motor response was realized with both legs. The H-potential was evoked in the ipsilateral soleus muscle while the actual initiation of the response was determined according to the initiation of the EMG response of the contralateral muscle. In these conditions a correlation for the equivalent level of desynchronization between the responses of both legs was introduced. It is concluded that a phase of specific 'adjustment' exists, which precedes by 40-45 msec the initiation of the voluntary response N.B.

#### A83-12218

##### THE EFFECT OF COLD ON THE THERMOREGULATORY REACTIONS OF HUMANS IN SIBERIA [VLIANIE KHOLODOVYKH VOZEISTVII NA THERMOREGULIATORNYE REAKTSII CHELOVEKA V USLOVIAKH SIBIRI]

V. A. MATIUKHIN, N. D. NEDBAEVA, and G. M. DIVERT (Akademiia Meditsinskikh Nauk SSSR, Novosibirsk, USSR) *Fiziologiya Cheloveka*, vol 8, Sept.-Oct. 1982, p 868-873. In Russian. refs

The thermoregulatory reactions of individuals living in Western Siberia and in individuals who moved to that region from European Russia and Central Asia were investigated both before and after the effects of cold. It was found that for Siberians and new arrivals, the thermoregulatory reactions after the influence of cold were more greatly expressed in the first year of observation than in the third. The new arrivals from the southern regions were less resistant to the influence of cold than Siberians, especially during the first year of observation. This is manifested in an increase in the demand for oxygen in response to the influence of cold, and in most cases in a lowering of the temperature of the body below the normal level, and the absence of occasions of the increase of this indicator above the initial values. N.B.

#### A83-12251#

##### PRECARDIAL MAPPING OF ST-T SEGMENT IN ACUTE MYOCARDIAL INFARCTION

R. R. KAPUR (Air India, Bombay, India), S. KRISHNAMURTI (St. John Medical College, Bangalore, India), V. M. ALURKAR (Military Hospital, Poona, India), and P. C. CHATTERJEE (Indian Air Force, Institute of Aviation Medicine, Bangalore, India) *Aviation Medicine*, vol 26, June 1982, p. 1-12 refs

A quantitative estimation of ST-T segment deviation from multiple precordial ECG leads is a fairly sensitive index of the geographic extent of myocardial ischaemia. Precordial ST-T segment mapping was done with 72 electrode positions in 20 patients admitted with acute myocardial infarction to a coronary care unit. Mapping was also done on five normal subjects as controls. The results show a good correlation with simultaneous clinical and enzymatic evaluation of the severity (extent) of myocardial ischaemia, and its duration in acute anterior myocardial infarction. It failed to reveal inferior wall as well as subendocardial infarction. ST-T mapping is a good bedside guide for a clinician and retains its popularity because of its low cost, noninvasive approach, and standard rules of interpretation (Author)

#### A83-12252#

##### EFFECT OF SHORT TERM EXPOSURE TO HYPOXIA ON SYSTOLIC TIME INTERVALS

N. N. AGGARWAL (Indian Air Force, Institute of Aviation Medicine, Bangalore, India) *Aviation Medicine*, vol 26, June 1982, p 13-20. refs

Two groups of ten subjects each were studied to assess the effects of short term hypoxia on systolic time intervals (ST). One group consisted of normal ECG healthy adult volunteers and the other of adult subjects in a lower medical category with the diagnosis of ischaemic heart disease having ECG abnormalities mainly consisting of ST-T changes. Simultaneous recordings of ECG, indirect carotid pulse tracking, phonocardiogram and apex cardiogram were taken in resting subjects in supine position at ground level, and at a simulated altitude of 15,000 ft, in a decompression chamber at 15 minute intervals for a total duration of 45 min of hypoxia. STIs were measured. While the QS(2) difference was insignificant between the two groups at ground level and under identical conditions of hypoxia, the abnormal ECG

group showed increased PEP, decreased LVET and significantly increased PEP/LVET ratio when recorded after 45 min of hypoxia, though no such difference was noted up to 30 min. (Author)

#### A83-12254#

##### AN ANALYSIS OF SPINAL INJURIES AFTER EJECTIONS AND CRASH LANDINGS IN THE IAF

M. M. DOGRA (Indian Air Force, Aero Medical Training Centre, Hindan, India), R. R. KAPUR (Air India, Bombay, India), and P. M. SUNDARAM (Indian Air Force, Medical Services, New Delhi, India) *Aviation Medicine*, vol 26, June 1982, p. 29-34. refs

This study includes detailed follow up of spinal injury cases involved in successful ejections and crash landings in the Indian Air Force. In the period 1960-1980, there were 69 spinal injury cases from 209 successful ejections. During 1974-1980, out of 46 pilots involved in crash landings, 5 sustained spinal injuries. The maximum incidence of ejection spinal injuries has been seen in Marut Aircraft. Compression vertebral fracture has been the most common injury. Most cases were hospitalized for less than 30 days. Majority of spinal injury cases resumed flying within 16 months, 22 pilots could not resume fighter flying. Only 2 spinal injury cases were invalidated out of service (Author)

#### A83-12256#

##### PHYSIOLOGICAL CRITERIA OF UPPER LIMITS OF BODY HEATING

P. K. BANERJEE (Indian Air Force, Institute of Aviation Medicine, Bangalore, India) *Aviation Medicine*, vol 26, June 1982, p. 39-42 refs

Human tolerance to acute heat exposure was studied using ten male volunteers in simulated air temperature of 50 C with 60% relative humidity. The exposure level is common in low-level, high-speed flying in the summer and has relevance to military aviation. Every 15 minutes measurements were made of mouth and skin temperature as well as of heart rate. Perspiration loss was calculated from body weight before and after the test. The results were compared to a number of earlier studies, including Billingham and Jones, 1957. The present study confirms the criteria for the upper limits of safe body heating for aircrew established in the 1957 report: mouth temperature 38 C, heart rate 130 beats/min, perspiration rate 300 g/hr/m<sup>2</sup> in unacclimatized men. S.C.S.

#### A83-12258#

##### AGRICULTURAL AVIATION IN INDIA - A PERSPECTIVE WITH ACCENT ON AERO-MEDICAL PROBLEMS

M. SISHTA (Indian Air Force, New Delhi, India) *Aviation Medicine*, vol 26, June 1982, p. 53-56. refs

#### A83-12259#

##### PHYSIOLOGICAL ASPECTS AND SCOPE OF HYPERBARIC OXYGEN THERAPY

P. C. CHATTERJEE (Indian Air Force, Institute of Aviation Medicine, Bangalore, India) *Aviation Medicine*, vol 26, June 1982, p. 57-60.

#### A83-12262#

##### CURRENT TRENDS IN HYPERBARIC OXYGEN THERAPY

A. K. CHATTERJEE *Aviation Medicine*, vol. 26, June 1982, p. 71-73

Hyperbaric oxygen therapy extends conventional oxygen therapy such that a large amount of oxygen can reach the needed area directly via circulation. The most important applications of hyperbaric oxygen therapy are: carbon monoxide poisoning, gas gangrene, burns, decompression sickness and aeroembolism, indolent ulcers, peripheral vascular diseases, neurological conditions, radio necrosis, and infections. The treatment is not advised for viral infections and lung pathology among other conditions. The most common hazards of the treatment are barotitis and oxygen toxicity which usually occurs at pO<sub>2</sub> over 3 ATA. In general, the treatment is administered twice a day for two hours at 2 ATA. S.C.S.

A83-12406

**THE INFLUENCE OF DIFFERENTIAL PHYSICAL CONDITIONING REGIMENS ON SIMULATED AERIAL COMBAT MANEUVERING TOLERANCE**

W. L. EPPERSON (USAF, Eglin AFB, FL), R. R. BURTON (USAF, School of Aerospace Medicine, Brooks AFB, TX), and E. M. BERNAUER (California, University, Davis, CA) Aviation, Space, and Environmental Medicine, vol. 53, Nov 1982, p. 1091-1097. refs

The influence of different types of physical conditioning on the tolerance to a centrifugation profile, called the Simulated Aerial Combat Maneuvering, is investigated using 24 young male subjects. The subjects were assigned to groups as controls (no physical training), runners, and weight trainers, and they followed a 12-week protocol of specified physical training. Results show that the +Gz tolerance of the runners and controls increased at an average rate of 4 sec/week during the course of the experiment, while the weight trainers increased their G tolerance at an average rate of 15 sec/week. The difference between the group of weight trainers and the other two groups was statistically significant at the 5% level. In addition, fatigue scores indicate that the weight trainers take longer to reach a given level of fatigue than did the subjects in the other two groups. It is concluded that a physical conditioning program of weight training will improve human tolerance to aerial combat maneuvers. N B

A83-12407\* Iowa Univ., Iowa City.

**KNEE-LIGAMENT LOADING PROPERTIES AS INFLUENCED BY GRAVITY. I - JUNCTION WITH BONE OF 3-G RODENTS**

C. C. WUNDER, R. D. MATTHES, and C M TIPTON (Iowa, University, Iowa City, IA) Aviation, Space, and Environmental Medicine, vol 53, Nov 1982, p. 1098-1111. refs (Contract NGR-16-001-031; NIH-AM-08893-11)

The effect of 3-G conditions on the bone-to-ligament junctions of the knee is studied in rats. Results following chronic 3-G centrifugation of rats show that their bone-to-ligament junctions exhibited a force-sustaining capacity (F) which was 95 + or - 12% of the value for the control group. However, F was actually 29 + or - 5% greater for centrifuged rats than for control rats of comparable size, as the experimental animals grew to smaller body mass. It is concluded that gravity determines part of the magnitude of F, and therefore this value will probably be weaker after development in a weightless environment. N B

A83-12410

**A CASE REPORT - UNILATERAL CYCLOPLEGIA RESULTING FROM CARELESS USE OF TRANSERM-V**

D L ROPER and L. L. HALE (White-Wilson Medical Center, Fort Walton Beach, FL) Aviation, Space, and Environmental Medicine, vol. 53, Nov. 1982, p. 1129, 1130. refs

The transdermal delivery of scopolamine to combat motion sickness is a novel, safe, and efficient system with very few adverse effects. One significant side effect is cycloplegia resulting from direct ocular contamination with scopolamine - not from systemic absorption. Proper insertion and removal techniques along with thorough hand washing after handling the device should be emphasized. (Author)

A83-12411

**CIRCADIAN RHYTHMS AND FATIGUE - A DISCRIMINATION OF THEIR EFFECTS ON PERFORMANCE**

R. DODGE (Wright State University, Dayton, OH) Aviation, Space, and Environmental Medicine, vol. 53, Nov. 1982, p. 1131-1137. refs

Different effects between circadian rhythms and fatigue have been discriminated. The discrimination was based on human performance changes. It was shown that such changes, not related to loss of sleep, are more easily attributable to either circadian rhythm or fatigue effects. However, when they follow loss of sleep, discrimination becomes difficult. Consequently, a new, more direct way of describing them and their cause has been formulated. This type of change is then related to the jet-lag-by-time-zone myth. (Author)

N83-10758\* National Aeronautics and Space Administration, Washington, D. C.

**AEROSPACE MEDICINE AND BIOLOGY, A CONTINUING BIBLIOGRAPHY WITH INDEXES. SUPPLEMENT 236**

Sep 1982 78 p (NASA-SP-7011(236); NAS 1.21:7011(236)) Avail. NTIS HC \$7.00 CSCL 06E

This bibliography lists 207 reports, articles, and other documents introduced into the NASA scientific and technical information system in August 1982. M G.

N83-10759# Naval Submarine Medical Research Lab., Groton, Conn

**DEPTH PERCEPTION WITH YELLOW GOGGLES Interim Report**

J. S. KINNEY, S. M. LURIA, C. L. SCHLICHTING, and D. F. NERI 11 Aug. 1981 11 p refs (NSMRL-960) Avail: NTIS HC A02/MF A01

The ability of subjects to judge depressions in the snow was studied at a cross country ski area. Many pairs of depressions were made in the snow and each subject was asked to judge which depression in each pair was deeper. The percentage of correct judgments was significantly greater on an overcast day with yellow goggles than with luminance matched neutral goggles. E.A.K.

N83-10760\*# Technology, Inc., Houston, Tex. Life Sciences Div.

**SPECIAL REPORT ON THE DATA COLLECTION PROGRAMS FOR THE GROUND BASED NITROGEN WASHOUT EXPERIMENT. VOLUME 2: DETAILED PROGRAM DESCRIPTIONS, LISTINGS, EXAMPLES AND HARDWARE SPECIFICATIONS**

30 Jul. 1982 209 p (Contract NAS9-14880) (NASA-CR-167737; NAS 1 26:157737) Avail. NTIS HC A10/MF A01 CSCL 06B

Personal data input, decompression data, nitrogen washout, nitrogen data, and update computer programs are described. Input data and formats; program output, reports, and data; program flowcharts; program listings; sample runs with input and output pages; hardware operation; and engineering data are provided. N.W.

N83-10761# Defence Research Information Centre, Orpington (England).

**THE ENDANGERING OF MANKIND BY MICROWAVES AND RADIO WAVES**

J. BERNHARDT Jun. 1982 18 p refs Transl. into ENGLISH of Deut. Med. Wochenschr., (West Germany), v. 104, no. 50, 1979 p 1757-1761 (DRIC-T-6709; BR83907) Avail: NTIS HC A02/MF A01

Data on the effect of microwaves, radio waves, and electric and magnetic fields on man are summarized. Effect (heat or stimulation), penetration depth, organ affected, biological reactions, threshold values, and exposure time recommendations are given. Author (ESA)

N83-10762# Army Research Inst. of Environmental Medicine, Natick, Mass. Military Ergonomics Div.

**CARDIORESPIRATORY RESPONSES TO VARIED EXERCISE DISTRIBUTIONS BETWEEN UPPER AND LOWER BODY MUSCLE GROUPS**

M. M. TONER, M. N. SAWKA, L. LEVINE, and K. B. PANDOLF 5 May 1982 25 p refs (Contract DA PROJ. 3E1-62777-A-878) (AD-A115092; USARIEM-M-30/82) Avail. NTIS HC A02/MF A01 CSCL 06S

The present study examined the influence that distributing exercise between upper (arm crank exercise) and lower (cycle exercise) body muscle groups had upon cardiorespiratory responses to constant power output (PO) exercise. Six male volunteers completed five submaximal exercise bouts at both 76

and 109 W of 7 min duration. Resulting data suggested that during upper body exercise the increased VO<sub>2</sub> associated with increased % arm values was not accompanied by an elevated HR response when at least 40% of the PO was performed by the lower body. This might be attributed to a facilitated venous return and/or a decreased total peripheral resistance when the lower body was involved in the exercise. GRA

**N83-10763#** Wisconsin Univ., Madison. Dept of Veterinary Science.

**LUNG METABOLISM, FUNCTION, AND MORPHOLOGY DURING HYPEROXIC AND HYPERBARIC EXPOSURE Interim Report, 1 Jan. - 31 Dec. 1981**

J. A. WILL Dec. 1981 14 p  
(Contract AF-AFOSR-3497-78; AF PROJ. 2312)  
(AD-A117074; AFOSR-82-0536TR) Avail NTIS HC A02/MF A01 CSCL 06S

Productivity resulting from the multi-disciplinary approach we have been developing for studying O<sub>2</sub> toxicity is obvious. We have quite thoroughly defined (both qualitatively and quantitatively) the temporal sequelae of cardiopulmonary structural changes associated with onset, duration, and intensity of O<sub>2</sub> exposure as well as changes due to varying the rate of withdrawal from the hyperoxic environment. These studies in rats, rabbits, and hamsters have been extended to testing a variety of pharmacologic as well as dietary manipulations which alter tolerance to pulmonary O<sub>2</sub> toxicity and hypoxic pulmonary vasoconstriction. At present, each bit of information obtained continues to direct us toward microsomal enzymes and serotenergic regulation. Our major goals for Year 05 involve studies directed at the involvement of these systems in the oxygen-related insults. GRA

**N83-10764#** Letterman Army Inst. of Research, San Francisco, Calif.

**THE DEVELOPMENT AND EVALUATION OF HEMOGLOBIN SOLUTION AS A BLOOD SUBSTITUTE**

F DEVENUTO and A. I. ZEGNA 18 Jun. 1982 15 p refs  
Presented at the Army Sci. Conf., 15-18 Jun. 1982  
(AD-A117318) Avail: NTIS HC A02/MF A01 CSCL 06E

The development and evaluation of an effective Hb solution as a blood substitute are important not only for the care of casualties resulting from mass disasters, but also for eventual use in other special clinical situations. Substantial improvements have been made by several recent research efforts in the general purity and quality of experimental Hb solutions. Such improvements have enabled investigators to study the potential applications of Hb solutions in far less ambiguous manner than was previously possible. These studies have produced a reasonably clear picture of the limitations of the current product and an insight for approaches in a systematic improvement. The Hb solution as presently formulated, although has the limitation of short vascular retention time, potentially could be useful in several applications such as transfusions in patients who cannot receive immediate medical assistance, but could receive blood after a few hours, or transfusions in patients who cannot receive medical care for prolonged periods of time, provided that the Hb and blood volume losses are restored by periodic or continuous infusion of Hb solution. Furthermore, the present product could be useful in open heart surgery, in organ perfusion and in situations of uncontrolled bleeding. GRA

**N83-10765#** Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

**THE HEALING PROCESS WITH VERTEBRAL FRACTURE, WITH SPECIAL CONSIDERATION OF THE QUESTION OF TRAUMATIC SPONDYLOSIS DEFORMANS. PART 1. ANIMAL EXPERIMENTS**

A. LOB 7 Jun 1982 23 p refs Transl. into ENGLISH from Dtsche Z. Chir. (East Germany), v. 248, 1937 p 452-466  
(AD-A117464, FTD-ID(RS)T-0506-82) Avail. NTIS HC A02/MF A01 CSCL 06E

The occurrence of a traumatically caused localized spondylosis deformans and the healing process of vertebral fracture in general and its relation to spondylosis deformans were investigated. Serial investigations of X-rays, observations on macerated preparations, and histological findings show that (1) vertebral fracture heals predominantly toward the endosteum with perosteal callus. The callus formation attains only moderate extent and is always limited to the fracture site and its immediate vicinity. It never leads to spondylotic edge growth or bridge formation, (2) spondylotic changes occur only after injury to the anterior fiber ring of the disc; (3) callus formation and development of spondylotic changes are two different processes which can be separated satisfactorily in every animal experiment in the X-rays, in macerated preparations, and in the histologic sections. (GRA)

**N83-10766#** Deputy Chief of Staff for Research Development and Acquisition (Army), Washington, D.C.

**BIOEFFECTS DATA CONCERNING THE SAFE USE OF GAAS LASER TRAINING DEVICES**

D. J. LUND, E. S. BEATRICE, and S. T. SCHUSCHERBA Jun. 1982 14 p refs  
(AD-A117810) Avail. NTIS HC A02/MF A01 CSCL 06R

The MILES system simulates the firing of live munitions for training purposes. A gallium arsenide laser transmitter is mounted on, and boresighted with, each weapon, and all potential targets are equipped with detectors sensitive to GaAs laser radiation. When a weapon is triggered, no projectile is fired, rather a signal is transmitted from the laser and directed at the intended target. The success of the round is scored upon receipt of the signal at the target. The system is effective; however it does present a problem. The MILES system transmits laser beams at personnel; the probability of their eyes being exposed is high. It is essential that the consequences of such ocular exposure be understood to insure that the signal used for simulation does not carry potential harm. GRA

**N83-10767#** Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering

**FEEDBACK INFORMATION AND ANALYSIS FOR MICROPROCESSOR CONTROLLED MUSCLE STIMULATION M.S. Thesis**

D. J. HEICHEL Dec. 1981 141 p refs  
(AD-A115532; AFIT/GE/EE/81D-26) Avail: NTIS HC A07/MF A01 CSCL 06P

A cat was fitted with feedback sensors which provided information on joint position and foot force during unrestrained locomotion. A harness outlining the rear leg skeleton of the cat was designed. The harness was worn and supported by the animal. It contained position transducers at the joints and followed the movement of the leg throughout the step cycle. The harness restricted the rotational and lateral movements of the leg. Other feedback sensors were developed to sense foot contact and force. A simple contact switch on the ball of the foot of the cat was used with feedback harness to show exact foot placement. A force transducer designed to mount on the foot of the cat provided additional feedback from the foot. The cat was walked under different conditions to obtain position data for models of the gait cycle. Hip action with respect to a ground plane was observed for leg motion modeling. The cat was also walked on a treadmill with electromyograph activity recordings for the flexor and extensor group of each joint. This joint provided information to model the activity sequence in the muscles during locomotion. From the tabulated leg position, foot forces, hip motion and muscle activity,

a model walk is presented for future microprocessor controlled stimulation experimentation for paralysis Author (GRA)

**N83-10768#** Naval Ocean Systems Center, San Diego, Calif.  
**REMOTE MEDICAL DIAGNOSIS SYSTEM (RMDS) ADVANCED DEVELOPMENT MODEL (ADM) AT-SEA TEST RESULTS**

W. T. RASMUSSEN, I STEVENS, P D HAYES, and J. WEST  
Jan 1982 99 p refs Prepared in cooperation with WESTEC Services, Inc, San Diego, Calif.  
(Contract N66001-78-C-0274; PROJ. M0933PN)  
(AD-A114374; NOSC-TR-690) Avail NTIS HC A05/MF A01  
CSCL 06E

This report provides the results of at-sea experimental evaluation of video transmissions of radiographs over the Remote Medical Diagnosis System (RMDS) advanced development model terminals. The objectives of this evaluation were (1) to obtain quantitative and qualitative data on the functional parameters of the RMDS ADM terminals and components, (2) to define design risks associated with the current approach to RMDS implementation, and (3) to provide baseline data to support follow-on procurement of RMDS engineering development model (EDM) terminals. Author (GRA)

**N83-10769#** Naval Submarine Medical Research Lab., Groton, Conn.

**FILTER STABILITY, DIAGNOSTIC CONSISTENCY, AND DURABILITY OF THE FARNSWORTH LANTERN COLOR VISION TEST Final Report**

H. M PAULSON 20 Apr. 1982 24 p refs  
(Contract MO100PN001)

(AD-A115052; NSMRL-979) Avail: NTIS HC A02/MF A01  
CSCL 06E

This Laboratory, as developer of the Farnsworth Lantern (FALANT), the U S Navy's color vision test, has been the recipient through the years of various queries about the test. To provide the answers, three investigations were undertaken. The filters in several 25 year old FALANTS were measured and found to still meet the transmittance, chromaticity, and neutrality specifications. Fifty nine color defectives were tested on NSMRL's FALANT and on a Naval Air Station's FALANT which was thought to be too stringent and all examinees received the same Pass/Fail results. A questionnaire evaluating the instrument's durability was sent to all the Armed Forces entrance and examining stations and the responses indicated essentially trouble free performance. Author (GRA)

**N83-10770#** Johns Hopkins Univ., Baltimore, Md.  
**HEALTH EFFECTS OF LOW LEVEL RADIATION IN SHIPYARD WORKERS Progress Report, Sept. 1981**

MATANOSKI Sep 1981 16 p  
(Contract DE-AC02-79EV-10095)  
(DE82-001112; DOE/EV-10095/1) Avail: NTIS HC A02/MF A01

In order to determine the effects of low-level doses of radiation it was necessary to define an adequate population, to gather and collate data relating to this population and to organize this data in such a manner as to render it suitable for analysis. Much of the groundwork, including the development of data collection systems and the establishment of liaisons with public and private data resources was completed. DOE

**N83-10771#** Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho. Safety Div

**HEALTH EFFECTS OF WELDING FUMES AND GASES**

B. W. HUNTSMAN Dec. 1981 29 p refs  
(Contract DE-AC07-76ID-01570)

(DE82-012199; EGG-SD-5546) Avail. NTIS HC A03/MF A01

A welder's exposure to harmful effluent is dependent on variables in personnel sampling, welding technique, equipment, and environmental situations. Upon entrance into the body, the welding contaminant may cause physical symptoms, respiratory diseases, and other illnesses. Charts listing these contaminants and their effects are included. Ventilation is the preferred method of

reducing employee exposure to airborne contaminants. Depending on the type of welding situation, a combination of ventilation and respiratory protection is required to achieve the desired result. DOE

**N83-10772#** Sandia Labs., Albuquerque, N. Mex  
**RECOMMENDATIONS FOR COLOR VISION TESTING AND CRITERIA FOR ITS IMPLEMENTATION AT SANDIA NATIONAL LABORATORIES**

L. L. YOUNG, III (Univ. Autonoma de Chihuahua) and P. B. MOSSMAN Jul. 1982 9 p refs  
(Contract DE-AC04-76DP-00789)  
(DE82-019826; SAND-82-1114) Avail: NTIS HC A02/MF A01

A color-vision test battery that classifies personnel according to the severity of their color vision abnormality is discussed. These tests will result in improved job placement of color-vision-deficient personnel and thereby reduce the possibility of job discrimination without adversely affecting safety, health, or logistics. Preliminary etiological and pathophysiological aspects are discussed briefly. DOE

**N83-10773#** National Library of Medicine, Bethesda, Md. Index Section

**MEDICAL SUBJECT HEADINGS, TREE ANNOTATIONS, 1983**

T CHAREN May 1982 125 p refs  
(PB82-208653; NLM-MED-82-02) Avail: NTIS HC A06/MF A01  
CSCL 05B

The Medical Subject Headings tree annotations designed for indexers and searchers are presented. The tree annotations have a two-fold purpose: first, to give a general statement on the approach indexers or searchers should pursue to a given tree, and second, to advise them of special features within that tree that they should be aware of before indexing or searching. M.G.

**N83-10774#** Applied Physics Lab., Johns Hopkins Univ., Laurel, Md

**BIOMEDICAL RESEARCH, DEVELOPMENT AND ENGINEERING AT THE JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LABORATORY Annual Report, 1 Oct. 1980 - 30 Nov. 1981**

Nov. 1981 59 p refs  
(PB82-184029; JHU/APL/MQR-81) Avail: NTIS HC A04/MF A01  
CSCL 06E

A program of biomedical research, development, and systems engineering was developed. The expertise in engineering, physical sciences, and systems analysis acquired in defense and space research and the development to problems of medical research and health care delivery are applied. Active collaboration projects exist in biophysics, ophthalmology, neurosensory research and instrumentation development, cardiovascular systems, patient monitoring, therapeutic and rehabilitation systems, clinical information systems, and clinical engineering. The application of state of the art technology has contributed to advances in many areas of basic medical research and in clinical diagnosis and therapy through improvement of instrumentation, techniques, and basic understanding. GRA

**N83-10775#** National Bureau of Standards, Washington, D.C. Office of Standard Reference Data

**MEDICAL PHYSICS DATA BOOK**

T. N. PADIKAL, ed. (National Cancer Inst., Bethesda, Md.) and S. P. FIVOZINSKY, ed. Mar. 1982 125 p refs. Sponsored by National Cancer Inst and American Association of Physicists in Medicine

(PB82-217175; NBS-HB-138; LC-81-600102) Avail: NTIS HC A06/MF A01  
CSCL 06E

Physical and chemical data useful in medical physics is provided. The information was extracted from other published sources. General physics, nuclear medicine, diagnostic radiology, radiation therapy, and non-ionizing radiation are considered. Author (GRA)

**N83-11392#** Twente Univ. of Technology, Enschede (Netherlands). Dept. of Electrical Engineering  
**THE HUMAN VISUAL SYSTEM**  
 D. BOSMAN *In* AGARD Image Process. Tech 22 p May 1982 refs  
 Avail NTIS HC A11/MF A01

The psycho-physical limits of performance are determined by the physical stimulus values at which there is 50% probability of detection: thresholds of the visual channel. Such visual characteristics are discussed. Author

**N83-11710#** Joint Publications Research Service, Arlington, Va.  
**HELIUM-NEON LASER USED TO TREAT ANGINA PECTORIS**  
 B. S. AGOV, N. D. DEVYATKOV, A. Y. ZHUK, N. S. MAKEYEVA, D. B. TSYKIN, and N. N. SHASTIN *In its* USSR Rept.: Life Sci Biomed. and Behavioral Sci., No. 23 (JPRS-82060) p 40-42 25 Oct. 1982 refs Transl. into ENGLISH from Klin. Med. (USSR), v. 60, no 5, May 1982 p 65-67  
 Avail: NTIS HC A07

Therapeutic effect of red light helium and neon laser (HNL) in patients with angina pectoris was studied. Experimental and clinical data on the beneficial effects of red HNL on metabolic processes in tissues, circulation and mitotic activity are presented. It is shown that exposure of the skin over the region of the rat heart is instrumental in dilating blood vessels, not only of the skin and subcutaneous cellular tissue, but the myocardium. Use of red light HNL for treatment of patients with angina pectoris over a 5 year period is reported. Indications and contraindications for laser therapy are elaborated, and the effect of HNL red light on parameters of peripheral blood, the EKG were studied and the mechanism of HNL effect on angina pectoris is determined. E.A.K.

**N83-11711#** Joint Publications Research Service, Arlington, Va.  
**MEDICAL USES FOR LASERS**  
 O. SEMENOVA *In its* USSR Rept. Life Sci. Biomed. and Behavioral Sci., No. 23 (JPRS-82060) p 45-47 25 Oct 1982 Transl. into ENGLISH from Leninskoye Znaniya (USSR), 16 May 1982 p 4  
 Avail. NTIS HC A07

Ultrasound for treatment of a number of occupational diseases was developed. Ultrasound has curative properties. It has become a physiotherapeutic agent, and it is used in surgery. The effects of prolonged contact with ultrasonic equipment to health are examined. It is found that general by ultrasound is harmless in low doses and even beneficial. The very same ultrasound however, that treats could cause some diseases if there is prolonged and periodically repeated contact. The development of pain in operators' hands, heightened sensitivity of the skin to cold and vegetovascular syndromes, is attributed to ultrasound. E.A.K.

**N83-11712#** Joint Publications Research Service, Arlington, Va.  
**HELIUM-NEON LASERS IN TREATMENT OF PATIENTS WITH ODONTOGENIC INFLAMMATORY DISEASES**  
 D. L. KORYTNYI, T. K. SUPIYEV, and D. M. ARTYGALIYEVA *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci., No. 23 (JPRS-82060) p 48-51 25 Oct 1982 refs Transl. into ENGLISH from Zdravookhr. Kaz (USSR), no. 6, Jun. 1982 p 42-44  
 Avail. NTIS HC A07

Treatment of acute suppurative and inflammatory diseases is to limit the spread of the infectious process. The clinical use of laser therapy, as a method for physiotherapy, is examined. Good results with the use of helium-neon lasers (HNL) in the treatment of a number of stomatological diseases in both adults and children are reported. The effects of laser therapy on aseptic staphylococcal infection in the region of the rabbit's mandible were studied and the possibility of using a combination of radiation with surgical intervention in the site of inflammation was determined. E.A.K.

**N83-11713#** Joint Publications Research Service, Arlington, Va.  
**ACCIDENTAL LASER INJURY TO FUNDUS OF BOTH EYES**  
 V. M. GAYDAY and V. I. FILIPPENKO *In its* USSR Rept.: Life Sci Biomed. and Behavioral Sci., No. 23 (JPRS-82060) p 52-54 25 Oct 1982 Transl. into ENGLISH from Voenno-Med. Zh (USSR), no 5, May 1982 p 56-58  
 Avail NTIS HC A07

Laser application in different sectors of technology, science and medicine is broadened which has caused an increase in the range of specialists related to production, adjustment and operation. It is found that the biological effect of laser radiation on man affects primarily the eyes. It is shown that infractions of safety rules when working with lasers causes eye damage which varies in severity with partially reversible or irreversible loss of visual functions. The effect of laser beams on a biological system can cause thermal burn, coagulation of protein structures and even mechanical trauma. E.A.K.

**N83-11714#** Joint Publications Research Service, Arlington, Va.  
**POSSIBILITY OF HYPERBARIC OXYGENATION AT MEDICAL EVACUATION STAGES**  
 S. B. GATAGOV, A. A. RAFALSKIY, and A. F. LITAVRIN *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci., No. 23 (JPRS-82060) p 66-71 25 Oct. 1982 Transl. into ENGLISH from Voenno-Med. Zh. (USSR), no. 5, May 1982 p 16-19  
 Avail NTIS HC A07

The use of hyperbaric oxygen in the treatment of hypoxia was examined. Effective control of hypoxia which is of interest to military physicians is discussed. Hypoxia frequently complicates the pathology of combat trauma with wound infection, acute poisoning, damage to the respiratory tract by gunpowder fumes, toxic smoke and other highly toxic impurities. Acute hypoxia causes difficulties in the implementation of therapeutic and evacuation measures. Early use of hyperbaric oxygenation (HBO) at different stages of medical evacuation is necessary for prompt restoration of oxygenation of the body. It is shown that wide use of hyperbaric oxygen in the practice of medical institutions enables to shorten the period of patient treatment and avoid development of many dangerous complications. E.A.K.

**N83-11717#** Joint Publications Research Service, Arlington, Va.  
**CHANGES IN BLOOD CLOTTING SYSTEM AFTER SURGICAL INTERVENTION ON LUNGS WITH EXPOSURE TO STATIC MAGNETIC FIELD**  
 Y. A. NOVIKOV *In its* USSR Rept. Life Sci. (JPRS-82061) p 4-7 25 Oct 1982 refs Transl. into ENGLISH from Anesteziologiya i Reanimatologiya (Moscow), no. 3, May - Jun. 1982 p 21-23  
 Avail: NTIS HC A05

Changes in blood coagulation and anticoagulation system as related to method of analgesia used, in the early postoperative period in patients who underwent lung surgery. The effect of static magnetic fields (SMF) on biological systems is discussed. Author

**N83-11718#** Joint Publications Research Service, Arlington, Va.  
**MAGNETOTHERAPY OF TRAUMA AND SOME DISEASES OF ATHLETES**  
 I. S. SHEPELEVA, Y. F. KAMENEV, N. A. DEMETSKAYA, Y. V. BOGDANOV, V. G. SLYUSARENKO, and K. S. BEKSEITOV *In its* USSR Rept.: Life Sci. (JPRS-82061) p 8-11 25 Oct. 1982 refs Transl. into ENGLISH from Teoriya i Prakt. Fiz. Kultury (Moscow), no. 3, Mar. 1982 p 56-58  
 Avail: NTIS HC A05

Physical methods play a rather important part among the diverse methods available to the system of rehabilitation of athletes with trauma and diseases of the skeletomuscular system. Use thereof reduces patient rehabilitation time and accelerates recovery of athletic work capacity. The choice and prescription of physical factors depend largely on conditions, under which athletes are rehabilitated after sustaining trauma. The possibilities of rehabilitation therapy are more favorable when there is a physiotherapy office and necessary specialists, and they are limited.

when the sports physician works at educational and training meets, where only portable physiotherapeutic equipment can be used. For this reason, the search for new and effective physical factors, use of which does not require cumbersome and complicated equipment, is one of the pressing problems of sports medicine in general and traumatology in particular. In this respect, magnetotherapy using a static magnetic field (SMF) is particularly promising; according to data in the literature, it has anti-inflammation, analgesic and vasodilating effects; it improves metabolic processes in tissues, normalizes regenerative processes and has a favorable psychological effect on patients. Author

**N83-11719#** Joint Publications Research Service, Arlington, Va.  
**ROLE OF GEOMAGNETIC FIELD IN ALTERATION OF ERYTHROCYTE SURFACE MEMBRANE PROPERTIES IN PATIENTS WITH CHRONIC, NONSPECIFIC LUNG DISEASES**  
 V. P. PYATKIN and V. L. SEMENOV *In its* USSR Rept.: Life Sci. (JPRS-82061) p 12-16 25 Oct 1982 refs Transl. into ENGLISH from Vopr. Kurortol., Fizioterapii i Lechebnoy Fiz. Kultury (Moscow), no 3, May - Jun 1982 p 12-15  
 Avail: NTIS HC A05

The influence of geomagnetic field (GMF) variations on the functional state of surface membranes of erythrocytes was investigated. N.W.

**N83-11720#** Joint Publications Research Service, Arlington, Va.  
**EFFECT OF STATIC MAGNETIC FIELD ON COMPRESSION OF CAROTID ARTERIES AND ASPHYXIA (EXPERIMENTAL STUDY)**  
 S. V. RUTSAY *In its* USSR Rept.: Life Sci. (JPRS-82061) p 17-20 25 Oct. 1982 refs Transl. into ENGLISH from Vopr. Kurortol., Fizioterapii i Lechebnoy Fiz. Kultury (Moscow), no 3, May - Jun. 1982 p 15-18  
 Avail: NTIS HC A05

The effect of preliminary and repeated exposure to a static magnetic field (SMF) on rat resistance to asphyxia and compression of the carotids. Since it is known that the central nervous system is highly sensitive to SMF. This effect was tested on the head of the animals. Brain function according to conditioned reflex activity was assessed. Author

**N83-11721#** Joint Publications Research Service, Arlington, Va.  
**USE OF SONIC RANGE MAGNETIC FIELDS IN TREATMENT OF SOME DISEASES**  
 A. G. KAKULIYA, L. A. ABULADZE, L. G. GLONTI, M. N. MELIKISHVILI, and L. S. URPANISHVILI *In its* USSR Rept.: Life Sci. (JPRS-82061) p 21-24 25 Oct 1982 refs Transl. into ENGLISH from Vopr. Kurortol., Fizioterapii i Lechebnoy Fiz. Kultury (Moscow), no. 3, May - Jun 1982 p 18-21  
 Avail: NTIS HC A05

The efficacy of magnetic fields (MF) in the sonic range was tested on patients with arteriosclerosis obliterans of the lower extremities and osteoarthritis deformans (OAD). The effect of a course of sonic-range MF was tested on the model of OAD in experiments on rabbits. Author

**N83-11723#** Joint Publications Research Service, Arlington, Va.  
**USE OF LASERS IN SURGERY**  
 A. S. KRYUK, V. P. KOSTYUK, V. P. DOLGOLIKOV, N. S. SERDYUCHENKO, and Y. F. PLATKOVSKIY *In its* USSR Rept.: Life Sci. (JPRS-82061) p 51-56 25 Oct. 1982 refs Transl. into ENGLISH from Zdravookhraneniye Belorussii (Minsk), no. 4, Apr. 1982 p 52-54  
 Avail: NTIS HC A05

The use of low-power lasers to stimulate repair processes in the case of trophic ulcers, consolidate fractures, and other applications is discussed. N.W.

**N83-11724#** Joint Publications Research Service, Arlington, Va.  
**NEW BOOK ON LASER TREATMENT OF WOUNDS**  
 A. K. POLONSKIY, Y. I. POLISHCHUK, and V. A. PAVLOV *In its* USSR Rept.: Life Sci. (JPRS-82061) p 57-59 25 Oct. 1982 Transl. into ENGLISH from Klinich. Khirurgiya (Kiev), no. 2, Feb. 1982 p 58-59  
 Avail: NTIS HC A05

The results of experimental studies and clinical use of lasers in the treatment of wounds are summarized. Author

**N83-11725#** Canada Inst. for Scientific and Technical Information, Ottawa (Ontario).  
**THE PROBLEM OF CREATING ARTIFICIAL BLOOD USING FLUOROCARBONS**  
 V. S. YAROCKIN and V. B. KOZINER 1982 27 p refs Transl. into ENGLISH from Patol. Fiziol. Eksp. Ter. (USSR), no 3, 1981 p 78-87  
 (NRC/CNR-TT-2032; ISSN-0077-5606) Avail: NTIS HC A03/MF A01

Research toward the creation of a synthetic blood substitute using fluorocarbons is reviewed. N.W.

**N83-11726\*#** National Aeronautics and Space Administration, Washington, D. C.  
**VOLUNTARY SODIUM INTAKE DURING EFFORT IN HOT ENVIRONMENTS**  
 E. SOHAR, R. ADAR, and A. HERSHCO Sep. 1982 11 p refs Transl. into ENGLISH from Harefuah, J. of the Med. Assoc. of Israel, v. 60, no. 10, May 1961 p 334-337 Transl. by Kanner (Leo) Associates, Redwood City, California Original doc. prep. by Tel-Hashomer Government Hospital  
 (Contract NASW-3541)  
 (NASA-TM-76954; NAS 1.15:76954) Avail: NTIS HC A02/MF A01 CSCL 06P

The factors that influence the amount of salt that a person adds to his food at mealtime, and the part played by the general requirement for salt in the daily diet stemming from the voluntary input of salt are studied. Careful measurements of salt intake and outflow were performed on ten marchers in a high temperature environment who were given individual salt shakers that were weighed before and after each meal. Some marchers were told to add salt to their meals on specific days. No parallelity was found between the voluntary sodium intake and the general sodium intake, the excretion of sodium in the urine or the environmental heat stress. Individual food habit was found to be the most important factor. R.J.F.

**N83-11727#** Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio. Environmental Quality Branch.  
**COMPARATIVE TOXICITY OF SELECTED AVIATION FUELS AS MEASURED BY INSECT BIOASSAY M.S. Thesis**  
 D. W. BOMBICK, L. G. ARLIAN, and J. M. LIVINGSTON Jul. 1982 55 p refs Prepared in cooperation with Wright State Univ.  
 (Contract AF PROJ. 6302)  
 (AD-A118362; AFAMRL-TR-82-31) Avail: NTIS HC A04/MF A01 CSCL 06T

The acute toxicity of JP-4, JP-8 and JP-9 fuels was evaluated for several terrestrial insects by contact exposure. JP-8 was the most toxic fuel to most of the insect species. Shale derived fuels were more toxic than their petroleum derived counterparts, however, species response varied with each type fuel. The order of decreasing susceptibility to petroleum derived JP-4 was earwigs, rice weevils, flour beetles, lady beetles, tenebrionid beetles and cockroaches. GRA

**N83-11728#** Army Environmental Hygiene Agency, Aberdeen Proving Ground, Md.

**HEALTH HAZARD EVALUATION OF LIQUID MONOPROPELLANTS. PHASE 2: EFFECTS OF DERMAL ADMINISTRATION OF HYDROXYLAMMONIUM NITRATE**

**Report, May 1980 - Mar. 1982**

A. ASAKI Mar. 1982 26 p refs  
(AD-A118415, USAEHA-75-51-0132-82) Avail: NTIS HC A03/MF A01 CSCL 06T

Skin application of hydroxylammonium nitrate (HAN) to rabbits for 3 weeks induced a high incidence of chronic and ulcerative dermatitis in all treatment groups including the lowest dose tested, i.e., 0.7 mg/kg. Higher doses, 1.5 to 11.7 mg/kg, caused Heinz body formation and red blood cell destruction. It is recommended that extreme caution be taken to prevent HAN from coming into contact with the skin. Personal protection, to include rubber gloves and chemical splash goggles, should be worn when working with this material. Author (GRA)

**N83-11729#** Michigan Univ., Ann Arbor. Highway Safety Research Inst.

**ANALYSIS OF HEAD AND NECK DYNAMIC RESPONSE OF THE U.S. ADULT MILITARY POPULATION** Annual Report, 1 Jul. 1981 - 30 Jun. 1982

B. M. BOWMAN and L. W. SCHNEIDER 27 Jul. 1982 39 p refs

(Contract N00014-81-K-0603; NR PROJ. 207-280)  
(AD-A118440; UM-HSRI-82-29; TR-1) Avail: NTIS HC A03/MF A01 CSCL 06S

Human subject data collected in the program of impact acceleration tests being conducted at the Naval Biodynamics Laboratory were analyzed to investigate the relationships between dynamic head/neck response and biomechanical properties of the neck. Study of these data with head/neck motion simulation has yielded important information pertinent to eventual construction of improved anthropomorphic dummies and has helped to improve the predictive capabilities of mathematical models. Author (GRA)

**N83-11730#** Naval Ocean Systems Center, San Diego, Calif  
**MECHANISM OF ELECTROMAGNETIC ENERGY EFFECTS OF THE NERVOUS SYSTEM. EXPERIMENTAL SYSTEM AND PRELIMINARY RESULTS** Preliminary Report, Oct. 1979 - 16 Jun. 1979

N. L. CAMPBELL and C. L. BRANDT 1 Jul. 1982 68 p refs  
(Contract ZR0000101)  
(AD-A117527; NOSC-TR-698) Avail: NTIS HC A04/MF A01 CSCL 06R

Effects of high-level electromagnetic (EM) energy on living nerve tissue were assessed by subjecting individual nerve cells of the marine gastropod *Aplysia californica* to microwave radiation levels of 10-300 mW/sq cm. Of the 84 cells exposed, five showed inhibitory responses and one showed excitatory response that required from 6 to 82 minutes to develop. In each case, the cell returned to normal activity within 70 minutes of removing the EM field. It appears from the data collected that interaction of EM energy with the electrical activity of nerve cells does exist, and that this interaction is not heat-related. Understanding the mechanism of this interaction will provide a valuable tool in determining the hazards of nonionizing EM energy and the necessary safety limits of exposure. Author (GRA)

**N83-11731#** Army Aeromedical Research Lab., Fort Rucker, Ala.

**OSCILLATIONS IN THE VISUAL RESPONSE TO PULSED STIMULI**

F. F. HOLLY Jun 1982 63 p refs  
(Contract DA PROJ. 3E1-61102-BS-07; DA PROJ. 3E1-62773-A-819)

(AD-A117428; USAARL-82-5) Avail: NTIS HC A04/MF A01 CSCL 05J

Dunlap (1915) reported a phenomenon in which a single photic pulse, presented in the periphery under mesopic conditions, is perceived as two sequential flashes. The present work indicates

that this double-flash effect is but a special case of a class of auto-oscillatory phenomena occurring at a frequency in the neighborhood of 10 Hz. Flicker studies by several investigators (e.g., de Lange, 1958) have indicated a resonance (temporal MTF peak) at approximately 10 Hz. It is believed that the frequency of the oscillatory phenomena described here results from the natural frequency of the network responsible for this peak. It is also believed that these phenomena are related to the oscillatory potentials which have been recorded from retina and cortex. The impetus for this work was provided by the need to explicate certain oscillatory phenomena which had been noted in the course of evaluating proposed lighting systems on new Army helicopters.

Author (GRA)

**N83-11732#** Medical Biological Lab. RVO-TNO, Rijswijk (Netherlands)

**TOXICOLOGY OF 1,2-DICHLOROETHANE**

D. M. W. ELSKAMP Nov. 1981 26 p refs In DUTCH, ENGLISH summary

(MBL-1981-13; TDCK-76173) Avail: NTIS HC A03/MF A01

The results of a search of the literature for the toxic characteristics of 1,2-dichloroethane are presented. Technical data, environmental and biological monitoring, toxicokinetics and data of acute and chronic toxicity for laboratory animals and humans are dealt with. The effects on reproduction and mutagenic and carcinogenic effects are discussed: the available data show that dichloroethane can only be slightly suspected. Author (ESA)

**N83-11733#** Medical Biological Lab. RVO-TNO, Rijswijk (Netherlands)

**TOXICOLOGY OF 1,1-DICHLOROETHANE**

D. M. W. ELSKAMP Nov. 1981 10 p refs In DUTCH; ENGLISH summary

(MBL-1981-14; TDCK-76174) Avail: NTIS HC A02/MF A01

The results of a search of the literature for the toxic characteristics of 1,1-dichloroethane are presented. Technical data, environmental and biological monitoring, toxicokinetics, and data of acute and chronic toxicity for laboratory animals and humans are dealt with. The effects on reproduction as well as mutagenic and carcinogenic effects are discussed. Author (ESA)

**N83-11734#** Institute of Applied Physiology and Medicine, Seattle, Wash.

**INVASIVE BLOOD FLOWMETERS** Final Report, 15 May 1973 - 15 Jun. 1974

J. M. REID 20 Jan. 1982 41 p refs  
(Contract NO1-HV-3-2994)

(PB82-190851; NO1-HV-2994-1) Avail: NTIS HC A03/MF A01 CSCL 06L

Catheter mounted ultrasonic Doppler blood flowmeters capable of measuring the volume flow of blood in small diameter vessels were explored. It is suggested that the instrument could be passed through the center of conventional catheters to obtain additional information from the examination. Ultrasonic Doppler electronics packages were tested for operation with the catheters. System testing for stability and accuracy showed that the basic calibration was feasible and measurements could be taken which were independent of the sensitivity of the catheters and of the electronics system. It is shown that the sources of interference and noise can be eliminated and that the catheter is a useful tool as a flow and aeroembolism monitor in animals. GRA

**N83-11735#** National Inst. for Occupational Safety and Health, Cincinnati, Ohio. Bureau of Occupational Safety and Health.

**A FOLLOW-UP SURVEY OF LASER INJURIES IN THE STATES OF CALIFORNIA, MASSACHUSETTS, AND NEW JERSEY**

G. A. GELLIN May 1969 22 p refs  
(PB82-196262; TR-67) Avail: NTIS HC A02/MF A01 CSCL 06R

Laser injuries were confirmed in a followup survey of establishments that use lasers in California, Massachusetts and New Jersey. Eye injuries caused field defects but no blindness developed among those with retinal injuries. Electrical shocks were

sustained but no one died. Skin burns from laser beam impact were diagnosed. Aspects of laser safety, case histories of affected workers, and methods of injury prevention are reviewed GRA

**N83-11736#** National Academy of Sciences - National Research Council, Washington, D. C. Committee on Vision.

**PROCEDURES FOR TESTING COLOR VISION Final Report**

Dec. 1981 131 p refs

(Contract N0014-80-C-0159)

(PB82-209693) Avail: NTIS HC A07/MF A01 CSCL 06P

Information on color vision tests was assembled. The administration, scoring, and interpretations of these color vision tests are described and studies of the validation of each test is evaluated. Additional material is included to make a self-contained reference source on procedures for testing color vision. Characterization of color vision and the classification of color vision defects are described. Recommendations are made for the appropriate use of color vision tests in occupational screening.

GRA

**N83-11737#** Institute of Applied Physiology and Medicine, Seattle, Wash.

**ULTRASONIC IMAGING DEVELOPMENT Annual Report, Sep. 1977 - Jun. 1978**

J. M. REID Mar. 1982 41 p refs

(Contract NO1-HV-2926)

(PB82-215518, NO1-HV-2926-1) Avail: NTIS HC A03/MF A01 CSCL 06A

Producing a continuous-wave Doppler arterial imaging system for the detection and quantitation of atherosclerosis was investigated. An automatic line scanning system, a new pulse-Doppler system for producing biplane images of the carotid bifurcation and a physiological interpretive display for presenting data in the form of a color map are discussed Author (GRA)

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### BEHAVIORAL SCIENCES

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

**A83-10503**

**THE FUNCTIONAL ASYMMETRY OF THE BRAIN AND THE DIRECT SUBJECTIVE EVALUATION OF LOUDNESS [FUNKTSIONAL'NAIA ASIMMETRIIA MOZGA I PRIAMAIA SUB'EKTIVNAIA OTSENKA GROMKOSTI]**

S. A. ZAKHAROVA Voprosy Psikhologii, July-Aug 1982, p. 135-137 In Russian. refs

The peculiarities of the direct subjective estimation of tone loudness were studied in left-handed subjects under conditions of the preferential stimulation of either of the two hemispheres of the brain. Two procedures, verbal and nonverbal, were utilized for the estimation of the tone loudness. Results show that no significant differences are found between the subjective estimations of tones addressed to different hemispheres. N.B.

**A83-10504**

**PRINCIPLES OF DIFFERENTIATION OF THE SELF-EVALUATION SCALES IN PSYCHOPHYSIOLOGICAL INVESTIGATIONS [PRINTSIPIY DIFFERENTSIROVANIYA SHKALY SAMOOTSENKI V PSIKHOFIZIOLOGICHESKIKH ISSLEDOVANIYAKH]**

G. K. MAKSIMOV and A. N. SINITSYN Voprosy Psikhologii, July-Aug. 1982, p. 124-128 In Russian. refs

Principles necessary for the proper design of scales that are used in psychophysiological studies for the estimation by the subjects of their state during conditions of stress are examined. A criterion for the optimal differentiation of the scales is proposed. The application of these principles has been found to increase

the efficiency of studies conducted under conditions of near stress. N.B.

**A83-10522**

**THE DYNAMICS OF THE GROWTH OF THE RESULTS OF HEAVY ATHLETES IN CONNECTION WITH PSYCHOMOTOR PECULIARITIES OF PERSONALITY [DINAMIKA ROSTA REZUL'TATOV TIAZHELOATLETOV V SVIAZI S PSIKHOMOTORNymi OSOBNOSTIAMi LICHNOSTI]**

V. A. SALNIKOV (Chuvashskii Gosudarstvennyi Pedagogicheskii Institut, Cheboksary, USSR), B. V. KIMEISHA (Omskii Politekhicheskii Institut, Omsk, USSR), and A. M. NIKITIN (Kirgizskii Gosudarstvennyi Institut Fizicheskoi Kul'tury, Frunze, Kirghiz SSR) Teoriya i Praktika Fizicheskoi Kul'tury, July 1982, p. 14-17 In Russian. refs

**A83-10533**

**THE EFFECT OF CHRONIC ALCOHOLIC INTOXICATION ON THE TEMPORAL PARAMETERS OF THE PROCESS OF 'MOTOR COMMAND' ORGANIZATION AND ON THE INTERHEMISPHERIC FUNCTIONAL RELATIONS IN HUMANS [VLIANIE KHRONICHESKOI ALKOGOL'NOI INTOKSIKATSII NA VREMENNYE PARAMETRY PROTSESSA ORGANIZATSII 'MOTORNOI KOMANDY' I MEZHPOLUSHARNYE FUNKSIONAL'NYE OTNOSHENIYA U CHELOVEKA]**

S. A. POGREBINSKII (Vsesoiuznyi Nauchno-Issledovatel'skii Institut Obshchei i Sudebnoi Psikhologii, Moscow, USSR) Zhurnal Vysshei Nervnoi Deiatel'nosti, vol. 32, July-Aug. 1982, p. 741-743 In Russian.

**A83-11137**

**OPTICAL INFORMATION FOR DESCENT IN FLIGHT SIMULATION**

L. J. HETTINGER, R. WARREN, and D. H. OWEN (Ohio State University, Columbus, OH) In: NAECON 1982; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 18-20, 1982. Volume 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1982, p. 435-439 refs

Studies of optical information required during flight simulation descent are presented, in an attempt to assess descent sensitivity of the viewer using fewer sources of information by negating optical flow acceleration. Twenty-eight observers performed 54 trials each, in which distinction between descent and level movement was made, and confidence was evaluated. Scores for proportion errors and mean reaction time were recorded. It is found that proportion error and reaction time decreased as the global optical flow rate increased, and the combination of a steeper path slope and more rapid flow rate tended to decrease the number of errors. In addition, increases in fractional descent rate caused decreases in proportion error and reaction time. Finally, it is determined that initial optical texture density variations (3-fold) seemed to have negligible effects. R.K.R.

**A83-11168#**

**INVESTIGATING THE CORRELATION BETWEEN READING ERRORS AND DEGRADED NUMERICS - OR, DO MISSING DOTS CALL THE SHOTS**

J. A. UPHAUS, JR and J. R. PASTOR (USAF, Flight Dynamics Laboratory, Wright-Patterson AFB, OH) In: NAECON 1982; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 18-20, 1982. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1982, p. 734-738. refs

Analytical and experimental procedures are developed which can be used to predict reading error rate when worst case dot loss occurs in flat panel dot matrix displays. A mathematical model of the human visual perception system is developed in order to generate degraded 7 x 9 ASCII numbers with predicted worst case dot loss characteristics. The model produces a Euclidian distance parameter which is inversely proportional to the visual similarity between two numbers, and the reading error rates for the degraded numbers are determined experimentally. Results show that high Pearson correlation coefficients are obtained for

the relationship of Euclidian distance ratio and reading errors. In addition, test results for goodness of fit are also found to support this relationship. N.B.

**A83-12068**  
**ROTATIONAL INVARIANCE IN VISUAL PATTERN RECOGNITION BY PIGEONS AND HUMANS**

V. D. HOLLARD and J. D. DELIUS (Bochum, Ruhr-Universität, Bochum, West Germany) *Science*, vol 218, Nov. 19, 1982, p. 804-806. Research supported by the Heinrich-Hertz Foundation, Ruhr-Universität Bochum, and Deutsche Forschungsgemeinschaft refs

Pigeons and humans chose which one of two alternative visual forms was identical to, or a mirror image of, a previously presented sample form. The two comparison forms were presented in various orientations with respect to the sample. The two species yielded similar accuracies, but although human reaction times depended linearly on the angular disparities, those of the pigeon did not. Humans appeared to apply a well-known, thoughlike, mental rotation procedure to the problem, whereas pigeons seemed to rely on a more efficient automatic process that humans can use only in simpler rotation invariance tasks. Mirror-image forms may be better discriminated by the pigeon's visual system than by the human one. (Author)

**A83-12095**  
**THE CYCLOPEAN EYE VS. THE SIGHTING-DOMINANT EYE AS THE CENTER OF VISUAL DIRECTION**

H. ONO (York University, Downsview, Ontario, Canada) and R. BARBEITO (Waterloo, University, Waterloo, Ontario, Canada) *Perception and Psychophysics*, vol 32, no 3, Sept 1982, p. 201-210. Natural Sciences and Engineering Research Council refs (Contract NSERC-A-0296)

Two competing hypotheses concerning the center of visual direction, the cyclopean-eye and the sighting-dominant eye, were evaluated with the stimuli used in the Card test which requires a subject to position the card with a hole so that a target can be seen. In the first experiment, the aperture and the target were collinear with the sighting eye, such that the mean apparent locations of the aperture when the target was fixated, and of the target when the aperture was fixated, were consistent only with the cyclopean-eye hypothesis. In experiment two, the subjects moved the card from the side of the nonsighting eye, while in experiment three the target was viewed through the aperture with both the sighting and nonsighting eye in six different stimulus arrangements. Results show that the 95% confidence intervals of all 12 mean apparent locations of the targets contained the predicted values from the cyclopean-eye hypothesis but none of those from the sighting-eye hypothesis. It is concluded that the results are compatible with the cyclopean-eye hypothesis, and that the sighting eye is not the center of visual direction. N.B.

**A83-12096**  
**ANALYSIS OF THE PERCEPTION OF MOTION CONCOMITANT WITH A LATERAL MOTION OF THE HEAD**

W. C. GOGEL (California, University, Santa Barbara, CA) *Perception and Psychophysics*, vol. 32, no. 3, Sept 1982, p. 241-250. Research supported by the University of California. refs

Two hypotheses concerning the illusory motion of objects that occurs concomitantly with motion of the head are evaluated. One hypothesis asserts that this illusory concomitant motion, unlike the perception of real motion, is paradoxical in the sense that, although the object appears to move, it does not appear to go anywhere. The second hypothesis asserts that illusory concomitant motion can be explained by errors in convergence produced by a tendency for the convergence of the eyes to displace in the direction of the resting state of convergence. Results of the first experiment show that the illusory motion perceptually can add to or subtract from apparent motion resulting from real motion. In the second experiment, it was shown that, for a binocularly viewed object at a near distance, the error in convergence (fixation

disparity) is far too small to be an explanation for the illusory object motion associated with a moving head. It is concluded that these results support an interpretation of illusory concomitant motion in terms of errors in the apparent distance of the stimulus object and the veridical perception of its direction. N.B.

**A83-12209**  
**THE BRAIN ORGANIZATION OF EMOTIONAL REACTIONS AND STATES [MOZGOVAIA ORGANIZATSIIA EMOTSIONAL'NYKH REAKTSII I SOSTOIANII]**

N. P. BEKHTEREVA, D. K. KAMBAROVA, and G. G. IVANOV (Akademiia Meditsinskikh Nauk SSSR, Leningrad, USSR) *Fiziologiya Cheloveka*, vol 8, Sept-Oct. 1982, p. 691-706. In Russian. refs

The structural-functional and neurophysiological organization of the human brain is analyzed by a variegated method in order to provide a full and adequate observation of emotional manifestations. This method of analysis allows valuable information that is closer to reality than that provided by previous methods to be obtained about the emotional brain, its statics, and the normal and pathological patterns in humans. Investigations on 12 epileptic subjects were conducted to study the patterns of their emotional reactions and states during diagnostic and therapeutic treatments using implanted electrodes. N.B.

**A83-12210**  
**THE CONTINGENT NEGATIVE VARIATION /CNV/ DURING THE FULFILLMENT OF TASKS AT THE REACTION TIME. I [USLOVNO-NEGATIVNAIA VOLNA /CNV/ PRI VYPOLNENII ZADACHI NA VREMIA REAKTSII. I]**

I. E. KANUNIKOV and V. A. DOROSHENKO (Leningradskii Gosudarstvennyi Universitet, Leningrad, USSR) *Fiziologiya Cheloveka*, vol 8, Sept.-Oct. 1982, p. 707-714. In Russian. refs

The temporal and topographic characteristics of the CNV are investigated during the fulfillment of a simple sensorimotor task at the reaction time with a preparatory interval. It is shown that the CNVs, which are recorded in the frontal, central, and parietal areas of the cortex, functionally reflect the various processes, the early and late components of the waves representing relatively independent variables, as shown by their different distributions on the surface of the brain. It is found that the topography of the CNV depends on the strategy chosen by the subject for the fulfillment of the given task. This investigation confirms the heterogeneous nature of the CNV. N.B.

**A83-12211**  
**THE MODALITY OF AN IMPERATIVE SIGNAL AND THE CHARACTERISTICS OF THE CONTINGENT NEGATIVE VARIATION /CNV/. II [MODAL'NOST' IMPERATIVNOGO SIGNALA I KHARAKTERISTIKI USLOVNOI NEGATIVNOI VOLNY /CNV/. II]**

I. E. KANUNIKOV (Leningradskii Gosudarstvennyi Universitet, Leningrad, USSR) *Fiziologiya Cheloveka*, vol 8, Sept.-Oct. 1982, p. 715-720. In Russian. refs

The modal specificity of the CNV parameters was studied by investigating a task involving the detection of auditory and visual threshold stimuli which are produced as imperative signals. The warning signal (the lighting up of a cross or point on the screen of a tachystoscope) informs the subject about the modality of the imperative signal. It is found that, during the anticipation by the subject of visual threshold signals, the early CNV in the parietal region has a significantly greater amplitude than during the anticipation of auditory signals. It is proposed that these differences are evidence of the modal specificity of the CNV. N.B.

A83-12213

**THE POSSIBLE MEANING OF THE RAPIDLY PROCEEDING PROCESSES OF THE SPATIAL-TEMPORAL ORGANIZATION OF THE EEG IN THE FORMATION OF PSYCHIC ACTIVITY [VOZMOZHNOE ZNACHENIE BYSTROPROTEKAIUSHCHIKH PROTSESSOV PROSTRANSTVENNO-VREMENNOI ORGANIZATSII EEG V FORMIROVANII PSIKHICHESKOI DEIATEL'NOSTI]**

V. V. DUBIKAITIS (Kaunasskii Meditsinskii Institut, Kaunas, Lithuanian SSR) *Fiziologiya Cheloveka*, vol. 8, Sept.-Oct. 1982, p. 757-764. In Russian. refs

A hypothesis is developed according to which the accomplishment of conscious acts of psychic activity requires a group of 4-5 or more (depending on the complexity of the activity) cyclic trajectory regions of the accumulation of electronegativity (RAE), which reflect the character of the displacement of the electronegativity along the surface of the brain. The possible significance of the rapidly proceeding processes of the EEG in the system of the organization of the higher cortical functions is considered. It is proposed that the instability in the work of the scanning mechanism of the thalamic pacemaker can lead to the disruption of the systemic activity of the brain, particularly the psychic activity. In addition, the probability of the existence of specific functionally determined RAE trajectories and their grouping for the determination of brain activity is examined N.B.

A83-12214

**THE REFLECTION OF THE SUCCESS OF THE SOLVING OF ARITHMETIC AND VISUAL TASKS IN THE SPATIAL-TEMPORAL DISTRIBUTION OF CEREBRAL CORTICAL BIOPOTENTIALS [OTRAZHENIE USPESHNOSTI RESHENIIA ARIFMETICHESKIKH I ZRITEL'NYKH ZADACH V PROSTRANSTVENNO-VREMENNOM RASPREDELENII BIOPOTENTIALOV KORY GOLOVNOGO MOZGA]**

V. N. KIROI (Rostovskii Gosudarstvennyi Universitet, Rostov-on-Don, USSR) *Fiziologiya Cheloveka*, vol. 8, Sept.-Oct. 1982, p. 765-772. In Russian. refs

A83-12215

**THE VOLUNTARY REGULATION OF ALPHA AND THETA EEG RHYTHMS IN HUMANS [PROIZVOL'NAIA REGULIATSIIA AL'FA-I TETA-RITMOV EEG CHELOVEKA]**

V. N. CHERNIGOVSKII, V. G. MARKMAN, and A. N. AVSARKISIAN (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR) *Fiziologiya Cheloveka*, vol. 8, Sept.-Oct. 1982, p. 817-821. In Russian. refs

The possibility of voluntarily regulating the alpha and theta EEG rhythms with external feedback is studied in 160 young male humans. It was found that the subjects were able to increase their alpha rhythms by 36%, while their theta rhythms could be decreased by 53%. An analysis of the changes in the alpha and theta rhythms revealed a tendency toward a unidirectional displacement of the rhythm markedness during successful regulation, and a tendency toward multidirectional displacement during unsuccessful regulation. Changes in the EEG rhythms in the desired direction occurred only during the influence of the appropriate feedback. It is concluded that under certain conditions the rhythmicity of the investigated frequency range of the EEG is subject to a general modulating influence, and that the presence of feedback is essential for the success of the voluntary regulation of EEG parameters in humans N.B.

A83-12216

**THE RELATION OF PSYCHIC AND NEUROPHYSIOLOGICAL PHENOMENA AND BIOFEEDBACK [SOOTNOSHENIE PSIKHICHESKIKH I NEIROFIZIOLOGICHESKIKH FENOMENOV I BIOLOGICHESKAIA OBRATNAIA SVIAZ']**

V. IA. SARMANOV (Akademiia Meditsinskikh Nauk, Moscow, USSR) *Fiziologiya Cheloveka*, vol. 8, Sept.-Oct. 1982, p. 846-850. In Russian. refs

Studies on 10 healthy subjects show that biofeedback can be successfully used for the formation of a stable psycho-emotional state. Separate characteristics of the electrical activity (the index

of the alpha rhythm and the frequency of the beta rhythm) were used as indicators in the feedback chain. It was found that the best results were obtained on the basis of the integral characteristics of the electric activity - the indicator of the spatial synchronization of the alpha rhythm. It is found advisable to separate and use the integral characteristics, which reflect the structural peculiarities of the whole EEG, in the regulator chain of the adaptive control of the biological system. N.B.

A83-12253#

**PSYCHOLOGICAL AND ELECTROENCEPHALOGRAPHIC CHANGES WITH AGING IN RELATION TO AIRCREW PERFORMANCE**

N. RAMACHANDRAN, J. M. WADHAWAN, J. S. SANT (Indian Air Force, Institute of Aviation Medicine, Bangalore, India), and V. KUMAR (Air Force Central Medical Establishment, New Delhi, India) *Aviation Medicine*, vol. 26, June 1982, p. 21-28. refs

This study is aimed at identifying any perceptible difference in certain selected perceptuomotor and cognitive functions among age groups of 20-34 yrs, 35-40 yrs and 41-55 yrs. All subjects were administered suitable psychological tests. Their electroencephalograms were recorded in the resting awake state as well as under provocation. The higher age group showed a significant slowness to respond where speed of performance was a main factor. Cognitive functions, psychophysiological indices and flight-oriented psychomotor tests did not discriminate between different age groups. In the higher age group, alpha index showed a significant decrement and alpha attenuation following visual stimulation was poorer. (Author)

A83-12257#

**PSYCHOLOGICAL FACTORS RESPONSIBLE FOR WASTAGE AMONG TRAINEES DURING AB INITIO FLYING TRAINING**

A. K. SENGUPTA (Indian Air Force, New Delhi, India) and C. P. KOHLI *Aviation Medicine*, vol. 26, June 1982, p. 43-52. refs

A83-12405\* National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**VISUAL SCANNING BEHAVIOR AND PILOT WORKLOAD**

R. L. HARRIS, SR., J. R. TOLE, A. T. STEPHENS, and A. R. EPHRATH (NASA, Langley Research Center, Flight Operations Research Branch, Hampton, VA; MIT, Cambridge, MA) (NASA, Association of Aviation Psychologists, and Battelle Memorial Institute, Symposium on Aviation Psychology, 1st, Ohio State University, Columbus, OH, Apr. 21, 22, 1981.) *Aviation, Space, and Environmental Medicine*, vol. 53, Nov. 1982, p. 1067-1072.

This paper describes an experimental paradigm and a set of results which demonstrate a relationship between the level of performance on a skilled man-machine control task, the skill of the operator, the level of mental difficulty induced by an additional task imposed on the basic control task, and visual scanning performance. During a constant, simulated piloting task, visual scanning of instruments was found to vary with the difficulty of a verbal mental loading task. The average dwell time of each fixation on the pilot's primary instrument increased with the estimated skill level of the pilots, with novices being affected by the loading task much more than experts. The results suggest that visual scanning of instruments in a controlled task may be an indicator of both workload and skill (Author)

A83-12408

**STRESS COPING AND THE U.S. NAVY AIRCREW FACTOR MISHAP**

R. A. ALKOV, M. S. BOROWSKY, and J. A. GAYNOR (U.S. Navy, Naval Safety Center, Norfolk, VA) *Aviation, Space, and Environmental Medicine*, vol. 53, Nov. 1982, p. 1112-1115. refs

The relationship between aviation mishaps and inadequate stress-coping strategies of aviators was examined. Questionnaires containing 22 questions covering life style changes and personality variables, were distributed during 1979-1980 to all aviators involved in major aircraft mishaps, and 501 of the 585 questionnaires were returned. The returned questionnaires were divided into two groups of aviators, those that had an aircrew error factor assigned and

those who did not. An analysis of the questionnaires shows that individuals named as a contributing cause factor to their mishap were more likely to be involved in making a decision concerning their future and more likely to have recently become engaged. More significantly, it was found that these individuals are much more likely to have mental problems; to have trouble with superiors, peers, and others; and to have difficulty with interpersonal relationships in general. It is concluded that aircrew members assigned as a factor in an aircraft mishap are more likely to show symptoms of inadequate stress-coping strategies which appear through their 'acting out' behavior directed at others, rather than internalizing their feelings. N.B.

**A83-12975**  
**HUMAN PERFORMANCE CAN DRASTICALLY AFFECT CRITICAL SYSTEMS OPERATION**

T. DOLL, J. GREEN, and M. HODGES (Georgia Institute of Technology, Atlanta, GA) Military Electronics/Countermeasures, vol. 8, Nov 1982, p. 50-53

Results of research on the principles of human performance and on human performance measurement are described. A computer simulation of human continuous tracking performance, the HOPE model, reproduces the control movements that human operators make in following an irregular line which moves across a video display screen. Control strategy is represented in HOPE as a set of parameters which impact the processing activities occurring during tracking. HOPE is a hierarchical model that clearly differentiates between controlled and automatic functions. The ability of human operators to track targets on a radar display in the presence of jamming and deceptive ECM is studied with an ECM/radar simulator. Research on the effectiveness of radar warning receivers (RWR) is planned. The parameters of successful pilot-RWR interaction are being studied along with methods of optimizing that interaction. C.D.

**A83-13015**  
**PSYCHIC EFFECTS ON THE SAFETY AND RELIABILITY OF COMPLEX TECHNICAL SYSTEMS [PSYCHISCHE EINFLUESSE AUF DIE SICHERHEIT UND ZUVERLAESSIGKEIT KOMPLEXER TECHNISCHER SYSTEME]**

K. STEININGER (Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Institut fuer Flugmedizin, Hamburg, West Germany) Ortung und Navigation, no 2, 1982, p. 246-257. In German. refs

Psychic factors arising in connection with the employment of complex technical systems by human operators are considered. Under certain conditions related to aspects of complexity, controllability, and conceptual understanding of a technical process, a discrepancy can arise between situational factors and idiosyncratic factors concerning the operator. This discrepancy can lead to a disturbance of the balance between the requirements of the industrial society and the readiness of the individual to perform. Negative observations made in connection with such imbalances provide objects of study for the science of ergonomics. Attention is given to questions regarding the acceptance of man-machine-environment systems, concepts of safety and risk, human factors, the causes for the occurrence of a disequilibrium, relations between personality and performance, and the reliability of the operator. G.R.

**N83-10776#** Naval Submarine Medical Research Lab, Groton, Conn.

**THE RELATIONSHIP OF VISUAL EVOKED POTENTIAL ASYMMETRIES TO THE PERFORMANCE OF SONAR OPERATORS Interim Report**

C. L. SCHLICHTING and S. W. KINDNESS 11 Aug. 1981 21 p refs

(NSMRL-957) Avail: NTIS HC A02/MF A01

Interhemispheric differences in visual evoked potential amplitude in right handed sonar operators were measured. Each operator was also rated for performance while using visual sonar displays. Significant interhemispheric asymmetries were found in the group as a whole and in the better performers. Poorer performers did

not show asymmetries. It is suggested that the magnitude and direction of interhemispheric asymmetries in evoked potential amplitude can be used in the prediction of performance as sonar operators. These measures could also be used to test the effect of training and watch standing schedules. E.A.K.

**N83-10777\*#** Johns Hopkins Univ., Baltimore, Md. Div of Behavioral Biology.

**BEHAVIORAL AND BIOLOGICAL INTERACTIONS WITH SMALL GROUPS IN CONFINED MICROSOCIETIES Annual Technical Report**

J. V. BRADY and H. H. EMURIAN 27 Sep 1982 27 p refs (Contract NAG2-139) (NASA-CR-169445; NAS 1.26:169445) Avail: NTIS HC A03/MF A01 CSCL 05J

Requirements for high levels of human performance in the unfamiliar and stressful environments associated with space missions necessitate the development of research-based technological procedures for maximizing the probability of effective functioning at all levels of personnel participation. Where the successful accomplishment of such missions requires the coordinated contributions of several individuals collectively identified with the achievement of a common objective, the conditions for characterizing a team, crew, or functional group are operationally defined. For the most part, studies of group performances under operational conditions which emphasize relatively long exposure to extended mission environments have been limited by the constraints imposed on experimental manipulations to identify critical effectiveness factors. On the other hand, laboratory studies involving relatively brief exposures to contrived task situations have been considered of questionable generality to operational settings requiring realistic group objectives. L.F.M.

**N83-10778#** Illinois Univ., Champaign. Human Attention Research Lab.

**INDIVIDUAL DIFFERENCES AND TIME-SHARING ABILITY: A CRITICAL REVIEW AND ANALYSIS**

P. L. ACKERMAN, W. SCHNEIDER, and C. D. WICKENS Mar. 1982 62 p refs (Contract N00014-81-K-0034; NIMH-1-R01-MH-31425; NR PROJ. 154-460) (AD-A115082; HARL-ONR-8102) Avail: NTIS HC A04/MF A01 CSCL 05J

Statistical methods employed to test individual differences in dual-task performance and the existence of a general time-sharing ability are reviewed and extensively critiqued. Specifically, both the types of data being collected and the types of procedures used in data analysis have been inadequate to the critical evaluation of a hypothetical 'time-sharing' ability. Serious problems resulting from unsophisticated use of correlational and factor analytic procedures in methodology and analysis are discussed. GRA

**N83-10779#** Illinois Univ., Champaign. Human Attention Research Lab.

**THE USE OF DUAL TASK PARADIGMS IN MEMORY RESEARCH: A METHODOLOGICAL ASSESSMENT AND AN EVALUATION OF EFFORT AS A MEASURE OF LEVELS OF PROCESSING**

A. D. FISK, W. L. DERRICK, and W. SCHNEIDER Mar. 1982 29 p refs (Contract N00014-81-K-0034; NIMH-5-R01-MH-31425; NR PROJ. 154-460) (AD-A115093; HARL-ONR-8105) Avail: NTIS HC A03/MF A01 CSCL 05J

Results from dual task experiments have often been used to make inferences concerning memorial processes. However, many dual task experiments are based on invalid methodological assumptions. Three major assumptions which are implicitly assumed by current dual task memory research are shown to be inappropriate. Criteria which should be met in dual task experiments that draw inferences from secondary task decrements are discussed. A dual task experiment meeting the proposed criteria

was conducted. Contrary to previous dual task research, the present experiment demonstrates that a carefully controlled dual task experiment shows that primary task effort is neither monotonically related to levels of processing, nor does it produce better memory for verbal stimuli. It is concluded that researchers must carefully consider the assumptions inherent in any dual task experiment when designing such experiments. Author (GRA)

**N83-10780#** Army Research Inst. of Environmental Medicine, Natick, Mass.

**RISK TAKING AS MOTIVATION FOR VOLUNTEERING FOR A HAZARDOUS EXPERIMENT**

J. B. JOBE, S. H. HOLTGATE, and T. A. SCRAPANSKY 20 May 1982 29 p refs  
(AD-A115097; USARIEM-M-31/82) Avail: NTIS HC A03/MF A01 CSCL 05J

Army male enlisted personnel were tested in two experiments to assess the psychological correlates of volunteering for a hazardous experiment, (Experiment 1) and a riskless, psychological experiment (Experiment 2). Subjects were given a biographical and personal habit questionnaire, IPAT Anxiety Scale, Rotter's Locus of Control Scale, and Torrance and Ziller's Life Experience Inventory. Results from Experiment 1 indicated that volunteers were significantly less anxious ( $p < .01$ ), and more willing to take risks ( $p < .01$ ) than were nonvolunteers. Noncommissioned officers ( $p < .05$ ), smokers ( $p < .05$ ), later-born children ( $p < .05$ ), and children of lower socioeconomic class parents ( $p < .05$ ) were significantly overrepresented among the volunteers, and the hazardous nature of the experiment appears to have determined their characteristics. In Experiment 2, the only finding was that children of mothers who had attended college ( $p < .01$ ) were overrepresented. Results are in agreement with findings, using college students, that volunteer samples differ significantly from nonvolunteer samples, and that results vary as a function of situational variables. The study indicates that the generalizability of experimental results have important limitations. Author (GRA)

**N83-10781#** Army Research Inst. for the Behavioral and Social Sciences, Alexandria, Va.

**MAINTAINING MOTOR SKILL PERFORMANCE**

J. D. HAGMAN 18 Jun. 1982 15 p refs Presented at the Army Sci. Conf., 15-18 Jun. 1982  
(AD-A117349) Avail: NTIS HC A02/MF A01 CSCL 05I

The results of the present experiments clarify certain training issues regarding the relative contributions of presentation and testing to motor task performance. In doing so, they answer the Army's question of which training methods most effectively promote the highest levels of skill acquisition and retention. First, the results indicate that the goal of training should dictate the training method used. If the goal is a consistent and high level of acquisition, then training should emphasize repeated presentation or alternation of presentation with testing, with the latter method being preferred because of enhanced short- and long-term retention. If effective long-term retention is the goal, then training should emphasize repeated testing. Second, testing should not only be viewed merely as a means of evaluation, but also as a means of improving motor skill performance. And third, the enhanced retention associated with repeated testing can be achieved by merely changing the emphasis of training from presentation to testing. This could be done without the usual negative aspects of additional expenditures in training time, money and personnel. Author (GRA)

**N83-10782#** Naval Biodynamics Lab., New Orleans, La  
**IMPLICATIONS OF DUAL-TASK PERFORMANCE VARIABLES FOR DESIGN OF GENERIC WORKSTATIONS: LITERATURE REVIEW**

M. PATSFALL Nov. 1981 28 p refs  
(Contract MF58524023)  
(AD-A114421; NBDL-81R014) Avail: NTIS HC A03/MF A01 CSCL 05J

This is a review of dual-task performance findings related to design of a generic workstation performance test. The effect of

multiple inputs/outputs on performance is best explained in terms of overlap of input/output requirements on mental resources. Mental resources can be usefully categorized by sensory modality of input/output, stages of mental processing, and laterality of brain function. Inputs/outputs which have overlapping requirements in one of these categories generally interfere with each other. Author (GRA)

**N83-10783#** Air Force Systems Command, Wright-Patterson AFB, Ohio Foreign Technology Div

**TWO LANDINGS**

L. STANISLAWSKI 7 Jun 1982 15 p Transl into ENGLISH from *Zotnierz Pol.* (Poland), v 36, no. 28(1725), 12 Jul 1981 p 9-10  
(AD-A117466; FTD-ID(RS)T-0368-82) Avail: NTIS HC A02/MF A01 CSCL 05I

Judgment of pilots in the Polish Air Force is discussed. Landing of supersonic aircraft on a public highway is described. L.F.M.

**N83-10784#** Naval Biodynamics Lab., New Orleans, La Bureau of Medicine and Surgery

**HUMAN PERFORMANCE TESTS FOR REPEATED MEASUREMENTS: ALTERNATE FORMS OF EIGHT TESTS BY COMPUTER**

R. C. CARTER and H. E. SBISA (Q.E.I., Inc.) Jan 1982 60 p refs  
(Contract MF58524002)  
(AD-A115021; NBDL-82R003) Avail: NTIS HC A04/MF A01 CSCL 05J

Eight performance tests for repeated measurements based on published tests were generated on paper by computer programs. The computer programs can be used to sample equivalent forms of the tests for any number of occasions of repeated measurement. The programs also print any specified number of copies of the alternate forms to provide for multiple subjects. The logic of the item-sampling procedures and block diagrams of the item-generated method are discussed. The FORTRAN computer programs are given as Appendices. The tests are Addition, Number Comparison, Code Substitution, Grammatical Reasoning, Fitts' Histogram Recognition, Klien's Pattern Comparison, Neisser's Letter Search, and randomly-placed Number Search. Author (GRA)

**N83-10785#** National Aerospace Lab., Amsterdam (Netherlands). Vliegtuigen Afdeling

**MODELS FOR HUMAN OBSERVING, CONTROLLING AND DECISION MAKING IN A DYNAMIC SYSTEM [MODELLEN VAN HET MENSELIJK WAARNEMINGS-, REGEL- EN BESLISGEDRAG]**

P. H. WEWERINKE 10 Jun 1981 16 p refs In DUTCH; ENGLISH summary  
(NLR-MP-81036-U) Avail: NTIS HC A02/MF A01

The modeling approach to describing the human observer, controller and decision maker, participating in a dynamic system, is reviewed. The use of the models in the design and analysis of man machine systems is illustrated. The models are formulated in terms of linear estimation, control and decision theory. The perception and processing of information results in an internal representation of the task which can be used to control the process (optimal control model) and/or make decisions, concerning abnormal (unacceptable) system operation (human observer and decision maker model). Author (ESA)

**N83-11738\*#** Old Dominion Univ., Norfolk, Va. Center for Applied Psychological Studies.

**THE EFFECTIVENESS OF INCORPORATING A REAL-TIME OCULOMETER SYSTEM IN A COMMERCIAL FLIGHT TRAINING PROGRAM Final Report, 4 Nov. 1981 - 3 Sep. 1982**

D. H. JONES, G. D. COATES, and R. H. KIRBY Oct. 1982 41 p refs

(Contract NCC1-57)

(NASA-CR-169465; NAS 1.26.169465) Avail: NTIS HC A03/MF A01 CSCL 05I

The effectiveness on pilot and trainee performance and scanning behavior of incorporating a real time oculometer system in a commercial flight training program was assessed. Trainees received simulator training in pairs requiring the trainees to alternate the order of training within a session. The 'third day phenomenon' of performance decrement was investigated, including the role of order of training on performance. M.W.

**N83-11739#** New Mexico State Univ., Las Cruces. Behavioral Engineering Lab

**HUMAN FACTORS AFFECTING PILOT PERFORMANCE IN VERTICAL AND TRANSITIONAL INSTRUMENT FLIGHT Interim Scientific Report, 15 Mar. - 31 Dec. 1981**

S N ROSCOE, J C. HULL, P M. SIMON, and L CORL Dec 1981 66 p refs

(Contract N00014-81-K-0439, NR PROJ. 196-170)

(AD-A118345; BEL-81-1/ONR-81-1) Avail: NTIS HC A04/MF A01 CSCL 05E

A conceptual analysis and review of human factors problems in piloting VTOL aircraft including helicopters is presented. VTOL mission and flight requirements are contrasted with those of CTOLs. Deficiencies in present VTOL flight instrumentation are detailed. The requirement that information regarding ground-referenced and air-mass-referenced position in all six degrees of freedom be presented to the VTOL pilot and/or incorporated into positional control stabilization is stated. Author (GRA)

**N83-11740#** Vanderbilt Univ., Nashville, Tenn. Dept. of Psychology.

**THE EFFECT OF CONTEXT ON PERCEIVED DEPTH**

R. PATTERSON, A. T. MENENDEZ, and R. FOX Jul 1982 26 p refs

(Contract N00014-81-C-0001, RR0420901, NR PROJ. 197-067)

(AD-A117444, N14-0001-82C-0002) Avail: NTIS HC A03/MF A01 CSCL 05J

The effect of context on the perceived depth positions of stereoscopic forms was studied. Data exist which suggest the perceived depth position of one stimulus can be influenced by the apparent depth positions of other stimuli. The effect of a large enveloping form on the perceived depth position of a smaller surrounded (test) form was examined when all cues for vertical distance and depth were present. The forms, which were contours formed from dynamic random element stereograms, were combined factorially in 36 experimental conditions: four levels of context, three viewing distances, and three levels of disparity value. Perceived depth did vary as a function of viewing distance and disparity value in accord with the geometry of stereoscopic space, but not as a function of context. Author (GRA)

**N83-11741#** Embry-Riddle Aeronautical Univ., Daytona Beach, Fla. Aviation Research Center

**PILOT JUDGMENT TRAINING AND EVALUATION, VOLUME 2 Final Report, Jun. 1981 - Mar. 1982**

J. I. BERLIN, E. V. GRUBER, and C. W. HOLMES Jun. 1982 181 p

(Contract DOT-FA79NA-6040)

(AD-A117667; FAA-CT-82-56-VOL-2) Avail: NTIS HC A09/MF A01 CSCL 05I

This manual contains instructional material for student use in conjunction with the pilot judgment training program. It contains 18 lessons which are divided into three units. Unit I presents terms and concepts designed to develop modified patterns of thinking and to give students and instructors the most objective

means possible for discussing pilot behavior. Unit II addresses behavioral aspects of judgment, including hazardous thoughts and stress. Unit III relates the learning of Units I and II to actual flight situations using scenarios based on actual pilot accident reports. This manual is intended as a training aid and workbook requiring a minimum of supplemental teaching by the flight instructor.

GRA

**N83-11742#** Navy Personnel Research and Development Center, San Diego, Calif

**HUMAN MEMORY LIMITATIONS IN MULTI-OBJECT TRACKING Interim Report, Jun. 1980 - Nov. 1981**

F. L. GREITZER, R. T. KELLY, and R. L. HERSHMAN Jun. 1982 41 p refs

(AD-A117586, NPRDC-TR-82-48) Avail: NTIS HC A03/MF A01 CSCL 05J

Basic performance data were obtained on the effect of critical task variables in unaided multi-object tracking behavior. Six observers viewed computer-generated displays in which five, seven, or nine objects represented targets that moved in random linear trajectories at one of two speeds. Displayed positions were updated six times at intervals of 5, 8, 13 or 18 seconds, and no track history was provided. The task for the observer was to monitor the trajectories and then predict the next position of each object. Results showed that the unaided observer can keep track of up to about seven moving objects. Performance improved as the interval between updates was increased to about 13 seconds. These variables interact in their effects on tracking performance and may be trade off in a complex manner. A family of mathematical models of human memory that focus on the encoding, learning, and rehearsal processes of the observer was developed. Two of the models' predictions were consistent with the data observed and those reported in the psychological literature. The analysis of human memory and information processing limitations should be extended to more complex operational tasks to support system designers with quantitative estimates of operator performance.

Author (GRA)

**N83-11743#** Institute for Perception RVO-TNO, Soesterberg (Netherlands) Afd Verkeersgedrag.

**THE DRIVING SKILL OF REHABILITANTS WITH A DIFFUSE TRAUMATIC BRAIN INJURY. A PRELIMINARY APPROACH**

R. RAVESTEIN, I. H. VELING, and A. W. K. GAILLARD Jun. 1982 28 p refs In DUTCH, ENGLISH summary

(Contract A81/D/025)

(IZF-1982-16; TDCK-76638) Avail: NTIS HC A03/MF A01

By request of the Military Rehabilitation Center in the Netherlands, 10 rehabilitants, suffering from traumatic injury of the brain, were examined with regard to their driving skills. The performance of the rehabilitants were compared with that of a control group over a number of driving tasks, psychological tests and reaction-time tasks. Results show that in all tasks the speed of performance is lower for rehabilitants, together with a tendency to a reduced accuracy. With regard to specific stages of information processing (response selection and motor adjustment) no selective effects of the brain damage are found. Also, the rehabilitants do not meet any specific difficulties with the driving tasks.

Author (ESA)

## MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

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

### A83-10253

#### HUMAN FACTORS AND THE DESIGN OF DISPLAY TERMINALS

D. J. WHEATLEY (ITT Europe, Inc., Industrial Design Centre, Harlow, Essex, England) Electrical Communication, vol. 57, no. 1, 1982, p. 11-17.

It is pointed out that most of the early fears about the possible health hazards of using video display units have now been dispelled. It is now known that no radiation hazard exists in a correctly functioning terminal and that damage to the eyes cannot occur. The visual load of an operator performing a screen-based task can be especially high, placing greater demands on terminal designers to improve the quality of the displayed image. A pressing need exists to consider the design of the displayed image from an ergonomic viewpoint as well as considering the technical and engineering aspects of the design. Improvements in the following factors are considered: screen size and capacity, tubeface reflections, contrast and brightness, the choice of phosphor, flicker and jitter, resolution and character design, and coding methods. It is noted that the human factors aspect in the design of screen-based systems now figures prominently in sales. C.R.

### A83-10254

#### HUMAN FACTORS AND INTELLIGENT PRODUCTS

I. COLE, B. DRAKE, and J. HARVEY (ITT Europe, Inc., Engineering Support Centre, Harlow, Essex, England) Electrical Communication, vol. 57, no. 1, 1982, p. 18-25. refs

It is noted that concern for ease of use in new products is now on a par with the functional performance requirements. This concern is being reinforced by the rapid increase in government, union, and consumer legislation in many countries pertaining to the safety and use of intelligent products. Since the users are no longer computer specialists, training and skill cannot be expected to overcome bad design. The way in which user needs now figure in hardware technology, software technology, and the user interface is discussed. A distinction is made between human factors research, which is concerned with providing information about the user and the components that make up an intelligent product, and human factors support, which seeks to apply this knowledge and provides support to the product designers. C.R.

### A83-10380

#### THE ACTIVE-OPERATOR PRINCIPLE IN ENGINEERING PSYCHOLOGY [PRINTSIP AKTIVNOGO OPERATORA V INZHENERNOI PSIKHOLOGII]

B. F. LOMOV (Akademiia Nauk SSSR, Institut Psikhologii, Moscow, USSR) Priroda, Aug. 1982, p. 87-95. In Russian.

An anthropocentric approach to the analysis of man-machine systems is considered, and the active-operator principle which follows from this approach is described. In contrast to the machinocentric approach, the anthropocentric approach is directed not toward the simplification of labor but toward the humanization of technology, toward the maximal adaptation of technology to man. The closer the goal of the active operator is approached, the higher the quality of system operation. As an example, the application of this anthropocentric approach to the pilot-aircraft system is discussed. B.J.

### A83-10452

#### THE MOTION OF PLANAR ROD SYSTEMS [DVIZHENIE PLOSKIKH STERZHNEVYKH SISTEM]

R. A. SOROKA and V. I. PETRUK (Kievskii Gosudarstvennyi Universitet, Kiev, Ukrainian SSR) Vychislitel'naia i Prkladnaia Matematika, no. 45, 1981, p. 58-62. In Russian. refs

The paper obtains dynamics equations for a planar rod system representing an anthropomorphic mechanism such as a robot manipulator or a walking machine. Attention is given to the problem of finding compensatory motions for some of the components of the system when the law of variation of the other components is specified. The conditions of the solvability of the appropriate boundary value problem are indicated, and a method for solving this problem is presented. B.J.

### A83-10501

#### A NEW METHOD FOR LIMITING THE FIELD OF VISION [NOVAIA METODIKA OGRANICHENIIA POLIA VIDENIIA]

S. I. ARGUSTEVICH Voprosy Psikhologii, July-Aug. 1982, p. 140-143. In Russian refs

A review of the methods used for investigating visual perception is presented, and the advantages of the method of the limitation of visual perception is demonstrated. Real-life working conditions of the observer-operator can be simulated through the manual control of the restricted operative field of vision. A design for a visuocinematograph is developed for studying the visual-perceptual activity of the observer-operator under conditions of a limited field of vision similar to actual working conditions. Some data obtained through the application of this method are briefly examined. N.B.

### A83-10562

#### THE USE OF COMPUTERS AT HOSPITALS IN THE UKRAINIAN SSR [PRIMENENIE EVM V UCHREZHDENIIAKH ZDRAVOOKHRANENIIA UKRAINSKOI SSR]

A. E. ROMANENKO (Ministerstvo Zdravookhraneniia Ukrainskoi SSR, Kiev, Ukrainian SSR) Sovetskoe Zdravookhraneniie, no. 8, 1982, p. 8-13. In Russian

### A83-10783

#### OPERATOR TEST CONTROL AND INTERFACE EVALUATION

W. W. RAMAGE (Westinghouse Research and Development Center, Pittsburgh, PA) In: AUTOTESTCON '81, Proceedings of the Conference, Orlando, FL, October 19-21, 1981. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 407-411. refs

An automatic test system person-machine interface concept that supports operator participation in test decision processes is implemented and evaluated. The test program designs are specified in a manner that provides a multitude of test options for an operator at any decision point in the test process. Data from approximately 180 hours of testing are analyzed. It is found that a judicious provision of operator test sequence control can provide improved performance. The availability of test progress and intertest dependency information is shown to improve operator performance. The value of this information increases as the task difficulty increases. Certain classes of faults are found to be highly dependent on an effective operator and interface for accurate isolation. Among these faults are intermittent faults and test system faults. C.R.

### A83-10914#

#### ROBOTS WITH ARTIFICIAL INTELLIGENCE [ROBOTI S IZKUSTVEN INTELEKT]

A. ANGELOV B'lgarska Akademiia na Naukite, Spisanie, vol. 28, no. 3, 1982, p. 5-15. In Bulgarian. refs

Various aspects of the development of industrial robots with artificial intelligence are discussed, including sensors in industrial robotics, the basic principles of artificial intelligence, video information channels, and adaptive devices. Particular attention is given to the third generation of Bulgarian robots. B.J.

A83-11107#

**ACQUISITION AND ANALYSIS OF THE EMG POWER SPECTRA - A REPRODUCIBLE TECHNIQUE FOR ASSESSMENT OF MUSCLE FATIGUE**

R. J. LUCIANI, D. A. RATINO, D. R. MCGREW, and R. I. SUIZU (USAF, Aerospace Medical Research Laboratory and Aeronautical Systems Div., Wright-Patterson AFB, OH) In: NAECON 1982; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 18-20, 1982. Volume 1 New York, Institute of Electrical and Electronics Engineers, Inc., 1982, p. 178-185.

An electromyogram (EMG) technique for testing the fatigue tolerances of combat pilots in AFTI F-16 fighters, which are capable of lateral acceleration, is reported. The surface EMG, monitoring the complex interference pattern arising from an active muscle by means of electrodes attached to the neck, has been shown to decrease linearly with muscle fatigue. The tests are considered critical because of the pilot's sustained viewing of HUD displays during lateral g acceleration. A signal is obtained from the sternomastoid and trapezius muscles, with signal processing at 1000 Hz through a fast Fourier transform to isolate 58 discrete power spectra and identify the center frequency. Details of the analysis and display procedures are presented, including demonstrations of reproducibility. M.S.K.

**A83-11108\* Wright State Univ., Dayton, Ohio. AN ATMOSPHERIC EXPOSURE CHAMBER FOR SMALL ANIMALS**

R. M. GLASER (Wright State University, Dayton, OH), H. S. WEISS, J. F. PITT (Ohio State University, Columbus, OH), and M. GRIMARD (Sherbrooke, Universite, Sherbrooke, Quebec, Canada) In: NAECON 1982; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 18-20, 1982. Volume 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1982, p. 203-207. refs

(Contract NGR-36-008-004)

The purpose of this project was to design a long-term environmental exposure chamber for small animals. This chamber is capable of producing hypoxic, normoxic and hyperoxic atmospheres which are closely regulated. The chamber, which is of the recycling type, is fashioned after clear plastic germ-free isolators. Oxygen concentration is set and controlled by a paramagnetic O<sub>2</sub> analyzer and a 3-way solenoid valve. In this way either O<sub>2</sub> or N<sub>2</sub> may be provided to the system by way of negative O<sub>2</sub> feedback. Relative humidity is maintained at 40-50 percent by a refrigeration type dryer. Carbon dioxide is absorbed by indicating soda lime. A diaphragm pump continuously circulates chamber gas at a high enough flow rate to prevent buildup of CO<sub>2</sub> and humidity. This chamber has been used for numerous studies which involve prolonged exposure of small animals to various O<sub>2</sub> concentrations. (Author)

A83-11124

**HOS - A TOOL FOR GENERATING VOICE SYSTEM REQUIREMENTS**

J. M. STOKES and R. J. WHERRY, JR. (Analytics, Inc., Willow Grove, PA) In: NAECON 1982; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 18-20, 1982. Volume 1 New York, Institute of Electrical and Electronics Engineers, Inc., 1982, p. 343-350. refs

The development of specifications for automated speech systems for advanced complex military or commercial systems engaged in various missions is reviewed. The cost-effectiveness issues of automated speech systems are considered, including the determination/specification of devices to be voice controlled, formats for verbal messages, and required speeds and accuracies of voice transmissions. One technique being developed for automatic speech systems is the Human Operator Simulator (HOS), which can simulate the behavior of trained human operators performing specified missions within a defined crewstation layout. In alternate HOS runs selected devices can be specified as being voice-activated and/or voice-responsive, and operator loading assessed accordingly. In addition, the rapidity of speech and the

probability of correct message understanding can be adjusted to determine their impact on system performance. N.B.

A83-11187#

**PILOT WORKLOAD IN THE NIGHT ATTACK MISSION**

L. A. CARR and R. F. LOPINA (USAF, Aeronautical Systems Div., Wright-Patterson AFB, OH) In: NAECON 1982; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 18-20, 1982. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1982, p. 881-884. refs

Developments for the enhancement of tactical force night attack capabilities are discussed, with particular attention given to minimizing pilot workload. Workload tasks were defined, causes of high workload were identified, and measurement techniques were recommended. Workload quantifying techniques are performance based, subjective, and physiological response measurements, but inconsistencies in correlations to workload must be considered. It is determined that the primary factors contributing to cockpit workload reduction are proper equipment selection, optimal systems integration, automation, and increased situational awareness. Recommendations addressing pilot workload are in the areas of simulation, flight test, equipment, and studies. A recommended flight test was also presented. R.K.R.

A83-11189

**EVALUATING COCKPIT COMPONENTS WITH HAND DISPLACEMENT TIME SCORES**

S. B. HOTTMAN and J. C. SIMONS (Systems Research Laboratories, Inc., Dayton, OH) In: NAECON 1982; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 18-20, 1982. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1982, p. 890-893. (Contract F33615-79-C-0503)

This paper describes a method of deriving switch operation timelines by sensing only two cockpit controls rather than the costlier provision of instrumenting over 30 controls. Using electrical sensitivity switches on a throttle and control stick, switch off-times were recorded in a recent ASD simulation and used to determine combined reach/activation times for seven switch panels. The HOFTAS (hands-off-throttle-and-stick) instrumentation concept will be evaluated in a mid-1982 full-mission study with contact switches replacing the skin-conductive switches (Carr, 1982). The flight test will compare HOFTAS with verbal recording techniques (DATA MYTE) and further validate the feasibility of HOFTAS as a reliable, accurate, non-obtrusive method of obtaining switch timelines. (Author)

A83-11396

**THE HYGIENIC CHARACTERISTIC OF THE AIR ENVIRONMENT IN BUILDINGS DURING ARTIFICIAL IONIZATION [GIGIENICHESKAIA KHARAKTERISTIKA VOZDUSHNOI SREDY POMESHCHENII PRI ISKUSSTVENNOI IONIZATSII]**

I. M. GELLER, L. A. BOCHKAREVA, M. T. TAKHIROV, and N. I. DOLGOVA (Uzbekskii Nauchno-Issledovatel'skii Institut Sanitarii, Gigieny i Profzabolevani, Tashkent, Uzbek SSR) Gigiena i Sanitariia, Aug. 1982, p. 79-81. In Russian. refs

A83-11466

**VISUAL INTERPRETATION OF THE MOTION OF OBJECTS IN SPACE**

J. A. WEBB and J. K. AGGARWAL (Texas, University, Austin, TX) In Conference on Pattern Recognition and Image Processing, Dallas, TX, August 3-5, 1981, Proceedings New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 516-521. refs

(Contract AF-AFOSR-77-3190)

A new method of interpreting structure from motion is presented. Using this technique, it is possible to recover the three-dimensional structure from a sequence of monocular views of any group of rigidly connected points whose motion satisfies the motion constraint developed here. Experiments testing the accuracy of the reconstruction in the case of human movement are presented.

Psychological implications of this approach to motion vision are discussed. (Author)

A83-11912

#### A SYSTEM FOR THE STUDY OF SUPERVISORY CONTROL OF MANIPULATION

G. P. STARR (New Mexico, University, Albuquerque, NM) In: Mini and microcomputers in control and measurement; Proceedings of the International Symposium, San Francisco, CA, May 20-22, 1981. Anaheim, CA and Calgary, Alberta, Canada, Acta Press, 1982, p 70-73. refs

A system for the study of supervisory control, in which control is traded between computer and operator during the operation of such automated devices as a remote manipulator arm, is described. Under supervisory control, the operator's commands are transmitted to a remote computer, which then commands the manipulator. The remote computer also processes sensory information from the manipulator and relays it to the operator. Since the remote computer is on site, it is not subject to the same feedback degradation as the human operator. The portion of the system comprising the manipulator and remote computer can accomplish parts of the task on its own. The operator functions primarily as a coordinator and supervisor, but may resort to direct control if necessary. O.C.

A83-12087

#### EVALUATION OF ALTERNATIVE ALPHANUMERIC KEYING LOGICS

L. C. BUTTERBAUGH (USAF, Flight Dynamics Laboratory, Wright-Patterson AFB, OH) and T. H. ROCKWELL (Ohio State University, Columbus, OH) Human Factors, vol. 24, Oct. 1982, p. 521-533. refs

(Contract AF PROJECT 2403; AF TASK 04)

Four keying logics for the entry of alphanumeric characters were evaluated. Selection of the logics was based on their compatibility with current keyboard designs used in the pilot-aircraft interface, which involves communications, navigation, and other aircraft subsystems. Subjects in each of four groups learned one of the logics, and their performance was recorded on an alphanumeric keying task. Performance measures were keying speed and keying accuracy for alphabetic characters, numeric characters, character strings, and total list. Keying time for a keying logic that used 36 individual keys for each alphabetic and numeric character was significantly superior to other logics that used push-button telephone-type keyboards. Subjects were equally accurate on all logics, with an error rate of approximately 0.5%. Significant performance differences among the three matrix keyboard logics were inconsistent. Of these, performance on a keyboard with the telephone arrangement was most accurate.

(Author)

A83-12088

#### ERGONOMIC EVALUATION OF TWO-HAND CONTROL LOCATION

S. E. NEMETH (General Motors Institute, Flint, MI) and K. M. BLACHE (General Motors Corp., Fisher Body Div., Warren, MI) Human Factors, vol. 24, Oct. 1982, p. 567-571. refs

Electromyography data were collected on three muscle groups of the arm while subjects performed a task with two-hand control buttons mounted at eye level and at waist level. It was found that EMG energy, an indicator of muscular effort expended, was 4.7 times higher with the eye-level buttons for all three muscle groups. (Author)

A83-12255#

#### RUDDER PEDAL FORCE AND SEAT RELATION FOR OPTIMAL EFFICIENCY WITH DIFFERENT LEG GEOMETRY

A. MOGRA (Indian Air Force, Aero Medical Training Center, Hyderabad, India) Aviation Medicine, vol. 26, June 1982, p. 35-38. refs

The force exerted on the rudder pedal and leg geometry of eleven healthy male subjects for different seat/rudder pedal adjustments were recorded. The maximum force is exerted on the

rudder pedal when the seat reference point (SRP) and the rudder reference point (RRP) are in the same horizontal plane. During maximum exertion of a force, a knee angle of 145.3 deg + or - 9.8 and an angle between the thigh and the horizontal (alpha angle) of 13.1 deg + or - 4.5 deg were observed. On increasing vertical separation of SRP above the RRP, there was a progressive decline in the maximum force exerted on the rudder pedal.

(Author)

A83-12409

#### COMPARISON OF RESPIRATOR PROTECTION FACTORS MEASURED BY TWO QUANTITATIVE FIT TEST METHODS

E. S. KOLESAR, JR., D. J. COSGROVE, C. M. DE LA BARRE, and C. F. THEIS (USAF, School of Aerospace Medicine, Brooks AFB, TX) Aviation, Space, and Environmental Medicine, vol. 53, Nov. 1982, p. 1116-1122. USAF-supported research refs

A study was conducted to compare the respirator protection factors measured by two widely used technologies, the di-2-ethylhexyl phthalate (DEHP) (liquid aerosol) and sodium chloride (NaCl) (solid aerosol) respirator quantitative fit test methods. Twelve individuals were fitted and tested on both respirator quantitative test methods on ten different occasions, using an exercise protocol of six different breathing and head movement maneuvers for each test. Results show that the DEHP method exhibited a significant order-interaction effect with respect to the exercise sequence whether it preceded or followed testing with the NaCl method. The NaCl method did not show a similar phenomenon, and consistently measured smaller protection factors compared to the DEHP method. It is concluded that the NaCl method is the more sensitive method. N.B.

A83-13070#

#### HEAT TRANSFER ON CYLINDER COVERED WITH CLOSE-FITTING FABRICS. I - WIND PENETRATION THROUGH FABRICS

M. TAKEUCHI, N. ISSHIKI (Tokyo Institute of Technology, Tokyo, Japan), and Y. ISHIBASHI (Nippon Steel Corp., Muroran Works, Muroran, Japan) JSME, Bulletin, vol. 25, Sept. 1982, p. 1406-1411. refs

The penetration of air into the fabric coverings over a cylinder placed in a uniform cross flow is investigated both experimentally and theoretically. Results show that the penetration from the upstream side of the fabric primarily flows downstream through a thin layer between the fabric and the cylinder, called a contact layer, and the dynamical properties of this layer are described by the characteristic number alpha. The value of alpha is determined from the pressures measured at the inner and the outer circumference of the fabric layer. The pressure relaxes through the contact layer, and the inner distribution of the pressures in the fabric becomes more moderate with an increase of alpha. The penetration flow is shown to be a function of alpha, the dynamic pressure of the incident flow, and the intrinsic properties of the material (thickness and permeability). N.B.

N83-10786# Naval Postgraduate School, Monterey, Calif. Dept. of Aeronautics.

#### A SIMULATOR EVALUATION OF PILOT RESPONSE TO LOW FREQUENCY AIRCRAFT VIBRATION WITH AUDIO FEEDBACK M.S. Thesis

M. W. MENTAS Mar 1982 93 p refs  
(AD-A117540) Avail: NTIS HC A05/MF A01 CSCL 051

An aircraft simulator facility employing a two axis air combat maneuvering simulation with whole body vibrational mode capability was used to investigate pilot response to vibration and the performance enhancement technique of audio feedback cuing. The reliability of pilot response to a tracking task was measured in both the nonvibrational and vibrational mode with audio feedback cuing as a primary stimulus in testing. In general, performance scores in all modes of testing were improved using aural tracking techniques with a significant reversal of the adverse vibration stress duration function above expected values. Detailed conclusions and recommendations are presented. Author (GRA)

**N83-10787#** Swedish Council for Building Research, Stockholm  
**TESTING OF SLIPPERINESS: FORCES APPLIED TO THE FLOOR AND MOVEMENTS OF THE FOOT IN WALKING AND IN SLIPPING ON THE HEEL**

Jun. 1981 182 p refs  
 (PB82-204108; ISBN-91-3669-0) Avail: NTIS HC A09/MF a01  
 CSCL 05E

An attempt to find a valid method for testing the slipperiness of heels during normal walking is documented. The movements of the foot and the forces applied to the floor were studied. The dependence of the coefficient of friction on different factors (such as load, velocity, temperature, lubrication, surface roughness) is discussed, as well as the consequences of these variations for different test methods. A functional method of testing slipperiness is proposed. Author (GRA)

**N83-10788#** Rhode Island Univ., Kingston Dept of Electrical Engineering

**GENERAL METHODS TO ENABLE ROBOTS WITH VISION TO ACQUIRE, ORIENT AND TRANSPORT WORKPIECES**

J. R. BIRK, J. DESSIMOZ, R. KELLEY, T. BARRON, A. BECKWITH, P. BRODEUR, J. CROUCH, R. GRAMMA, J. HALL, H. MARTINS et al. Dec. 1981 154 p refs  
 (Contract NSF DAR-78-27337)

(PB82-202540; NSF/MEA-81022; REPT-7) Avail: NTIS HC A08/MF A01 CSCL 13I

Results are presented of a research program designed to develop general methods for robots with vision to acquire, orient, and transport workpieces. The report includes papers addressing the following topics: summaries of research on robotics from 1979-1981, an experimental robot system using vision and a parallel jaw hand for acquiring connecting rod castings, methods for acquiring workpieces from a bin and for estimating a workpiece's position and orientation, errors that occur when the normals of surface patches are estimated by radiometric techniques; and design of a special purpose image processor. Knowledge of symmetry was shown to be helpful in providing a unique estimate of a workpiece's position and orientation, and in transporting a piece to a fixture in minimal time. Author (GRA)

**N83-10789#** National Academy of Sciences - National Research Council, Washington, D. C. Committee on Physics and Chemistry of Ozone Depletion.

**CAUSES AND EFFECTS OF STRATOSPHERIC OZONE REDUCTION: AN UPDATE Final Report**

Mar. 1982 348 p refs  
 (Contract EPA-68-02-3701)  
 (PB82-209644) Avail: NTIS HC A15/MF A01 CSCL 06R

Estimates of steady state reductions in stratospheric ozone due to continued releases of two chlorofluorocarbons at 1977 rates in the absence of other perturbations are lower than 1979 estimates by a factor between two and three. Current models suggest the steady state reduction will lie between 5 and 9%. The association of nonmelanoma skin cancers with ultraviolet-B radiation suggests that reductions in stratospheric ozone will result in increases of these cancers. Exposure to ultraviolet-B radiation has shown to adversely affect the immune response system. E.A.K.

**N83-11744#** Massachusetts Inst. of Tech., Cambridge Man-Machine Systems Lab

**THE USE OF MACHINE AIDS IN DYNAMIC MULTI-TASK ENVIRONMENTS: A COMPARISON OF AN OPTIMAL MODEL TO HUMAN BEHAVIOR Technical Report, 1 Feb. 1982 - 31 Jan. 1983**

W. T. WOOD Jun. 1982 121 p refs  
 (Contract N00014-77-C-0256)

(AD-A118419) Avail: NTIS HC A06/MF A01 CSCL 05H

Due to developments in the fields of computer and microprocessor technology, more and more tasks that previously only could be done by humans can now be assigned to machines. This study explores cases where such smart machines act as aids to human operators in dynamic multi-task systems. The

operator must act as a supervisor and assign these machine aids to tasks he discovers. Author (GRA)

**N83-11745\*#** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex. Food Engineering Lab.

**FOOD FOR US MANNED SPACE FLIGHT**

M. V. KLICKA (Army Natick Research and Development Labs.) and M. C. SMITH, JR. Apr 1982 101 p refs  
 (Contract NASA-MIPR-T-9371A)

(NASA-TM-84850; NAS 1 15-84850; AD-A118316; NATICK/TR-82/019) Avail: NTIS HC A06/MF A01 CSCL 06H

The food systems which have supported the U.S. manned space flight programs have provided safe, nutritious, acceptable, and convenient food, compatible with the mission. The food systems which supported the Mercury, Gemini, and Apollo Flights and the Skylab and Apollo-Soyuz Missions are briefly described. Also, the engineering operational and biological constraints which were imposed in these food systems by the space vehicle and environment are discussed. Author (GRA)

**N83-11746#** Institute for Perception RVO-TNO, Soesterberg (Netherlands)

**A COMPARATIVE TEST OF A2 CLOTHING. PART 2: THERMAL ASPECTS**

W. A. LOTENS and E. J. M. SMIENK 1979 20 p refs In DUTCH; ENGLISH summary  
 (Contract A78/KL/156)

(IZF-1979-21; TDCK-73403) Avail: NTIS HC A02/MF A01

Four types (English, German, French, and Belgian) of permeable chemical protective overgarments were evaluated. In order to test the thermal properties of the garments, eight subjects performed work on a bicycle ergometer in a climate of 30.4 C and 53% relative humidity. Physiological and temperature measurements were made. Clothing was worn in both open and closed condition. The calculated clothing parameters (heat insulation and water vapor conduction) show no difference between the garments, nor do the physiological measures. Under favorable conditions, the garments can be used during a two-hour march at air temperatures up to 30 C. Under worse conditions, the maximum tolerable air temperature can be as low as below zero C. Author (ESA)

## 55

## PLANETARY BIOLOGY

Includes exobiology, and extraterrestrial life.

**A83-10880**  
**EVOLUTION FROM SPACE /THE OMNI LECTURE/ AND OTHERS PAPERS ON THE ORIGIN OF LIFE**

F. HOYLE Hillsdale, NJ, Enslow Publishers, 1982. 81 p. refs \$9.00

The possibility that the origins of life, of genetic mutations, and of common diseases are due to an influx of extraterrestrial microorganisms from space is explored. It is argued that the chances that life evolved from a primordial soup are astronomically small, while protosolar material could very well have been formed into amino acid chains and microorganisms and been preserved intact in comets. The behavior of an invading virus is modeled as taking control of a cell, stopping its normal functions, making it provide conditions favorable to the replication of the virus, and occasionally changing the cell's functions in an evolutive manner. Samples from the Murchison meteorite are cited as evidence for methanogenic bacteria being present in extraterrestrial objects. It is suggested that carbon-based life may have been invented by living beings facing an alteration in the basic atomic matter stars produce and upon which their form of life depended. M.S.K.

## 55 PLANETARY BIOLOGY

**A83-11629\*** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md

### **PROBING THE PRESENTLY TENUOUS LINK BETWEEN COMETS AND THE ORIGIN OF LIFE**

R. W. HOBBS and J. M. HOLLIS (NASA, Goddard Space Flight Center, Laboratory for Astronomy and Solar Physics, Greenbelt, MD) *Origins of Life*, vol. 12, June 1982, p. 125-132. refs

The possibilities of using millimeter-wave technology to probe the subsurface processes of comets to investigate links between cometary materials and the origins of life are explored. It is noted that current theories hold that the necessities for life to begin comprise a fairly uniform temperature, the presence of a solvent to give materials mobility, and the presence of atoms which can form long chains of molecules. Consideration is given to two cometary nuclei models, a core with an equal amount of liquid water and lunar material, and a nucleus with equal amounts of frozen water ice and lunar material. Solutions to the radiative transfer equation for the two models are presented to characterize identifiable emissions using radiometric spectrometer instrumentation on a spacecraft. Particular species such as OH, CN, HCN, and glycine are expected to be detectable if present.

M S.K

**A83-11630**

### **STUDY ON THE CHEMICAL EVOLUTION OF LOW MOLECULAR WEIGHT COMPOUNDS IN A HIGHLY OXIDIZED ATMOSPHERE USING ELECTRIC DISCHARGES**

K. KAWAMOTO and M. AKABOSHI (Kyoto University, Osaka, Japan) *Origins of Life*, vol. 12, June 1982, p. 133-141. refs

The molecular basis for the chemical evolution of low molecular compounds was studied using electric discharges on a highly oxidized atmosphere comprised of CO<sub>2</sub>, N<sub>2</sub> and H<sub>2</sub>O. In the gas phase, O<sub>2</sub> and CO were formed by the decomposition of CO<sub>2</sub> and their yields were enhanced by the addition of N<sub>2</sub> to the gas mixture. It was demonstrated that H<sub>2</sub>O suppressed the reduction of CO<sub>2</sub> while H<sub>2</sub>O also had a role in producing organic compounds such as formic acid and formaldehyde. Infrared analysis of the water soluble products and the inner surface of the reaction vessel indicated the production of compounds more complex than formic acid and formaldehyde. These compounds contained the chemical bonds which were identified to be OH, CO, CN and/or CC.

(Author)

**A83-11631**

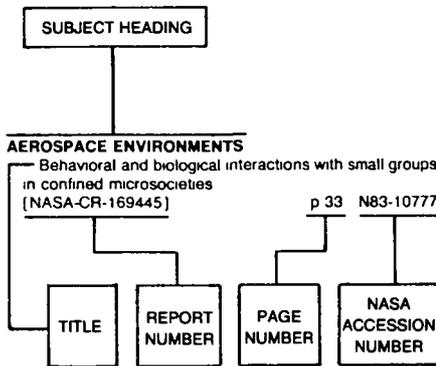
### **NUCLEOSIDE AND DEOXYNUCLEOSIDE PHOSPHORYLATION IN FORMAMIDE SOLUTIONS**

A. M. SCHOFFSTALL, R. J. BARTO, and D. L. RAMOS (Colorado, University, Colorado Springs, CO) *Origins of Life*, vol. 12, June 1982, p. 143-151. refs

The phosphorylations of nucleosides and deoxynucleosides by ammonium and alkali dihydrogen phosphates in formamide under possible prebiotic conditions were investigated. Results show that the conversions of the nucleosides and deoxynucleosides to their phosphorylated nucleotide and deoxynucleotide derivatives were smaller and slower at room temperature and greater and faster at elevated temperatures. The products of the reactions at elevated temperatures were cyclic nucleotides, nucleoside monophosphates, nucleoside diphosphates, and cyclic nucleotide phosphates, and the relative amounts of the products formed were found to be quite temperature dependent. Cyclic nucleotides were found to be in greatest abundance for reactions run at 125 C or above, while 5'-monophosphates were generally found to be present in larger quantities than 2' or 3'-monophosphates, and 2'-deoxyadenosine showed a preference for phosphorylation at the 3' position. It is concluded on the basis of mechanistic studies that these phosphorylations are a series of equilibrium reactions, with cyclic nucleotides being formed irreversibly.

N.B.

**Typical Subject Index Listing**



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

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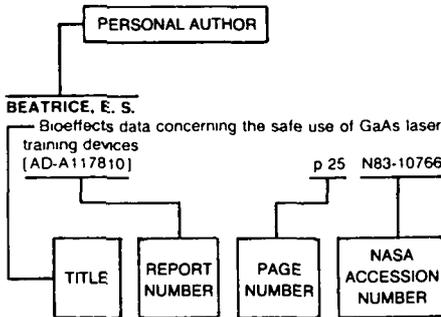
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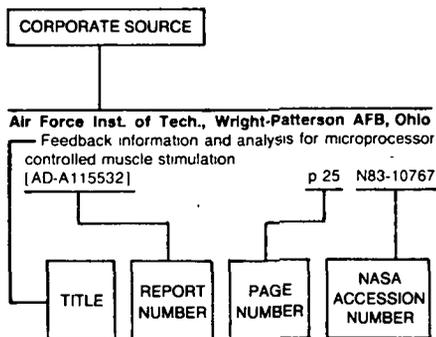
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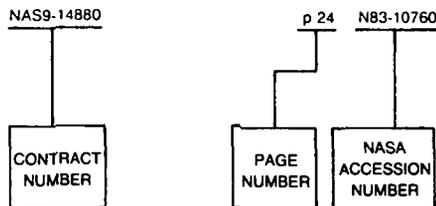
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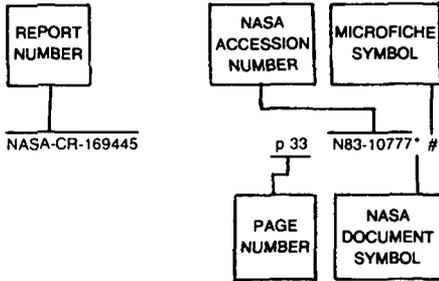
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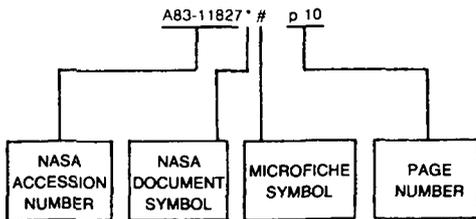
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