

NASA SP-7011(263)



Aerospace Medicine  
and Biology  
A Continuing  
Bibliography  
with Indexes

NASA SP-7011(263)  
October 1984



(NASA-SP-7011(263)) SPACE MEDICINE AND BIOLOGY, CONTINUING BIBLIOGRAPHY (SUPPLEMENT 263) (National Aeronautics and Space Administration) 114 p HC \$7.00 CSCL 06E N85-10636 Unclas 00/52 20555

Aerospace Medicine and Biology  
A Continuing Bibliography with Indexes

Pages 341-396

October 1984

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

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# **AEROSPACE MEDICINE AND BIOLOGY**

**A CONTINUING BIBLIOGRAPHY  
WITH INDEXES**

**(Supplement 263)**

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 September 1984 in

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

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

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

# INTRODUCTION

This Supplement to *Aerospace Medicine and Biology* lists 403 reports, articles and other documents announced during September 1984 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA)*. The first issue of the bibliography was published in July 1964.

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

Each entry in the bibliography consists of a bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged by *STAR* categories 51 through 55, the Life Sciences division. The citations, 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 1984 Supplements.

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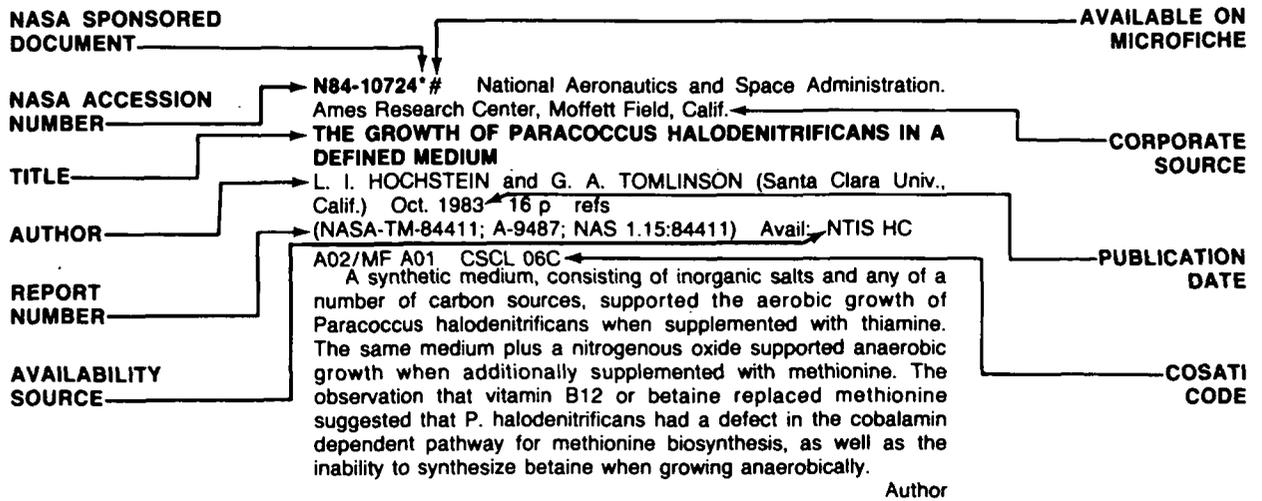
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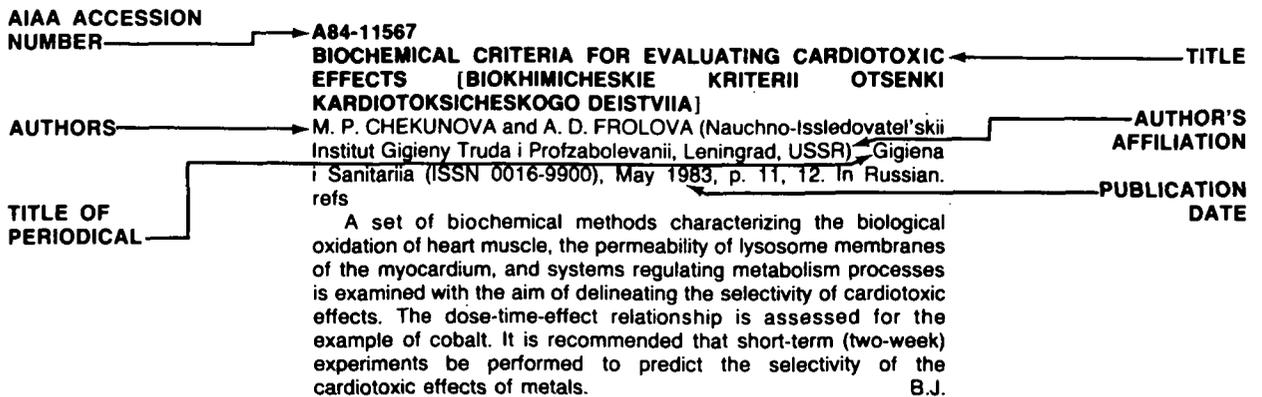
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# AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 263)

OCTOBER 1984

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## LIFE SCIENCES (GENERAL)

Includes genetics.

**A84-36589**

### IMAGE DISCRIMINATION AFTER EXTIRPATION OF STRIATAL OR LATERAL SUPRASYLVIAN AREAS IN THE BRAIN OF CATS [RAZLICHENIE IZOBRAZHENII POSLE EKSTIRPATSII STRIARNOI ILI LATERAL'NOI SUPRASIL'VIEVOI OBLASTEI KORY GOLOVNOGO MOZGA KOSHEK]

N. V. PRAZDNIKOVA, I. U. E. SHELEPIN, V. F. GERCHIKOVA, and E. NEMURENE (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR; Kaunasskii Meditsinskii Institut, Kaunas, Lithuanian SSR) *Fiziologicheskii Zhurnal SSSR* (ISSN 0015-329X), vol. 70, March 1984, p. 265-272. In Russian. refs

It is demonstrated that selective lesion of the striatal cortex in cats leads to decreased visual acuity. However, figure discrimination diminished only in the differentiation of shapes with differing high-frequency harmonic components of the image's spatial-frequency range. While lesion of the lateral suprasylvian area leaves the visual acuity intact, it does disturb differentiation of all images. In agreement with previous statements based on neurophysiological experimentation, it was found that more local and primarily high-frequency image description occurs in the striatal cortex, whereas a more global and mainly low-frequency description takes place in the lateral suprasylvian area. J.N.

**A84-36590**

### ISOPOTENTIAL SOUND PRESSURE LEVELS FOR COCHLEAR MICROPHONE POTENTIAL [IZOPOTENTIAL'NYE UROVNI ZVUKOVOGO DAVLENIIA DLIA MIKROFONNOGO POTENTIALA VNUTRENNEGO UKHA]

O. P. TOKAREV and A. V. KRUGLOV (Ministerstvo Zdravookhraneniia RSFSR, Moskovskii Nauchno-Issledovatel'skii Institut Ukha, Gorla i Nosa, Moscow, USSR) *Fiziologicheskii Zhurnal SSSR* (ISSN 0015-329X), vol. 70, March 1984, p. 306-309. In Russian. refs

It is shown that amplitude-frequency characteristics of microphone potential reflect the functional state of the inner ear, especially with respect to the perception of sound intensity. In experiments with guinea pigs, levels of sound pressure which evoke a similar amplitude of microphone potential of the inner ear during a free-running sweep of frequencies were measured. A method for regulating the level of sound pressure by the microphone potential voltage is described. Isopotential contours of sound pressure levels (SPL) were obtained, and the dynamics of the isopotential SPL on different levels within the range of 50-20,000 Hz is described. J.N.

**A84-36591**

### EFFECT OF COLD ADAPTATION ON THE EXCITATION TRANSMISSION IN NEUROMUSCULAR SYNAPSES [VLIANIE KHOLODOVOI ADAPTATSII NA PEREDACHU VOZBUZHDENIIA V MIONEVRAL'NOM SINAPSE]

G. P. BELOUSOVA (Petrozavodskii Gosudarstvennyi Universitet, Petrozavodsk, USSR) *Fiziologicheskii Zhurnal SSSR* (ISSN 0015-329X), vol. 70, March 1984, p. 326-330. In Russian. refs

Experiments with control and cold-adapted rats were used to study the influence of cold adaptation on processes related to excitation transfer in the myoneural synapse in fibers of fast (m. gastrocnemius) and slow (m. soleus) muscles. Synaptic excitability and lability of the muscle fibers were studied by intracellular recording of action potentials. A decrease in the thresholds of excitability was found in cold-adapted rats in both slow and fast muscle fibers. Also, the lability of neuromuscular synapses in both muscle types was higher in the cold-adapted rats. Cold adaptation appears to reduce the difference in excitability between fast and slow muscle fibers. J.N.

**A84-36592**

### SENSITIVITY OF SKIN COLD RECEPTORS TO NORADRENALINE IN CONTROL AND COLD-ADAPTED RATS [CHUVSTVITEL'NOST' KOZHNYKH KHOLODOVYKH RETSEPTOROV K NORADRENALINU U KONTROL'NYKH I ADAPTIROVANNYKH K KHOLODU KRYS]

T. V. KOZYREVA and M. A. IAKIMENKO (Akademiia Meditsinskikh Nauk SSSR, Novosibirsk, USSR) *Fiziologicheskii Zhurnal SSSR* (ISSN 0015-329X), vol. 70, March 1984, p. 331-338. In Russian. refs

**A84-36593**

### EFFECT OF BETA-1 ADRENORECEPTOR BLOCKING ON HEMODYNAMICS, AVAILABLE OXYGEN, AND SODIUM REABSORPTION IN THE RAT KIDNEY [VLIANIE BLOKADY BETA-ADRENORETSEPTOROV NA GEMODINAMIKU, NAPRIAZHENIE KISLORODA I REABSORBTSIIU NATRIIA V POCHKE KRYSY]

O. B. KUZMIN and P. A. KRIUKOVA (Gosudarstvennyi Meditsinskii Institut, Orenburg, USSR) *Fiziologicheskii Zhurnal SSSR* (ISSN 0015-329X), vol. 70, March 1984, p. 355-359. In Russian. refs

In experiments on anesthetized rats, blocking of the beta-1 adrenoreceptors of the kidneys by talinolol was found to induce a sodium-uretic reaction accompanied by inhibited sodium reabsorption and increased blood flow in cortical and external layers of the brain. The level of PO<sub>2</sub> in the investigated zones of kidney tissue was practically unchanged. This is apparently related to the excess of available oxygen in the studied structures of the kidney. While haloperidol prevented the increase of blood flow in the external layer, it did not affect the cortical hemodynamic shift or the depressing influence of talinolol on the channel transport of sodium. The inhibiting agent for the kallikrein-kinin system, contrical, and the inhibiting agent for prostaglandin synthesis, indometacin, did not alter the kidney responses to the drug under study. The hemodynamic shift as well as the inhibition of sodium reabsorption appear to be unrelated to the excitation of receptors sensitive to dopamine, to the activation of the kallikrein-kinin system, or to the stimulation of prostaglandin synthesis. J.N.

A84-36594

**IMPULSE ACTIVITY OF CUTANEOUS RECEPTORS IN CONVECTIVE AND RADIATIVE LOCAL COOLING [IMPUL'SNAIA AKTIVNOST' KOZHNYKH RETSEPTOROV PRI KONVEKTIVNOM I RADIATIONNOM LOKAL'NOM OKHLAZHDENII]**N. K. POLESHCHUK, N. I. DANILOVA, and L. A. FADEEVA (Petrozavodskii Gosudarstvennyi Universitet, Petrozavodsk, USSR) *Fiziologicheskii Zhurnal SSSR* (ISSN 0015-329X), vol. 70, March 1984, p. 360-364. In Russian. refs

Impulse activity in rabbits cooled by convection was eight times as great as that resulting from the same amount of cooling by radiation. In hairless areas, the increased impulse activity associated with convective cooling was twice as great as that associated with radiative cooling. Changes in impulse activity of fibers of the cutaneous nerve were characterized by considerable fluctuations of rhythm and an increase of receptor activity in hairless areas, indicating a direct dependence on the degree of cooling of subcutaneous tissue. The presence of an initial sharp increase in impulse activity to a maximum followed by a decrease is characteristic for activity of hair and other mechanoreceptors of the skin stimulated by cool air streams. J.N.

A84-36603

**THE GLYCOCALIX OF MEMBRANES IN THE RECEPTOR CELLS OF THE SENSE ORGANS [GLIKOKALIKS MEMBRAN U RETSEPTORNYKH KLETOK ORGANOV CHUVSTV]**I. A. VINNIKOV (Akademiiia Nauk SSSR, Institut Evoliutsionnoi Fiziologii i Biokhimii, Leningrad, USSR) *Arkhiv Anatomii, Gistologii i Embriologii* (ISSN 0004-1947), vol. 85, Nov. 1983, p. 5-26. In Russian. refs

The recent literature on the role of the glycocalix of receptor cells is reviewed, and a number of illustrative examples encompassing various sense organs are presented. It is concluded that the glycocalix of receptor membranes is the necessary condition for the achievement of contact between the stimulus and the receptor protein molecule in the bilipid membrane layer; the glycocalix executes penultimate conversion of the stimulus and thus assures the act of reception. B.J.

A84-36605

**ORIGIN OF TISSUE BASOPHILS AND BASOPHILIC BLOOD GRANULOCYTES [PROISKHOZHDENIE TKANEVYKH BAZOFILOV I BAZOFIL'NYKH GRANULOTSITOV KROVI]**S. I. SHPAK and V. A. PROTSENKO (Krymskii Meditsinskii Institut, Simferopol', Ukrainian SSR) *Tsitologiya i Genetika* (ISSN 0041-4883), vol. 17, Sept.-Oct. 1983, p. 66-70. In Russian. refs

An analysis of recent literature on the origin of basophils and basophilic blood granulocytes reviews data from radioimmunology, electron microscopy, and cytochemical and morphological studies. It appears that these cells have a common precursor and are of bone marrow origin. The character of the differentiation of tissue basophils and basophilic blood granulocytes from their precursors depends on the species of the organism, its strain, age, and immunological reactivity, as well as on the cultured cells and culture conditions. J.N.

A84-36607

**EFFECT OF CHILLING AND OF SUBSEQUENT SELF-HEATING ON THE LEVEL OF NONESTERIFIED FATTY ACIDS AND KETONE BODIES IN THE BLOOD AND ORGANS OF RATS [VLIANIE OKHLAZHDENIIA I POSLEDIUUSHCHEGO SAMOSGREVANIIA NA SODERZHANIE NEESTERIFITSIROVANNYKH ZHIRNYKH KISLOT I KETONOVYKH TEL V KROVI I ORGANAKH KRYSA]**P. M. IUFIT, E. K. ALIMOVA, and A. T. ASTVATSURIAN (Rostovskii Meditsinskii Institut, Rostov-on-Don, USSR) *Voprosy Meditsinskoi Khimii* (ISSN 0042-8809), vol. 29, Sept.-Oct. 1983, p. 2-5. In Russian. refs

The level of nonesterified fatty acids (NEFA) in the blood, liver, and brain of white male rats was found to increase in response to deep chilling while the level of NEFA in skeletal muscles decreased. An increase in the level of ketones in the blood was

also observed in deep chilling and within the first hours of subsequent self-heating. This effect may be seen as a compensatory reaction of the organism to cold stress which works toward preventing the accumulation of toxic levels of NEFA in the blood. Levels of NEFA decreased during self-heating in all studied areas except the blood, where the NEFA level remained constant. The fact that ketones formed as a result of oxidation of fatty acids in the liver may be actively used by other tissues as energy substrates demonstrates that enzyme processes of the liver are capable of regulating lipid metabolism on the level of the organism. J.N.

A84-36608

**MECHANISM OF INHIBITION OF FIBRIN POLYMERIZATION BY MEANS OF A THERMOSTABLE INHIBITOR FROM BLOOD SERUM [K MEKHANIZMU TORMOZHENIIA SAMOSBORKI FIBRINA TERMOSTABIL'NYM INGIBITOREM SYVOROTKI KROVI]**A. SH. BYSHEVSKII and E. A. CHIRIATEV (Tiumenskii Meditsinskii Institut, Tyumen, USSR) *Voprosy Meditsinskoi Khimii* (ISSN 0042-8809), vol. 29, Sept.-Oct. 1983, p. 22-27. In Russian. refs

A84-36609

**EFFECT OF PROSTAGLANDINS F-2 AND F-2-ALPHA ON THE PENTOSE PHOSPHATE PATHWAY IN HUMAN BLOOD PLATELETS [VLIANIE PROSTAGLANDINOV F2 I F2-ALPHA NA PENTOZOFOSFATNYI PUT' V KROVIANYKH PLASTINKAKH CHELOVEKA]**S. A. MAKAROV, G. V. KUDRIAVTSEVA, and A. I. KOLOTILOVA (Leningradskii Gosudarstvennyi Universitet, Leningrad, USSR) *Voprosy Meditsinskoi Khimii* (ISSN 0042-8809), vol. 29, Sept.-Oct. 1983, p. 27-32. In Russian. refs

A84-36610

**EFFECT OF 2-PYRROLIDONE ACETAMIDE (PYRACETAM) ON THE RESPIRATORY CHAIN OF ELECTRON TRANSPORT IN RAT LIVER MITOCHONDRIA [DEISTVIE 2-PIRROLIDONATSETAMIDA /PIRATSETAMA/ NA DYKHATEL'NIU TSEP' PERENOSA ELEKTRONOV V MITOKHONDRIIAKH PECHENI KRYSA]**A. P. AGUREEV and A. I. TEREKHINA (Nauchno-Issledovatel'skii Institut po Biologicheskim Ispytaniiam Khimicheskikh Soedinenii, Kupavna, USSR) *Voprosy Meditsinskoi Khimii* (ISSN 0042-8809), vol. 29, Sept.-Oct. 1983, p. 32-35. In Russian. refs

A84-36611

**INTERACTION OF BLOOD PLASMA PROTEINS IN HUMANS WITH GLYCOSAMINOGLYCANS [VZAIMODEISTVIE BELKOV PLAZMY KROVI CHELOVEKA S GLIKOZAMINOGLIKANAMI]**N. A. ZORIN (Novokuznetskii Institut Uovershenstvovaniia Vrachei, Novokuznetsk, USSR) *Voprosy Meditsinskoi Khimii* (ISSN 0042-8809), vol. 29, Sept.-Oct. 1983, p. 41-43. In Russian. refs

A84-36612

**KINETIC METHOD FOR DETERMINING ALKALINE PHOSPHATASE ISOENZYMES IN HUMAN BLOOD SERUM [KINETICHESKII METOD OPREDELENIIA IZOFERMENTOV SHCHELOCHNOI FOSFATAZY SYVOROTKI KROVI CHELOVEKA]**V. T. MOZZHECHKOV and V. N. MALAKHOV (Ministerstvo Zdravookhraneniia SSSR, Moscow, USSR) *Voprosy Meditsinskoi Khimii* (ISSN 0042-8809), vol. 29, Sept.-Oct. 1983, p. 43-48. In Russian. refs

A84-36613

**E GROUP PROSTAGLANDINS AND LIPOLYSIS IN THE ADIPOSE TISSUE OF INTACT AND STARVED RATS DURING AGING [PROSTAGLANDINY GRUPPY E I LIPOLIZ V ZHIROVOI TKANI INTAKTNYKH I GOLODAVSHIKH KRYSA PRI STARENII]**G. G. GATSKO, A. S. ZHUKOVA, T. A. MITIUKOVA (Akademiiia Nauk Belorusskoi SSR, Institut Fiziologii, Minsk, Belorussian SSR), and O. V. SHABLINSKAIA *Voprosy Meditsinskoi Khimii* (ISSN 0042-8809), vol. 29, Sept.-Oct. 1983, p. 49, 50. In Russian. refs

A84-36614

**EFFECT OF M- AND N-CHOLINOLYTICS ON CONTENT OF CA(+2) IN SYNAPTOSOMES AND METABOLISM OF PHOSPHOINOSITIDES IN THE BRAIN OF RATS [VLIANIE M- I H-KHOLINOLITIKOV NA SODERZHANIE CA/2+/ V SINAPTOSOMAKH I OBMEN FOSFOINOZITIDOV V GOLOVNO M MOZGE KRYS]**

T. A. SUKHOVSKAIA, E. V. SEMENOV, and S. S. KRYLOV (Ministerstvo Zdravookhraneniia SSSR, Institut Toksikologii, Leningrad, USSR) *Voprosy Meditsinskoi Khimii* (ISSN 0042-8809), vol. 29, Sept.-Oct. 1983, p. 51-54. In Russian. refs

A84-36616

**INTERRELATIONSHIP BETWEEN LACTATE DEHYDROGENASE AND ITS ISOENZYME CONTENT IN THE LIVER AND BLOOD SERUM IN EXPERIMENTAL MYOCARDIAL INFARCTION [VZAIMOSVIAZ' AKTIVNOSTI LAKTATDEGIDROGENAZY I EE IZOFERMENTNOGO SOSTAVA V PECHENI I SYVOROTKE KROVI PRI EKSPERIMENTAL'NOM INFARCTE MIOKARDA]**

A. K. PRASHKIAVICHUS, L. IU. LUKOSHIIVICHUS, V. I. GRIGALIUNENE, and R. R. SHATINSKENE (Kaunasskii Meditsinskii Institut, Kaunas, Lithuanian SSR) *Voprosy Meditsinskoi Khimii* (ISSN 0042-8809), vol. 29, Sept.-Oct. 1983, p. 58-62. In Russian. refs

A84-36617

**HORMONAL REGULATION OF SUPEROXIDE DISMUTASE TURNOVER IN THE LIVER OF RATS [GORMONAL'NAIA REGULIATSIIA OBOROTA SUPEROKSIDDISMUTAZY V PECHENI KRYS]**

V. P. KOMOV and E. IU. IVANOVA (Leningradskii Khimiko-Farmatsevticheskii Institut, Leningrad, USSR) *Voprosy Meditsinskoi Khimii* (ISSN 0042-8809), vol. 29, Sept.-Oct. 1983, p. 79-82. In Russian. refs

The degradation and biosynthesis of superoxide dismutase (SOD) in cytosol and mitochondrial fractions of rat liver tissue were inhibited by insulin and stimulated by glucagon. Insulin also increased the turnover of SOD in mitochondria. The action of exogenous and glucose-induced insulin increased the half-life of the cytoplasmic SOD while the constant of biosynthesis remained unchanged. Exogenous and arginine-induced glucagon decreased the half-life of SOD. The arginine-induced glucagon exerted a more marked influence on the enzyme turnover while the exogenous hormone had a greater effect on its concentration. Specific and nonspecific degradation were also subject to hormonal influences.

J.N.

A84-36618

**SEDIMENTATION OF ALKALINE LYSATES OF IRRADIATED CELLS OF RAT BONE MARROW [SEDIMENTATSIIA SHCHELOCHNYKH LIZATOV OBLUCHENNYKH KLETOK KOSTNOGO MOZGA KRYS]**

V. A. TRONOV, A. V. PROVOTOROV, and L. B. SHAGALOV (Ministerstvo Zdravookhraneniia SSSR, Institut Biofiziki, Moscow, USSR) *Radiobiologiya* (ISSN 0033-8192), vol. 23, Sept.-Oct. 1983, p. 599-602. In Russian. refs

A84-36619

**STRUCTURE AND REPAIR OF RAT THYMUS DNA DURING LONG-TERM IRRADIATION [STRUKTURA I REPARATSIIA DNK VILOCHKOVOI ZHELEZY KRYS PRI DLITEL'NOM OBLUCHENII]**

G. G. RUSIANOVA and G. S. MUSHKACHEVA (Ministerstvo Zdravookhraneniia SSSR, Institut Biofiziki, Moscow, USSR) *Radiobiologiya* (ISSN 0033-8192), vol. 23, Sept.-Oct. 1983, p. 603-607. In Russian. refs

The molecular weight of single-stranded DNA in the thymus of rats exposed to long-term fractionated irradiation (0.5 Gy, daily) remained the same as that of intact animals until a cumulative dose of 25 Gy had been attained. The integrity of the DNA structure was ensured by the repair of DNA and by the elimination of cells with unrepaired lesions. With increasing cumulative dose, the role of repair decreased and the elimination of cells increased. J.N.

A84-36620

**MODELING THE DOSE-EFFECT RELATIONSHIPS FOR CELL POPULATIONS UNDER THE EFFECT OF IONIZING RADIATION OF DIFFERENT QUALITY [MODELIROVANIE ZAVISIMOSTI 'DOZA-EFFEKT' KLETOCHNYKH POPULIATSII PRI DEISTVII IONIZIRUIUSHCHEGO IZLUCHENIIA RAZLICHNOGO KACHESTVA]**

A. K. VALEEV and O. V. MALINOVSKII (Akademiiia Nauk SSSR, Leningradskii Institut Iadernoi Fiziki, Gatchina, USSR) *Radiobiologiya* (ISSN 0033-8192), vol. 23, Sept.-Oct. 1983, p. 624-629. In Russian. refs

Analytical expressions for the survival rate of the exposed population are obtained in modeling the response of an individual cell to the effect of a determinate amount of radiation with allowance for the probability distribution of the energy absorbed among the cells. These relationships can be used to describe the RBE, the oxygen effect, and the chemical modification of the cell response. The influence of radiation quality on these relationships is examined. B.J.

A84-36685

**PERIOD MULTIPLYING-EVIDENCE FOR NONLINEAR BEHAVIOUR OF THE CANINE HEART**

A. L. RITZENBERG, D. R. ADAM, and R. J. COHEN (MIT, Cambridge, MA) *Nature* (ISSN 0028-0836), vol. 307, Jan. 12, 1984, p. 159-161. Research supported by the Whitaker Health Sciences Fund and R. J. Reynolds Industries. refs (Contract NSF ECS-79-22091; NSF ECS-81-21571; N00014-80-C-0520)

Evidence is reported of nonlinear behavior in the electrocardiogram and arterial blood pressure traces of the noradrenaline-treated dog. Noradrenaline produces variations in these traces that repeat themselves with regular periods of integral numbers of heartbeats (period multiplying), an effect that resembles the 'period doubling' and other 'bifurcative' behavior observed when the driving frequency of a nonlinear oscillator is increased above a critical value. The simplest type of periodic variation reported is the so-called 'electrical alternans', which has long been known as one response of cardiac electrical activity to certain stresses and disease states. C.D.

A84-36703

**BETA-ADRENERGIC MODULATION OF CALCIUM CHANNELS IN FROG VENTRICULAR HEART CELLS**

B. P. BEAN, M. C. NOWYCKY, and R. W. TSIEN (Yale University, New Haven, CT) *Nature* (ISSN 0028-0836), vol. 307, Jan. 26, 1984, p. 371-375. Research supported by the American Heart Association, Miles Institute, and PHS. refs

A84-36724

**MOLECULAR GENETIC EVIDENCE FOR EARLY EVOLUTIONARY ORIGIN OF BUDDING PEPTIDOGLYCAN-LESS EUBACTERIA**

E. STACKEBRANDT, W. LUDWIG (Muenchen, Technische Universitaet, Munich, West Germany), W. SCHUBERT (Muenchen, Technische Universitaet, Garching, West Germany), F. KLINK, H. SCHLESNER, T. ROGGENTIN, and P. HIRSCH (Kiel, Universitaet, Kiel, West Germany) *Nature* (ISSN 0028-0836), vol. 307, Feb. 23, 1984, p. 735-737. Research supported by the Deutsche Forschungsgemeinschaft. refs

It has been shown in recent studies that representatives of the genera *Planctomyces* and *Pasteuria* lack the peptidoglycan moiety, which is the characteristic feature of eubacterial cell walls, but possess an unidentified protein sheet. In this respect, the above strains resemble certain archaeobacteria more than eubacteria. To determine their phylogenetic positions, partial sequence analyses have been performed on 16S ribosomal RNAs of three budding, peptidoglycanless strains with and without stalks. A comparison of the results with data obtained from about 320 eubacterial and 40 archaeobacterial strains suggests that the strains investigated are not related to archaeobacteria but represent an ancient line of descent of eubacteria. V.L.

A84-36725

**POSSIBLE ARTEFACTUAL BASIS FOR APPARENT BACTERIAL GROWTH AT 250 C**

J. D. TRENT, R. A. CHASTAIN, and A. A. YAYANOS (California, University, La Jolla, CA) *Nature* (ISSN 0028-0836), vol. 307, Feb. 23, 1984, p. 737-740; Reply, p. 740. Research supported by Sandia National Laboratory. refs  
(Contract NSF OCE-82-08419)

Reference is made to the work of Baross and Deming (1983) who reported that thermophilic bacteria isolated from the vicinity of a submarine hot-spring grow at temperatures up to at least 250 C. It is noted, however, that in the above study, no appropriate control experiments were conducted to eliminate the effects of chemical artefacts or contamination. To verify the findings of Baross and Deming, experiments were conducted using the same growth medium, the same temperature and pressure apparatus, and the same sampling and analytical procedures. It is concluded that the evidence indicating bacterial growth at 250 C may be due to artefacts produced in the medium and to contaminants introduced during the sampling procedure. V.L.

A84-36731

**RELATIONSHIPS BETWEEN BRAIN NORADRENERGIC ACTIVITY AND BLOOD GLUCOSE**

G. A. SMYTHE, H. S. GRUNSTEIN, J. E. BRADSHAW, M. V. NICHOLSON, and P. J. COMPTON (St. Vincent's Hospital, Darlinghurst, New South Wales, Australia) *Nature* (ISSN 0028-0836), vol. 308, March 1, 1984, p. 65-67. refs

Novel techniques have been used to assess brain monoamine neuronal activity to investigate its relationship to blood glucose concentrations in the rat, and two important relationships emerging from these studies are described. One is that activation of hypothalamic noradrenaline (NA) activity following stress is associated with concurrent increases in plasma glucose concentrations. This relationship is linear and independent of the adrenal or pituitary glands. The second is an inverse relationship between plasma glucose concentration and hypothalamic NA neuronal activity - high blood glucose levels significantly inhibited the hypothalamic activity responses to stress, alpha(2)-adrenergic blockade, and adrenalectomy. Thus, glucose, or a metabolite of it, appears to provide a negative feedback signal sensed by hypothalamic NA neuronal systems which, in turn, appear to stimulate liver glucose output by a neural mechanism. C.D.

A84-36732

**VOLTAGE-DEPENDENT CALCIUM CHANNELS FROM BRAIN INCORPORATED INTO PLANAR LIPID BILAYERS**

M. T. NELSON, R. J. FRENCH, and B. K. KRUEGER (Maryland, University, Baltimore, MD) *Nature* (ISSN 0028-0836), vol. 308, March 1, 1984, p. 77-80. Research supported by the Alexander von Humboldt-Stiftung and University of Maryland. refs  
(Contract DAMD17-82-C-2188)

Currents have been measured through single, voltage-dependent calcium channels from rat brain that have been incorporated into planar lipid bilayers. Channel gating was voltage dependent; membrane deposition increased the channel open times and decreased the closed times. The channels were selective for divalent cations over monovalent ions. The calcium channel blockers lanthanum and cadmium produced a concentration-dependent reduction of the apparent single-channel conductance. Contrary to expectations, the nature of the divalent cation carrying current through the channel affected the channel open times as well as the single-channel conductance, with mean open times being shortest for barium. C.D.

A84-36743

**SPECTRAL SENSITIVITY OF A NOVEL PHOTORECEPTIVE SYSTEM MEDIATING ENTRAINMENT OF MAMMALIAN CIRCADIAN RHYTHMS**

J. S. TAKAHASHI, L. BAUMAN, M. MENAKER (Oregon, University, Eugene, OR), and P. J. DECOURSEY (Oregon, University, Eugene, OR; South Carolina, University, Columbia, SC) *Nature* (ISSN 0028-0836), vol. 308, March 8, 1984, p. 186-188. refs  
(Contract NIH-HD-13162; NIH-GM-07257)

A photoreceptive assay was made of the magnitude of the phase shift in golden hamster circadian rhythms caused by 15-min monochromatic light pulses after seven days in darkness. The animals were then kept in darkness for 14 days. The light pulses were given at circadian rhythm 18, when maximum phase advances are known to occur. Phase shifts of 2.4 hr were induced with 1 hr of pulses and 2.5 hr with 6 hr of pulses. Wavelengths of 476, 515, and 574 nm were used with separate hamsters. The amount of phase shift always increased with light intensity, although the response sensitivity was similar at all wavelengths. Expanding the wavelength tests to seven bands revealed a maximum sensitivity around 500 nm, close to the sensitivity of a visual pigment in the hamster retina. The intensity threshold for excitation of the rod-located phase shift pigment was significantly higher than the threshold of rod photoexcitation. M.S.K.

A84-36873

**ILLUSORY CONTOURS AND CORTICAL NEURON RESPONSES**

R. VON DER HEYDT, E. PETERHANS, and G. BAUMGARTNER (University Hospital, Zurich, Switzerland) *Science* (ISSN 0036-8075), vol. 224, June 15, 1984, p. 1260-1262. refs

Figures in which human observers perceive 'illusory contours' were found to evoke responses in cells of area 18 in the visual cortex of alert monkeys. The cells responded as if the contours were formed by real lines or edges. Modifications that weakened the perception of contours also reduced the neuronal responses. In contrast, cells in area 17 were apparently unable to 'see' these contours. Author

A84-36933

**VITAMIN D3 ACTIVE METABOLITES AS A COUNTERMEASURE AGAINST DISORDERS OF CALCIUM-PHOSPHORUS METABOLISM IN HYPOKINETIC RATS**

A. S. USHAKOV, V. B. SPIRICHEV, M. S. BELAKOVSKII, I. N. SERGEEV, A. S. KAPLANSKII, and V. N. SHVETS (Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR) *Aviation, Space, and Environmental Medicine* (ISSN 0095-0562), vol. 55, June 1984, p. 534-537. refs

A84-36934

**HYPOXIC AND NYCTHEMERAL RESPONSES BY THE ADRENAL CORTEX OF PARTIALLY HEPATECTOMIZED RATS**

L. WITEK-JANUSEK and S. F. MAROTTA (Illinois, University, Chicago, IL) *Aviation, Space, and Environmental Medicine* (ISSN 0095-0562), vol. 55, June 1984, p. 538-541. refs  
(Contract PHS-NU-05005)

The role of the liver in controlling glucocorticoid levels and its influence on hypothalamic-pituitary-adrenocortical (HPA) activity are investigated in an experiment on rats. Morning plasma and adrenal corticosterone levels of rats were measured 48 hours after 70 percent hepatectomy. It was found that the concentrations of plasma corticosterone were significantly higher in the hepatectomized (H) rats than in the sham (S) operated rats. Nocturnal rises in plasma corticosterone levels in the H rats were found to be 148 percent higher than those of the S rats. HPA response to hypoxia in the H rats was assessed by measuring plasma corticosterone levels at various times before, during and after exposure to 10 percent O<sub>2</sub> at ground level. In a curvilinear analysis of the plasma steroid levels, a significantly slower corticosterone rise was detected during the hypoxic phase in the H rats than in the S rats. The data indicate a decreased hepatic capacity to inactivate steroids in the H rats, and sluggish activation

of the HPA system by hypoxia, possible due to prior exposure of feedback sites to elevated plasma corticosterone levels. I.H.

**A84-36935\*** California Univ., Davis.  
**IMPAIRMENT OF THERMOGENESIS AND HEAT CONSERVATION IN RATS DURING 3 HOURS OF 3-G EXPOSURE**

C. B. MONSON and J. M. HOROWITZ (California, University, Davis, CA) Aviation, Space, and Environmental Medicine (ISSN 0095-0562), vol. 55, June 1984, p. 542-545. refs  
 (Contract NSG-2234; NGT-05-004-800)

**A84-36936\*** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.  
**THERMOREGULATORY RESPONSES OF RATS TO VARYING ENVIRONMENTAL TEMPERATURES**

J. J. BERRY, L. D. MONTGOMERY, and B. A. WILLIAMS (NASA, Ames Research Center, Moffett Field, CA) Aviation, Space, and Environmental Medicine (ISSN 0095-0562), vol. 55, June 1984, p. 546-549. refs

The peripheral (tail) circulatory responses of six male albino rats were measured at ambient temperatures between 5 and 40 C, using impedance plethysmography. Each animal was anesthetized, instrumented, and placed in a thermal environmental chamber to reach equilibrium. Tail blood flow, respiration rate, heart rate, core temperature, and tail skin temperature were then monitored at each ambient temperature. The mean tail blood flow was significantly higher ( $p$  less than 0.05) at 5 C than at 10 C. The mean blood flow increased significantly ( $p$  less than 0.01) at each of the temperatures above 10 C. Tail skin temperature and internal body (core) temperature increased significantly with increasing ambient temperature. Author

**A84-36937**  
**EFFECTS OF POSITIVE END EXPIRATORY PRESSURE AND COUNTERPRESSURIZATION ON CIRCULATING PROSTAGLANDINS IN THE DOG**

F. A. SUNAHARA, C. SUN, and S. HARDING (Toronto, University, Toronto, Canada) Aviation, Space, and Environmental Medicine (ISSN 0095-0562), vol. 55, June 1984, p. 550-555. Research supported by the Defense and Civil Institute of Environmental Medicine. refs

**A84-37118**  
**DEVELOPMENT CONDITIONS AND SPECIFIC COMPOSITION OF PHOTOTROPIC BACTERIA IN SALTY SHALLOW RESERVOIRS IN THE CRIMEA [USLOVIA RAZVITII I VIDOVOI SOSTAV FOTOTROFNYKH BAKTERII V SOLENYKH MELKOVODNYKH VODOEMAKH KRYMA]**

V. M. GORLENKO, E. I. KOMPANTSEVA, S. A. KOROTKOV, N. N. PUCHKOVA, and A. S. SAVVICHEV (Akademiia Nauk SSSR, Institut Mikrobiologii, Moscow, USSR) Akademiia Nauk SSSR, Izvestiia, Serii Biologicheskaiia (ISSN 0002-3329), May-June 1984, p. 362-374. In Russian. refs

**A84-37119**  
**PROBLEM OF DETERMINING EQUIVALENT INTENSITIES OF CHRONIC ELECTROMAGNETIC RADIATION FOR MAN AND LABORATORY ANIMALS [PROBLEMA OPREDELENIIA EKVALENTNYKH INTENSIVNOSTEI KHRONICHESKIKH ELEKTROMAGNITNYKH OBLUCHENII CHELOVEKA I LABORATORNYKH ZHIVOTNYKH]**

V. G. TIAZHELOVA, V. V. TIAZHELOV, and I. G. AKOEV (Akademiia Nauk SSSR, Institut Biologicheskoi Fiziki, Moscow, USSR) Akademiia Nauk SSSR, Izvestiia, Serii Biologicheskaiia (ISSN 0002-3329), May-June 1984, p. 418-427. In Russian. refs

The problem of estimating equivalent intensities of chronic electromagnetic radiation for men and laboratory animals is reviewed on the basis of general organism reaction to injury. Similarity criteria for damage from exposure to nonionizing electromagnetic radiation (NIEMR) were developed for dogs, mice, and men. Values of the specific absorbed radiation (SAR) which formed similar biological effects in different mammals over

biologically equivalent time periods were themselves taken to be equivalent. On this basis power density (PD) values were estimated. Results are tabulated and compared with data for ionizing radiation. The extremely strong influence of the frequency of radiation is demonstrated. The proposed estimation approach gives the direction and order of interspecies extrapolations for determining threshold intensities of radiation for weak, chronic, and long-term effects of NIEMR. J.N.

**A84-37120**  
**EXPERIMENTAL MODEL FOR THE OBJECTIVE EVALUATION OF THE DEGREE OF DEVELOPMENT OF INITIAL REACTION TO RADIATION IN RABBITS [EKSPERIMENTAL'NAIA MODEL' DLIA OB'EKTIVNOI OTSENKI STEPENI PROIAVLENIIA PERVICHNOI REAKTSII NA OBLUCHENIE U KROLIKOV]**

N. I. ARLASHCHENKO and A. I. POGOSOV (Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR) Akademiia Nauk SSSR, Izvestiia, Serii Biologicheskaiia (ISSN 0002-3329), May-June 1984, p. 428-432. In Russian. refs

A correlation between the value of the development of a primary reaction to radiation and the degree of disturbances in the permeability of the hemato-ophthalmic barrier has been established. Using this fact as justification, indicators of permeability of the vascular-tissue barrier may be used to objectively evaluate the degree of development of initial reaction to radiation. This paper describes an in vivo experiment on a rabbit which involves measuring the intensity of the luminosity of fluorescein emitted from the blood in the humor of the anterior chamber of the eye through the vascular walls of the iris and ciliary body. Disorders of the hemato-ophthalmic barrier also signal disturbances of the hemato-encephalic and hemato-labyrinthine barriers. Functional disturbances of the last two barriers led to disturbances of intracranial and intralabyrinthine pressure and may be the cause of various initial reactions to radiation in man. J.N.

**A84-37176**  
**INFLAMMATION, IMMUNITY, AND HYPERSENSITIVITY [VOSPALENIE, IMMUNITET, GIPERCHUVSTVITEL'NOST']**

V. V. SEROV (I Moskovskii Meditsinskii Institut, Moscow, USSR) Arkhiv Patologii (ISSN 0004-1955), vol. 45, no. 11, 1983, p. 3-14. In Russian. refs

It is suggested that inflammation and hypersensitivity stand in a cause-and-effect relationship, with immunity being the connecting link between them. Immune responses generated in inflammation for the elimination of the injurious agent and reparation may, upon distortion of the inflammation kinetics, become 'sick immunity' or hypersensitivity responses leading to damage and immune inflammation. It is concluded that an understanding of the relationship of inflammation, immunity, and hypersensitivity will give insight into various branches of modern medical and biological science, including morphology, molecular biology, immunology, and genetics. B.J.

**A84-37177**  
**POLYMORPHONUCLEAR LEUKOCYTES AND MACROPHAGES IN REACTIONS OF INFLAMMATION AND HYPERSENSITIVITY [POLIMORFNOIADERNYI LEIKOTSIT I MAKROFAG V REAKTSIIAKH VOSPALENIIA I GIPERCHUVSTVITEL'NOSTI]**

V. E. PIGAREVSKII (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Arkhiv Patologii (ISSN 0004-1955), vol. 45, no. 11, 1983, p. 14-22. In Russian. refs

**A84-37182**

**PATTERN OF INFLAMMATORY REACTION AS DEPENDENT ON THE ETIOLOGY OF INFECTION AND CERTAIN FEATURES OF THE MACROORGANISM [KHARAKTER VOSPALITEL'NOI REAKTSII V ZAVISIMOSTI OT ETIOLOGII INFEKTSII I NEKOTORYKH OSOBENNOSTEI MAKROORGANIZMA]**

A. V. TSINZERLING (Leningradskii Pediatricheskii Meditsinskii Institut, Leningrad, USSR) Arkhiv Patologii (ISSN 0004-1955), vol. 45, no. 11, 1983, p. 58-66. In Russian. refs

Differences in structural changes of the internal organs due to specific properties of the causative agents are examined on the example of affections of the respiratory organs, the intestinal tract, and the CNS caused by viruses, bacteria, fungi, and protozoa. It is shown that these changes are greatest when the causative agents belong to different types and classes. The effect of host factors (especially the immune status) on the course of infectious diseases is considered, and changes occurring in the macroorganism and microorganism in the course of such diseases are discussed. It is shown that not only local but also systemic defense mechanisms are disturbed during infection, which facilitates the occurrence of diseases of other etiologies and leads to an increased incidence of combined infections. B.J.

**A84-37184**

**THE ENDOCRINE SYSTEM AND IMMUNITY [ENDOKRINNAIA SISTEMA I IMMUNITET]**

O. K. KHMELNITSKII, A. SH. ZAICHIK, and I. U. N. ZUBZHITSKII (Leningradskii Institut Usovershenstvovaniia Vrachei; Leningradskii Pediatricheskii Meditsinskii Institut, Leningrad, USSR) Arkhiv Patologii (ISSN 0004-1955), vol. 45, no. 11, 1983, p. 82-89. In Russian. refs

Consideration is given to studies using antinuclear and antideoxyribonucleoprotein immunoglobulins of the G class from hormone-producing cells against specific structures of the adrenals, thyroid gland, and thymus, exerting a selective organ-specific effect, as well as the immunomodulator thymaline (a thymus factor). These studies disclosed previously unknown mechanisms of the interaction between the endocrine system and the immunogenesis organs. It is concluded that these results may aid in the clarification of mechanisms for the compensation of disturbed homeostasis. B.J.

**A84-37185**

**THE ROLE OF ERYTHROCYTES IN MAINTAINING THE IMMUNOLOGICAL HOMEOSTASIS OF THE ORGANISM [ROL' ERITROTSITOV V PODDERZHANII IMMUNOLOGICHESKOGO GOMEOSTAZA ORGANIZMA]**

V. T. VASILENKO (Ministerstvo Zdravookhraneniia SSSR, Nauchno-Issledovatel'skii Institut Transplantologii i Iskusstvennykh Organov, USSR) Sovetskaia Meditsina, no. 11, 1983, p. 25-31. In Russian. refs

It is suggested that a nonspecific property involving the ability of erythrocytes to adsorb various agents is of great significance in the development of the initial phase of immunogenesis. When the antigen material is adsorbed by red cells, their determinants are demasked, which facilitates the contact of the antigen with immune-competent cells in the immunogenesis organs. This mechanism is of particular importance in the stimulation of antibody genesis in the transplantation of isolated organs on vascular ligaments. In this case the graft has no connection with the lymphoid organs of the recipient, while there is only a limited possibility of the return of the recipient's lymphocytes (which migrated and contacted with the graft tissue) to the blood flow. B.J.

**A84-37193**

**DIURNAL VARIATIONS OF THE CONTRACTILITY OF THE LEFT VENTRICLE AND THE CONTENT OF FREE FATTY ACIDS IN THE BLOOD DURING ACUTE FOCAL MYOCARDIAL ISCHEMIA IN RABBITS [IZMENENIE SOKRATITEL'NOI AKTIVNOSTI LEVOGO ZHELUDCHKA SERDTSA I SODERZHANIIA SVOBODNYKH ZHIRNYKH KISLOT V KROVI PRI OSTROI OCHAGOVOI ISHEMII MIOKARDA U KROLIKOV V RAZNOE VREMIA SUTOK]**

V. A. FROLOV, T. A. KAZANSKAIA, S. M. CHIBISOV, and L. V. EFIMOVA (Universitet Druzby Narodov, Moscow, USSR) Kardiologiya (ISSN 0022-9040), vol. 23, Oct. 1983, p. 98-100. In Russian. refs

**A84-37195**

**THE EFFECT OF HYDROCORTISONE ON PROTEIN METABOLISM IN SKELETAL MUSCLES [DEISTVIE GIDROKORTIZONA NA METABOLIZM BELKOV V SKELETNYKH MYSHTSAKH]**

V. A. KAZARIAN, A. V. SHCHELKUNOV, and E. A. RAPOPORT (II Moskovskii Gosudarstvennyi Meditsinskii Institut, Moscow, USSR) Zhurnal Nevropatologii i Psikhatrii im. S.S. Korsakova (ISSN 0044-4588), vol. 83, no. 11, 1983, p. 1654-1659. In Russian. refs

A radioindicator technique was used to investigate the effect of hydrocortisone on the synthesis and breakdown of sarcoplasmic and myofibrillar proteins in white (m. extensor digitorum longus) and red (m. soleus) functioning and idle skeletal muscles in rats. Along with catabolic effects (i.e., the inhibition of protein synthesis and/or the stimulation of protein breakdown), hydrocortisone exhibited an anticatabolic effect consisting in the inhibition of the protein breakdown. Except in the case of the white functioning muscle, this anticatabolic effect was observed simultaneously with the inhibition of protein synthesis, thus counteracting to some extent the development of atrophic reactions in the muscles. B.J.

**A84-37200**

**COMPUTER-TOMOGRAPHIC DIAGNOSIS OF THE MIDDLE PART OF THE FACE [DIAGNOSTIKA OPUKHOLEI SREDNEI ZONY LITSA S POMOSHCH'IU KOMPI'UTERNOI TOMOGRAFII]**

T. NEMET and I. SOBOTA Voenno-Meditsinskii Zhurnal (ISSN 0026-9050), Nov. 1983, p. 54, 55. In Russian.

**A84-37260**

**IS THERE AN EVOKED VASCULAR RESPONSE?**

C. A. SANDMAN, J. P. OHALLORAN, and R. ISENHART (California, University, Irvine; Fairview Hospital, Costa Mesa, CA) Science (ISSN 0036-8075), vol. 224, June 22, 1984, p. 1355-1357. refs

Event-related potentials of the brain are enhanced when stimulation is synchronized with diastolic phases of cerebral or cephalic pulse pressure waves. A cerebral vascular event has been found to be temporally consistent with the event-related potential. Averaged evoked vascular responses were measured with bioimpedance techniques from the brain and the arm. Changes in brain blood volume occurred 150 to 250 milliseconds after stimulation synchronized with diastolic but not systolic phases of the cerebral pulse pressure wave. The time course of this phenomenon defies the usually accepted characteristics of metabolic activity. The evoked vascular response may be a neurally mediated event in anticipation of altered metabolic demand, and it offers the possibility of measurement in real time. Author

**A84-37275**

**GRAVITATIONAL SURGERY OF THE BLOOD [GRAVITATSIONNAIA KHIRURGIIA KROVI]**

O. K. GAVRILOV, ED. Moscow, Izdatel'stvo Meditsina, 1984, 304 p. In Russian.

A collection of works dealing with general questions of gravitational surgery of the blood, the method of gravitational surgery of blood in clinical practice, and the components of blood and component hemotherapy is presented. Attention is given to gravitational separation of the blood aimed at producing concentrates of globular mass and protein fractions for the

performance of differentiated component therapy. Problems associated with the use of gravitational correction of blood content are discussed. Data on the effectiveness of therapeutic cytopheresis and plasmapheresis in treating chronic myeloid leukemia, chronic lymphoid leukemia, acute leukemia, diabetes, and ischemic heart disease are presented. The use of therapeutic plasmapheresis is advocated for the correction of immune disturbances in some diseases. Also discussed are general principles of transfusion therapy using concentrates of red cells, platelets, granulocytes, lymphocytes, and blood plasma preparations. No individual items are abstracted in this volume

J.N.

**A84-37801**

**PROTEIN SYNTHESIS AND OXIDATIVE ACTIVITY OF THE BRAIN IN CONDITIONS OF OXYGEN DEFICIENCY [SINTEZ BELKA I OKISLITEL'NAIA AKTIVNOST' MOZGA V USLOVIAKH KISLORODNOI NEDOSTATOCHNOSTI]**

N. N. BOGOLEPOV, E. L. DOVEDOVA, A. P. MUSATOV, and M. KHAVKA (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Zhurnal Nevropatologii i Psikiatrii im. S. S. Korsakova (ISSN 0044-4588), vol. 83, no. 12, 1983, p. 1765-1769. In Russian. refs

Biochemical analysis and electron microscopy showed that experimental hypoxia and anoxia produce disorders of the metabolism and ultrastructure of the rat brain. After exposure of 2 to 3.5 hours, the protein synthesis in the neuronal fractions was impaired and the activity of oxidative enzymes in the subfractions of synaptosomes and mitochondria was inhibited. The tissue ultrastructure was also impaired, this impairment being most pronounced in the synaptic processes of neurons.

B.J.

**A84-37810**

**HYGIENIC EVALUATION OF THE ELECTRIC FIELD PRODUCED BY HIGH-VOLTAGE POWER TRANSMISSION LINES IN POPULATED AREAS [GIGIENICHESKAIA OTSENKA ELEKTRICHESKOGO POLIA, SOZDAVEMOGO VYSOKOVOL'TNYMI LINIAMI ELEKTROPEREDACHI V USLOVIAKH NASELENNYKH MEST]**

I. P. KOZIARIN (Kievskii Meditsinskii Institut, Kiev, Ukrainian SSR) and I. D. DUMANSKII (Kievskii Nauchno-Issledovatel'skii Institut Obshchei i Kommunal'noi Gigieny, Kiev, Ukrainian SSR) Gigiena i Sanitariia (ISSN 0016-9900), Nov. 1983, p. 17-21. In Russian.

Experiments were performed on animals and humans to assess the biological effects of an electric field with a 50 Hz frequency and a voltage of 1-15 kW/m during daily exposures of 2 hours and of 30 minutes. The following maximum allowable levels of voltage are recommended for populated areas: 5 kW/m for a short-term daily 2-hour exposure, and 12 kW/m for a 30-minute exposure.

B.J.

**A84-37820**

**THE CYCLASE SYSTEM IN PROKARYOTES AND EUKARYOTES [TSIKLAZNAIA SISTEMA U PROKARIOTOV I EUKARIOTOV]**

E. P. FEDENKO and N. G. DOMAN (Akademiia Nauk SSSR, Institut Biokhimii, Moscow, USSR) Uspekhi Sovremennoi Biologii (ISSN 0042-1324), vol. 96, Nov.-Dec. 1983, p. 323-338. In Russian. refs

This review paper examines the role of the cAMP system as a regulator of intracellular metabolism in prokaryotes and eukaryotes. Particular consideration is given to adenyl cyclase, the phosphodiesterase of cyclic nucleotides, cAMP-dependent protein kinases, and the nature of catabolic repression in *E. coli*.

B.J.

**A84-37821**

**A NEW CLASS OF BIOLOGICAL REGULATORS OF MULTICELL SYSTEMS CYTOMEDINS [NOVYI KLIASS BIOLOGICHESKIKH REGULIATOROV MNOGOKLETOCHNYKH SISTEM -TSITOMEDINY]**

V. G. MOROZOV and V. KH. KHAVINSON (Voenno-Meditsinskaiia Akademiia, Leningrad, USSR) Uspekhi Sovremennoi Biologii (ISSN 0042-1324), vol. 96, Nov.-Dec. 1983, p. 339-352. In Russian. refs

Evidence is presented which supports the existence of a new system of bioregulators of a peptide nature (cytomedins) which have a specific effect on the level of cell populations in multicell organisms. It is assumed that the mechanism for the cytomedin effect is based on the intercellular exchange and transmembrane transfer of information signals. Current ideas on the significance of peptidergic regulation in the development of multicell systems are discussed.

B.J.

**A84-37822**

**CELL BEHAVIOR IN A GRAVITATIONAL FIELD [POVEDENIE KLETKI V GRAVITATSIONNOM POLE]**

M. G. TAIRBEKOV and G. P. PARFENOV (Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR) Uspekhi Sovremennoi Biologii (ISSN 0042-1324), vol. 96, Nov.-Dec. 1983, p. 426-434. In Russian. refs

Data from exobiological experiments indicate that autonomous unicellular organisms are not affected by weightlessness. It is also shown that the effect of weightlessness at the level of a cell functioning as part of a single multicellular organism is of a secondary nature and is conditioned by changes occurring at the level of higher-order regulatory systems.

B.J.

**A84-37823**

**THE PLASMATIC MEMBRANE AS A TARGET FOR THE EFFECT OF HYPERTHERMIA [PLAZMACHESKAIA MEMBRANA KAK MISHEN' DEISTVIA GIPERTERMII]**

E. I. VOLKOV and A. A. POLEZHAEV (Akademiia Nauk SSSR, Fizicheskii Institut, Moscow, USSR) Uspekhi Sovremennoi Biologii (ISSN 0042-1324), vol. 96, Nov.-Dec. 1983, p. 353-365. In Russian. refs

An explanation is suggested for the selective effect of hyperthermia (at temperatures of 41-44 C) in the framework of the membrane model of malignant degeneration. It is shown that the selectivity is due to the destabilization of the membranes of tumoral cells. The effects of lipid composition, agents diluting the lipid bilayer, anisotonic conditions, changes in pH, and the choice of heating mode on the efficiency and selectivity of hyperthermia are evaluated on the basis of differences in the physical organization of the plasmatic membranes of normal and tumoral cells. It is suggested that the mode of soft but prolonged heating may be more efficient for the destruction of the peripheral zones of tumors than the presently used method of intense but relatively short-term heating.

B.J.

**A84-37824**

**STRUCTURE AND METHODOLOGICAL PROBLEMS IN THE STUDY OF THE LOCOMOTION OF FLYING AND SWIMMING ANIMALS [STRUKTURA I METODOLOGICHESKIE VOPROSY ISSLEDOVANIIA LOKOMOTSII LETAIUSHCHIKH I PLAVAIUSHCHIKH ZHIVOTNYKH]**

E. D. SOROKODUM (Taganrogskii Radiotekhnicheskii Institut, Taganrog, USSR) Uspekhi Sovremennoi Biologii (ISSN 0042-1324), vol. 96, Nov.-Dec. 1983, p. 466-475. In Russian. refs

A84-37825

**REGULATION OF CHOLESTEROL METABOLISM DURING DAMAGE CAUSED BY IONIZING RADIATION AND OTHER AGENTS [REGULIATSIIA OBMENA KHOLESTERINA PRI POVREZHDENII ORGANIZMA IONIZIRUIUSHCHEI RADIATSIEI I DRUGIMI AGENTAMI]**

I. K. KOLOMIITSEVA (Akademiia Nauk SSSR, Institut Biologicheskoi Fiziki, Moscow, USSR) Uspekhi Sovremennoi Biologii (ISSN 0042-1324), vol. 96, Nov.-Dec. 1983, p. 381-393. In Russian. refs

It is suggested that damage caused to living cells by ionizing radiation or any other kind of agent stimulates membrane recovery, which is due to the intensified production of lipids (especially cholesterol) in the damaged cells and liver. Data are presented which confirm the role of hepatic cholesterologenesis in the recovery of mucous membrane cells of the rat intestine under radiation damage. Attention is given to mechanisms for the activation of cholesterol biosynthesis during radiation damage. B.J.

A84-37836

**TRANSPORT OF SODIUM AND POTASSIUM IONS IN THE SKIN OF THE FROG RANA TEMPORARIA UNDER ANAEROBIC CONDITIONS [TRANSPORT IONOV NATRIIA I KALIIA V KOZHE LIAGUSHKI RANA TEMPORARIA V ANAEROBNYKH USLOVIYAKH]**

A. V. LAPIN, I. A. SKULSKII, and G. P. GUSEV (Akademiia Nauk SSSR, Institut Evoliutsionnoi Fiziologii i Biokhimii, Leningrad, USSR) Zhurnal Evoliutsionnoi Biokhimii i Fiziologii (ISSN 0044-4529), vol. 19, Nov.-Dec. 1983, p. 545-549. In Russian. refs

Saturation of incubation media with argon is demonstrated to completely inhibit the unidirectional transport of Na(+) across frog skin while the ion composition of the skin cells remains constant. The addition of ouabain to the serosa bathing medium saturated with argon results in an increase in the intracellular concentration of Na(+) and the loss of cellular K(+). This indicates that both sodium and potassium ions can freely diffuse across the cell membrane according to their electrochemical gradients. The present results suggest that the Na(+)/K(+) pumps involved in the mechanism of unidirectional Na(+) transport are critically dependent on the respiration energy, while the pumps responsible for the cell ion homeostasis can operate at the expense of glycolysis. J.N.

A84-37837

**EFFECTS OF HYPOTHERMIA AND HYPERTHERMIA ON THE CARDIOVASCULAR SYSTEM OF THE TORTOISE TESTUDO HORSFIELDI [VLIANIE GIPO- I GIPERTERMII NA KARDIO-VASKULIARNUIU SISTEMU CHEREPAKHI TESTUDO HORSFIELDI]**

V. I. IVANOV and A. A. TURDYEV (Akademiia Nauk Uzbekskoi SSR, Institut Zoologii i Parazitologii, Tashkent, Uzbek SSR) Zhurnal Evoliutsionnoi Biokhimii i Fiziologii (ISSN 0044-4529), vol. 19, Nov.-Dec. 1983, p. 556-559. In Russian. refs

A84-37838

**DIURNAL VARIATIONS IN THE SENSITIVITY OF HENS TO EXOGENOUS HORMONES AFFECTING MOULT AND REPRODUCTION [SUTOCHNYE IZMENENIIA CHUVSTVITEL'NOSTI KURY K EKZOGENNYM GORMONAM, VLIYUSHCHIM NA LIN'KU I RAZMNOZHENIE]**

A. V. SIROTKIN and A. K. GOLUBEV (Vsesoiuznyi Nauchno-Issledovatel'skii Institut Razvedeniia i Genetiki Sel'skokhoziaistvennykh Zhivotnykh, Pushkin, USSR) Zhurnal Evoliutsionnoi Biokhimii i Fiziologii (ISSN 0044-4529), vol. 19, Nov.-Dec. 1983, p. 565-570. In Russian. refs

A84-37839

**HYPOKINESIA IN YOUNG RATS GROWING UNDER LABORATORY CONDITIONS [GIPOKINEZIIA RASTUSHCHIKH V LABORATORII KRYSIAT]**

R. A. ABZALOV and G. G. SALIKHOVA (Kazanskii Gosudarstvennyi Pedagogicheskii Institut, Kazan, USSR) Zhurnal Evoliutsionnoi Biokhimii i Fiziologii (ISSN 0044-4529), vol. 19, Nov.-Dec. 1983, p. 604, 605. In Russian.

On the 28th day after their birth, baby rats were subject to a regime of increasing daily periods of immobilization in an expandable container at 26-27 C. In the initial period of hypokinesia the rats behaved calmly when in the container, and their release was marked by intense activity. From the 21st to the 42nd day of hypokinesia, the animals were restrained for 22 h out of every day. Upon release during this period the rats demonstrated impaired motor coordination until after they had eaten for 8-10 min, at which point they huddled together and went to sleep. J.N.

A84-37842

**EFFECT OF THYROIDECTOMY ON THE HISTOCHEMICAL AND ELECTROPHYSICAL PROPERTIES OF THE RAT MUSCULUS SOLEUS [VLIANIE TIREOIDEKTOMII NA GISTOKHIMICHESKIE I ELEKTROFIZIOLOGICHESKIE SVOISTVA KAMBALOIDNOI MYSHTSY KRYSY]**

N. P. REZVIAKOV (Kazanskii Meditsinskii Institut, Kazan, USSR), E. M. VOLKOV, A. R. ABDULLIN, and F. A. ABDULKHAEV Arkhiv Anatomii, Gistologii i Embriologii (ISSN 0004-1947), vol. 85, Dec. 1983, p. 65-69. In Russian. refs

In the musculus soleus of mature male rats, 6 weeks after thyroidectomy, a decrease was observed in both the number of muscle fibers with a low adenosin triphosphatase activity of myosin and in the cross-sectional area of muscle fibers with a moderate and high activity of the enzyme. The optical density of the staining of muscle fibers also decreases when succinate dehydrogenase activity is histochemically indicated. There is no change in the rest membrane potential or in the character of the sensitivity of the muscle fiber membrane to acetylcholine. The change in the histochemical properties of the muscle fiber is combined with chromatolysis in the motor neurons of the spinal cord ventral horns. J.N.

A84-37843

**SEASONAL DYNAMICS OF MITOTIC ACTIVITY OF CELLS IN THE ADENOHYPOPHYSIS AND IN THE ADRENAL CORTEX OF RATS IN NORMAL CONDITIONS AND STRESS REACTION [SEZONNAIA DINAMIKA MITOTICHESKOI AKTIVNOSTI KLETOK V ADENOGIPOFIZE I V KORE NADPOCHECHNIKA U KRYS V NORME I PRI REAKTSII STRESS]**

V. K. PERT (Tartuskii Gosudarstvennyi Universitet, Tartu, Estonian SSR) Arkhiv Anatomii, Gistologii i Embriologii (ISSN 0004-1947), vol. 85, Dec. 1983, p. 81-86. In Russian. refs

A84-37844

**MECHANISMS OF PHOTODAMAGE OF THE EYE STRUCTURE - UV-EFFECT ON SOLUBLE PROTEINS OF THE LENS [MEKHAZIMY FOTOPOVREZHDENIIA STRUKTUR GLAZA - DEISTVIE UF-SVETA NA RASTVORIMYE BELKI KHRUSTALIKA]**

M. M. KORKHMAZIAN, I. B. FEDOROVICH, and M. A. OSTROVSKII (Akademiia Nauk SSSR, Institut Khimicheskoi Fiziki, Moscow, USSR; Akademiia Nauk Armianskoi SSR, Fizicheskii Institut, Yerevan, Armenian SSR) Biofizika (ISSN 0006-3029), vol. 28, Nov.-Dec. 1983, p. 966-971. In Russian. refs

The harmful effect of UV-light on the soluble proteins of the lens was investigated using the eye of an ox. Water-soluble distillates of the lens nucleus and cortex were illuminated in aerobic conditions, resulting in oxidation of SH-groups in the crystallins and a change in their conformation. It was found that the formation of high-molecule protein aggregates may lead to lenticular opacity. Illumination resulted in yellow color in the soluble proteins and new absorption maxima appeared at 245 and 305 nm. J.N.

A84-37845

**THE EFFECT OF THALLIUM IONS ON THE GRAMICID-INDUCED CONDUCTANCE OF MUSCLE-FIBER MEMBRANE [DEISTVIE IONOV TALLIIA NA INDUTSIROVANNUIU GRAMITSIDINOM PROVODIMOST' MEMBRANY MYSHECHNOGO VOLOKNA]**

N. E. SHVINKA (Akademiia Nauk SSSR, Institut Tsitologii, Leningrad, USSR) and G. CAFFIER (Central Institute of Occupational Physiology and Medicine, Berlin, East Germany) *Biofizika* (ISSN 0006-3029), vol. 28, Nov.-Dec. 1983, p. 1006-1009. In Russian. refs

A84-37846

**EFFECT OF IONIZING RADIATION AT LOW DOSE RATES ON GLYCOPROTEID AND MUCOPROTEID METABOLISM IN DOGS [VLIANIE IONIZIRUIUSHCHEGO IZLUCHENIIA S NIZKOI MOSHCHEST'IU DOZY NA OBMEN GLIKO- I MUKOPROTEIDOV V ORGANIZME SOBAK]**

Z. A. VINOGRADOVA (Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR) *Radiobiologiya* (ISSN 0033-8192), vol. 23, Nov.-Dec. 1983, p. 808-810. In Russian. refs

Experiments were conducted on 24 dogs between one and three years of age over a period of 2-6 years in which the animals were subjected to Co-60 gamma-radiation in doses of 0.0034 G/day. With the range of total radiation dosage 2.45-7.35 Gy, the oxidation of tyrosine in the tissues was found to be already impaired at the lower dosage limit. Chronic irradiation induced intensification of sclerotic processes in connective tissue and, to a degree, in the adrenals. It was demonstrated that oxidation of glycoproteids and mucoproteids in lungs, skin, cartilaginous tissue, and elastic ligament is impaired. It is suggested that compensatory processes come into play in the skin and lungs. J.N.

A84-37847

**RADIOPROTECTIVE EFFECT OF S-CONTAINING DERIVATIVES OF METHYLFURAN AND THE ROLE OF THIOLS IN THE REALIZATION OF THIS EFFECT [RADIOZASHCHITNYI EFEKT SEROSODERZHASHCHIKH PROIZVODNYKH METILFURANA I ROL' TIOLOV V EGO REALIZATSII]**

N. G. CHIGAREVA, I. U. E. STRELNIKOV, and O. F. ALFEROVA (Voenno-Meditsinskaia Akademiia, Leningrad, USSR) *Radiobiologiya* (ISSN 0033-8192), vol. 23, Nov.-Dec. 1983, p. 816-819. In Russian. refs

Experiments on mice have demonstrated that S-containing methylfuran derivatives may be highly radioprotective. A survival rate of 50-70 percent of the exposed animals was achieved. From the moment of the appearance of the protective effect, the content of SH-groups in the spleen, a radiosensitive organ, either remained constant or decreased under the influence of S-containing derivatives of methylfuran. The content of nonprotein Sh-groups always remained constant, and the redox potential of tissues was unaffected. J.N.

A84-38078

**ON THE BIOMAGNETISM OF CELLS**

M. G. AKHALAIA, M. S. KAKIASHVILI, K. A. ZAKARAIA (Akademiia Nauk Gruzinskoi SSR, Institut Kibernetiki, Sukhumi, Georgian SSR), and M. E. PERELMAN (Akademiia Nauk Gruzinskoi SSR, Institut Kibernetiki, Tbilisi, Georgian SSR) *Physics Letters* (ISSN 0375-9601), vol. 101A, April 9, 1984, p. 367-370. refs

It is shown that magnetite particles of sizes of some hundred angstroms are attracted to the cells of an animal organism and are observed in liver cells, etc., where they are evidently located in cavities or are surrounded by destructed substances. These phenomena may be explained as due to electromagnetic radiation of the cells with frequencies into the 10 to the 8th to 2 x 10 to the 11th Hz band. Author

A84-38342\* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**A LABORATORY FOR LIFE SCIENCES RESEARCH IN SPACE**  
B. A. WILLIAMS and H. P. KLEIN (NASA, Ames Research Center, Moffett Field, CA) IN: *International Symposium on Space Technology and Science, 13th, Tokyo, Japan, June 28-July 3, 1982, Proceedings*. Tokyo, AGNE Publishing, Inc., 1982, p. 1601-1603.

Biological studies hardware for Spacelab flights are described. The research animal holding facility has modular construction and is installed on a single ESA rack. A biotelemetry system will provide body temperature and EKG/heart rate data from a radio transmitter surgically implanted in the animals' stomachs. A plant growth unit (PGU) will be used to study micro-g plant lignin growth. The PGU is automated and can carry as many as 96 plants. A general purpose work station (GPWS) biohazard cabinet will be flown on Spacelab 4 to control liquid and chemical vapors released during experimentation. Spacelab 4 will be the premier flight of actual animal studies comprising measurements of hematology, muscle biochemistry, blood circulation, fluids and electrolytes, vestibular adaptation, etc., using rats and squirrel monkeys as subjects.

M.S.K.

A84-38343

**HYPOGRAVIC EFFECTS OF STATIC-ANTIORTHOSTASIS IN RATS**

H. SAIKI, M. ABE, M. NAKAYA, and M. SUDOH (Jikei University School of Medicine, Tokyo, Japan) IN: *International Symposium on Space Technology and Science, 13th, Tokyo, Japan, June 28-July 3, 1982, Proceedings*. Tokyo, AGNE Publishing, Inc., 1982, p. 1605-1610. refs

Experimental results with rats held in a 20 deg head-down inclination to study the effects of hypodynamic conditions and antiorthostasis on physiological parameters are reported. Measurements were made of fluctuations in body weight, resting metabolic rate, blood pressure, urinary excretion volume, and the rate of K(+), Na(+), and Ca(2+) excretion during the five weeks of trials. Another group of rats were exposed only to hypodynamic conditions for comparisons. The resting metabolism was lower in the antiorthostatic group and urinary volume was increased, both results being similar to water immersion. The inclined body technique is concluded useful for the study of the effects of hypodynamic conditions in antiorthostatic postures. M.S.K.

A84-38344

**EFFECTS OF FORCED IMMOBILIZATION ON THE CARDIAC AND METABOLIC RESPONSES TO INFUSED CATECHOLAMINES IN RATS - THE ROLE OF THE BARORECEPTOR REFLEX**

T. NAGASAKA, T. NUNOMURA, H. SHIBATA, and K. HIRATA (Kanazawa University, Kanazawa, Japan) IN: *International Symposium on Space Technology and Science, 13th, Tokyo, Japan, June 28-July 3, 1982, Proceedings*. Tokyo, AGNE Publishing, Inc., 1982, p. 1611-1614. refs

Cardiac and metabolic responses to infused vasopressor amines, NE or PHE, were measured at 13 C in control and immobilized rats. In the control rats, an infusion of these amines decreased heart rate, shivering and heat production. An infusion of PHE decreased temperature of the interscapular brown adipose tissue (BAT) in the cold-acclimated rats. Besides shivering, NST occurring in BAT was suppressed via this reflex in rats. In the immobilized rats, no such inhibition was observed. The slope showing the relation between pulse interval blood pressure significantly decreased in the immobilized rats. These results suggest that forced immobilization decreases sensitivity of the sinoaortic baroreceptor reflex in rats. Author

## 51 LIFE SCIENCES (GENERAL)

**A84-38345**

### EFFECTS OF GRAVITY ON THE PHRENIC AND RENAL SYMPATHETIC NERVE ACTIVITIES IN THE RABBIT

T. HUKUHARA, N. KIMURA, and K. TAKANO (Jikei University School of Medicine, Tokyo, Japan) IN: International Symposium on Space Technology and Science, 13th, Tokyo, Japan, June 28-July 3, 1982, Proceedings. Tokyo, AGNE Publishing, Inc., 1982, p. 1615-1620. refs

Changes in phrenic and renal nerve activity induced by passive postural changes were examined. The vagi, depressor, and cervical sympathetic nerves of rabbit specimens were cut bilaterally at the neck. The rabbits had been paralyzed with gallamine triethiodide and were maintained by artificial ventilation. Recordings were made of the arterial blood pressure, ECG, spontaneous efferent discharges, and CO<sub>2</sub> concentrations in expired air, while a tilting table changed the postural orientation to levels ranging from 45 deg head-up to 30 deg head-down. Head-up and head-down tilting increased both the phrenic and renal neural activity. Head-down tilting also increased the end-tidal CO<sub>2</sub> concentration and prolonged the phrenic nerve volley. The results indicate that respiratory rhythms in the vasomotor control neural organizations have an important role in the regulatory and integrative process with the central vasomotor control mechanisms. M.S.K.

**A84-38348**

### EFFECTS OF CENTRIFUGAL ACCELERATION ON CARDIO PULMONARY REACTIONS

H. URANO, Y. MIZUNO, H. SATAKE, Y. SEKIMOTO, M. KITAGAWA, and S. WATANABE (Gifu University, Gifu, Japan) IN: International Symposium on Space Technology and Science, 13th, Tokyo, Japan, June 28-July 3, 1982, Proceedings. Tokyo, AGNE Publishing, Inc., 1982, p. 1633-1638. refs

This experiment was concerned with a participation of vestibular sensation in the autonomic reactions, during exposure of high G forces. At first, the transitional response provoked in early stage of centrifuge run vanished or was diminished by the labyrinthectomy. Using the staircase form of -G<sub>x</sub> and -G<sub>z</sub> loads, these transitional changes were summated and in some cases shown to be larger in intact animals than in labyrinthectomized ones. With +G<sub>z</sub> load, most cases of the labyrinthectomized hamsters led to uncompensatory state of the cardiopulmonary system and did not restore, while on the contrary most cases of the intact hamsters was recovered respondingly. From these facts, it may be concluded that the vestibular organ plays an important role for the defence action to the stress of centrifuge forces, and therefore the cardiopulmonary responses to centrifuge forces might be considered as the warning reaction of the individuals. Author

**A84-38498#**

### THE EFFECT OF APOMORPHINE ON AVOIDANCE BEHAVIOUR OF RATS UNDER HYPOXIC ENVIRONMENT

I. SAKURAI, H. OSADA, T. SAKAGUCHI, F. TAZIMA (Japan Air Self-Defense Force, Aeromedical Laboratory, Tachikawa, Tokyo, Japan), and A. NAKAMURA (Japan Air Self Defence Force, Aeromedical Laboratory, Reports (ISSN 0023-2858), vol. 24, Dec. 1983, p. 177-187. In Japanese, with abstract in English. refs

**A84-38516**

### HYPOTHALAMIC EFFECTS ON CARDIAC ACTIVITY FOLLOWING AN ADMINISTRATION OF ADRENERGIC BLOCKERS AND CHOLINOLYTICS [GIPOTALAMICHESKIE VLIANIYA NA DEIATEL'NOST' SERD TSA POSLE PRIMENENIYA ADRENOBLOKATOROV I KHOLINOLITIKOV]

A. F. KOSENKO and A. D. BEGEKA (Kievskii Gosudarstvennyi Universitet, Kiev, Ukrainian SSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol. 70, April 1984, p. 392-396. In Russian. refs

Experiments were conducted on dogs with implanted hypothalamic electrodes to investigate the effect of the separate blockage of alpha and beta adrenoceptors and M- and H-cholinoceptors on the cardiac rhythm and ECG before, during, and after a stimulation of the ventromedial and posterolateral structures of the hypothalamus. It is found that adrenergic blockers

and cholinolytics affect the heart rate and the ECG, as well as change the cardiac response to the stimulation of the hypothalamus. V.L.

**A84-38517**

### THE EFFECT OF MICROWAVES ON THE PERFORMANCE AND IMPEDANCE OF THE RAT BRAIN STRUCTURES [VLIANIE MIKROVOLN NA RABOTOSPOSOBNOST' I IMPEDANS STRUKTUR MOZGA KRYS]

N. N. VASILEVSKII (Akademiiia Meditsinskikh Nauk SSSR, Leningrad, USSR), L. N. GONDAREVA (Gosudarstvennyi Meditsinskii Institut, Karaganda, Kazakh SSR), and B. A. KOISIN (Gosudarstvennyi Politekhicheskii Institut, Karaganda, Kazakh SSR). Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol. 70, April 1984, p. 419-424. In Russian. refs

A systematic study has been made of the adaptive processes occurring in white rats in response to continuous microwave irradiation of nonthermogenic density. A comparative analysis is made of the ability of the animals to maintain equilibrium on a rotating rod and also of the impedance components of the sensorimotor cortex, hypothalamic nuclei, cerebral tissues, skeletal muscles, and liver. The physiological mechanisms of the observed effects are discussed. V.L.

**A84-38518**

### THE EFFECT OF BOMBESIN, SOME OF ITS FRAGMENTS, AND THEIR ANALOGUES ON THERMOREGULATION IN RABBITS [VLIANIE BOMBEZINA, NEKOTORYKH EGO FRAGMENTOV I IKH ANALOGOV NA TERMOREGULIATSIIU KROLIKA]

A. T. MARIANOVICH, V. D. BAKHAREV, I. L. KURANOVA, and S. I. CHURKINA Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol. 70, April 1984, p. 478-482. In Russian. refs

Bombesin, its fragments, and their analogues were injected into the lateral ventricle of the brain of live rabbits. It is found that at an ambient temperature of 10 C, bombesin and the C-terminal nanopeptide have a hypothermic effect that is close to the extreme (i.e., the cooling rate of a dead animal). The effect of the analogues on the body temperature is shown to be considerably less severe. V.L.

**A84-38519**

### THE DYNAMICS OF VEGETATIVE FUNCTIONS UNDER DEHYDRATION [DINAMIKA VEGETATIVNYKH FUNKTSII V USLOVIAKH DEGIDRATATSII ORGANIZMA]

K. R. TARKOVA (Voronezhskii Gosudarstvennyi Universitet, Voronezh, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol. 70, April 1984, p. 483-486. In Russian. refs

The response of the cardio-vascular and respiratory systems in dogs were studied under conditions of absolute and relative dehydration. The water content of the body was evaluated from the intensity of diuresis. It is shown that the dehydration process consists of two stages: the first stage involves only internal compensatory mechanisms, with the pulse rate decreasing and breathing becoming irregular; the second stage involves motivational excitation with an increase in the pulse rate and respiration frequency. V.L.

**A84-38520**

### CHOLINERGIC ASPECTS OF THE PERIPHERAL REGULATION OF WATER AND SALINE SOLUTION CONSUMPTION [KHOLINERGICHESKIE ASPEKTY PERIFERICHESKOI REGULIATSII POTREBLENIIA VODY I SOLEVYKH RASTVOROV]

A. P. SALEI (Voronezhskii Gosudarstvennyi Universitet, Voronezh, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol. 70, April 1984, p. 487-491. In Russian. refs

Under conditions of normal and increased thirst sensibility, the consumption of water and saline solutions is shown to depend on the state of the cholinergic system of the body. Atropine and proserine disturb the balance of sodium and potassium ions in the blood and thus alter motivational thirst and a desire for salt. A dehydration leads to a decrease in the acetyl choline content of the blood. V.L.

A84-38559

**ROLE OF COLLATERAL VENTILATION IN VENTILATION-PERFUSION BALANCE**

T. KURIYAMA, L. P. LATHAM, L. D. HORWITZ, J. T. REEVES, and W. W. WAGNER, JR. (Colorado, University, Denver, CO) *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology* (ISSN 0161-7567), vol. 56, June 1984, p. 1500-1506. refs  
(Contract NIH-HL-14985)

The effect of collateral ventilation (CV) on the vasoconstrictor response to local alveolar hypoxia is investigated experimentally in dogs and miniature pigs. A sublobar region of one lung is isolated and ventilated with 13-percent O<sub>2</sub>, while the rest of the lung is ventilated with 30-percent O<sub>2</sub>; after equilibrium is established, PGE(1) is infused as a vasodilator. End-tidal PO<sub>2</sub>, PCO<sub>2</sub>, and airway pressure are measured; pulmonary shunt fraction is determined; and radioactive microspheres are used to obtain the regional blood flow. In pigs, where no CV occurs, local hypoxia causes a 50-percent reduction in blood flow to the isolated region, maintaining arterial PO<sub>2</sub>, while in dogs (with CV) PO<sub>2</sub> is maintained without vasoconstriction. PGE(1) infusion restores blood flow in the isolated region in pigs, decreasing PO<sub>2</sub> and increasing shunt fraction. When CV in the dog is overcome by imposing increased airway pressure to the isolated region, the response becomes similar (blood flow decrease = 30 percent) to that in the pig.

T.K.

A84-38560

**PERFORMANCE OF HYPOTHERMIC ISOLATED RAT HEART AT VARIOUS LEVELS OF BLOOD ACID-BASE STATUS**

M. SINET, M. MUFFAT-JOLY, D. HENZEL, G. RENAULT, and J. J. POCIDALO (Institut National de la Santeet de la Recherche Medicale, Paris, France) *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology* (ISSN 0161-7567), vol. 56, June 1984, p. 1526-1532. Research supported by the Institut National de la Santeet de la Recherche Medicale. refs

The effect of hypothermia (26 C) on the response of the isolated blood-perfused working rat heart to increased blood pH (from 7.34 to 7.86) is investigated experimentally; the pH range for the normothermic heart is from 7.15 to 7.62. Measurements obtained include blood O<sub>2</sub> and CO<sub>2</sub>, aortic pressure, heart rate, and aortic and coronary flow, from which myocardial O<sub>2</sub> consumption, external work, and cardiac efficiency are determined. The results are presented in graphs and tables. At 37 C, increasing pH is found to increase heart rate and arteriovenous O<sub>2</sub> difference, while cardiac output and external work are unaffected; at 26 C, hemodynamic performance and myocardial O<sub>2</sub> consumption are lower, but cardiac efficiency and the response to increasing pH are the same as at 37 C. Hence the ability of the heart to compensate for lower temperature, changes in pH, or both is demonstrated.

T.K.

A84-38561

**A ROLE FOR NEURAL PATHWAYS IN EXERCISE HYPERPNEA**

F. M. BENNETT (Southern California, University, Los Angeles, CA) *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology* (ISSN 0161-7567), vol. 56, June 1984, p. 1559-1564. refs  
(Contract NIH-HL-26796)

The ventilatory response to exercise or CO<sub>2</sub> inhalation is investigated experimentally in seven anesthetized dogs in which the neural pathways from the exercising limb to the CNS are severed or blocked. Exercise is induced by electrically stimulating the severed sciatic nerves and maintained at a moderate level without rapid fatigue or significant metabolic acidosis, and expired minute ventilation (VE); arterial temperature, PCO<sub>2</sub>, PO<sub>2</sub>, pH, and pressure (MAP); CO<sub>2</sub> production; and O<sub>2</sub> consumption are determined. The results are presented in tables and compared with those obtained in similar experiments. Comparison of CO<sub>2</sub>-inhalation and stimulated-exercise data shows that exercise induces a hypercapnic hyperpnea, with increases of 4.09 l/min in

VE, 3.06 torr in PCO<sub>2</sub>, and 0.26 C in temperature and a decrease of 6.28 torr in MAP. This supports the finding of previous studies that neural pathways play a necessary role in the normal isocapnic-hyperpnea response to exercise; i.e., that humoral factors alone are insufficient to produce that response. T.K.

A84-38564\* Maryland Univ., Baltimore.

**NO EFFECT OF SEX STEROIDS ON COMPENSATORY MUSCLE HYPERTROPHY**

S. R. MAX and N. E. RANCE (Maryland, University, Baltimore, MD) *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology* (ISSN 0161-7567), vol. 56, June 1984, p. 1589-1593. Research supported by the University of Maryland. refs  
(Contract NAG2-100)

The effects of orchiectomy and/or subcutaneously implanted testosterone propionate (TP) on the hypertrophic response of rat plantaris muscles to functional overload (induced by bilateral removal of gastrocnemius and soleus muscles) are investigated experimentally. Muscle wet weight, metabolic substrate oxidation, and cytosolic androgen-receptor binding are measured, and the results are presented in tables. Eight weeks after surgery, the plantaris muscle weight as a percentage of body weight is found to be about twice that in rats without muscle overload, regardless of the sex-hormone status. Overloading causes decreased ability to oxidize glucose and pyruvate, decreased succinate dehydrogenase specific activity, and no change in the ability to oxidize beta-hydroxybutyrate or in androgen-receptor binding. The oxidative response is unaffected by orchiectomy or TP or both. It is argued that the actions of sex hormones and functional overload are not synergistic. T.K.

A84-39011

**AN EXPERIMENTAL INVESTIGATION OF THE COMBINED EFFECT OF NOISE AND TOXIC AEROSOLS IN ELECTRIC STEEL MELTING SHOPS [SOCHETANNOE DEISTVIE SHUMA I TOKSICHNYKH AEROZOLEI, ELEKTROSTALEPLAVIL'NOGO PROIZVODSTVA V EKSPERIMENTE]**

N. M. PARANKO and S. I. GONCHAROV (Dnepropetrovskii Meditsinskii Institut, Dnepropetrovsk, Ukrainian SSR) *Gigiena Truda i Professional'nye Zabolevaniia*, Feb. 1984, p. 49-51. In Russian.

A84-39014

**MONITORING THE BLOOD PRESSURE OF RATS WITH A SIMULTANEOUS RECORDING OF THE PULSE AND RESPIRATION RATES [OB IZMERENII KROVIANOGO DAVLENNIA S ODNOVREMENNOI REGISTRATSIEI PUL'SA I DYKHANIIA U KRYSA]**

T. M. KHODYKINA (I Moskovskii Meditsinskii Institut, Moscow, USSR) *Gigiena Truda i Professional'nye Zabolevaniia*, Feb. 1984, p. 54. In Russian.

In toxicological studies, it is sometimes necessary that the blood pressure, pulse rate, and respiration frequency be determined simultaneously. A method is proposed here that makes it possible to simultaneously monitor blood pressure, pulse, and respiration in rats. The method employs a piezoelectric transducer which is applied to the tail artery of the animal. When the transducer is connected to a recording device, such as an electrocardiograph, the respiration waves are superposed on the pulse waves, providing information on both pulse and respiration rates. Blood pressure readings are obtained by putting a cuff around the base of the tail and connecting it to a manometer. V.L.

A84-39015

**EFFECT OF 2,4-DINITROPHENOL ON THERMOGENESIS DURING ADAPTATION TO HYPOXIA [O VLIANII 2,4-DINITROFENOLA NA TERMOGENEZ PRI ADAPTATSII K GIPOKSII]**

B. K. SYDYKOV (Akademiia Nauk Kirgizskoi SSR, Institut Fiziologii i Eksperimental'noi Patologii Vysokogor'ia, Frunze, Kirgiz SSR) *Akademiia Nauk Kirgizskoi SSR, Izvestiia* (ISSN 0002-3221), no. 6, 1983, p. 28-31. In Russian. refs

A84-39017

**AN ELECTROPHYSIOLOGICAL METHOD OF RECORDING THE FUNCTIONAL ACTIVITY OF SMOOTH VASCULAR MUSCLES IN A TOXICOLOGIC EXPERIMENT [ELEKTROFIZIOLOGICHESKII METOD REGISTRATSII FUNKTSIONAL'NOI AKTIVNOSTI GLADKIKH MYSHTS SOSUDOV V TOKSIKOLOGICHESKOM EKSPERIMENTE]**

S. V. SINITSKII (Kievskii Nauchno-Issledovatel'skii Institut Gigieny Truda i Profzabolevanii, Kiev, Ukrainian SSR) Gigiena i Sanitariia (ISSN 0016-9900), Dec. 1983, p. 41-43. In Russian.

A84-39020

**DAILY CHANGES IN THE ACTIVITY OF LYSOSOMAL ENZYMES IN THE LIVER OF MICE AND RATS [SUTOCHNYE IZMENENIIA AKTIVNOSTI LIZOSOMAL'NYKH FERMENTOV V PECHENI MYSHEI I KRYS]**

T. V. BLINOVA, G. V. ZHARIKOVA, I. A. KOVALENKO, and A. A. KOSYKH (Nauchno-Issledovatel'skii Institut Epidemiologii i Mikrobiologii, Gorki, USSR) Voprosy Meditsinskoi Khimii (ISSN 0042-8809), vol. 29, Nov.-Dec. 1983, p. 27-30. In Russian. refs

A84-39233

**ECOLOGICAL PROBLEMS AND EXTENDED LIFE SUPPORT ON THE MARTIAN SURFACE**

B. MAGUIRE, JR. (Texas, University, Austin, TX) IN: The case for Mars; Proceedings of the Conference, Boulder, CO, April 29-May 2, 1981. San Diego, CA, Univelt, Inc., 1984, p. 163-171. refs (AAS PAPER 81-238)

Questions regarding the expansion of life from its planet of origin are considered, taking into account the colonization of Mars from earth. The advantages of Mars are related to the possession of gravity, and (apparently) the relatively ready availability of all the major and minor elements which take part in the functioning of biological ecosystems. It is pointed out that in any human-supporting, extraterrestrial ecosystem, an essentially complete cycling of all of the important elements must occur unless supplies external to the community are (sufficiently) readily available. Attention is given to the results of laboratory work with some small but closed samples of agricultural ecosystems, the observed collapse of samples of ecosystems, the avoidance of the inclusion of plant disease organisms in a self-supporting closed ecosystem, and problems with respect to the microbial flora of self-sustaining extraterrestrial colonies. G.R.

A84-39671

**INHIBITION AND ARCHITECTONICS OF THE CEREBRAL CORTEX [TORMOZHENIE I ARKHITEKTONIKA KORY GOLOVNOGO MOZGA]**

F. N. SERKOV (Akademiia Nauk Ukrainskoi SSR, Institut Fiziologii, Kiev, Ukrainian SSR) Fiziologicheskii Zhurnal (Kiev) (ISSN 0201-8489), vol. 30, May-June 1984, p. 278-289. In Russian. refs

Data are presented on the significance of inhibitory neurons in the structural and functional organization of the cerebral cortex. It is shown that inhibitory neurons are necessary structural components of neuronal modules in the cerebral cortex and their size and shape depend significantly on the length and branching pattern of inhibitory neuronal axons. Column and module theories of cerebral cortex structure are analyzed. I.H.

A84-39672

**INTEGRATIVE MECHANISMS OF HEMODYNAMICS [INTEGRATIVNYE MEKHANIZMY REGULIATSII GEMODINAMIKI]**

M. I. GUREVICH (Akademiia Nauk Ukrainskoi SSR, Institut Fiziologii, Kiev, Ukrainian SSR) Fiziologicheskii Zhurnal (Kiev) (ISSN 0201-8489), vol. 30, May-June 1984, p. 323-332. In Russian. refs

The mechanisms of the central nervous system which participate in the regulation of circulation are discussed in terms of their structural and functional organization, and a theory of a single mechanism for the regulation of hemodynamics is presented. The results of functional and morphological studies of hemodynamic

mechanisms are presented, based on data from recordings of electric activity in sympathetic nerve fibers in the central nervous systems of rats and mice, and on an analysis of the hemodynamic characteristics of cardiovascular reactions. The results show that several structures in the central nervous system play important roles in the organization and functional state of muscular elements of the heart and blood vessels. I.H.

A84-39673

**MYOCARDIAL CONTRACTILITY AND CONTRACTILE ACTIVITY [SOKRATIMOST' I SOKRATITEL'NAIA AKTIVNOST' MIOKARDA]**

A. A. MOIBENKO, S. G. KAZMIN, and V. F. SAGACH (Akademiia Nauk Ukrainskoi SSR, Institut Fiziologii, Kiev, Ukrainian SSR) Fiziologicheskii Zhurnal (Kiev) (ISSN 0201-8489), vol. 30, May-June 1984, p. 333-345. In Russian. refs

Contractility is considered as an intrinsic myocardial property which is not affected by an organism's regulatory (e.g., adrenergic) processes, but is revealed by them in the form of contractile activity. 'Isovolumic' indices and the relation of volume to pressure in the left ventricle are found to be the most useful indications of myocardial contractile activity. The information content of these factors is demonstrated in a series of experimental and clinical investigations. I.H.

A84-39674

**PROFILE OF OXYGEN CONCENTRATION IN A CELL AND CERTAIN DEBATABLE PROBLEMS OF FREE OXYGEN TRANSPORT IN BIOLOGICAL OBJECTS [PROFIL' KONTSENTRATSII KISLORODA V KLETKE I NEKOTORYE SPORNYE VOPROSY PEREMESHCHENIIA SVOBODNOGO KISLORODA V BIOLOGICHESKIKH OB'EKTAKH]**

V. A. BEREZOVSKII and B. S. SUSHKO (Akademiia Nauk Ukrainskoi SSR, Institut Fiziologii, Kiev, Ukrainian SSR) Fiziologicheskii Zhurnal (Kiev) (ISSN 0201-8489), vol. 30, May-June 1984, p. 345-355. In Russian. refs

Platinum microelectrode probing of various single animal cell soma has shown that the external shell of a loach egg at rest makes no resistance to free oxygen transport to the cell. The inner shell membrane is found to be distinct from other sites within the cell and is characterized by an oxygen pressure gradient which does not rise in response to respiration. This gives evidence for a possible increase in the plasma membrane permeability for oxygen under conditions of intensified respiration. It is shown that the amount of oxygen transport in an excited cell is 37 times as high as the amount of oxygen diffused in stagnant water, confirming the physiological significance of cyclosis and oxygen transport in cells. A comparison of theoretical oxygen concentration profiles with experimental evidence shows that diffusion in homogeneous immiscible media does not exhaust all mechanisms of oxygen transport in biological systems. I.H.

A84-39675

**SOME RESULTS OF STUDIES IN HYPOXIA PROBLEMS [NEKOTORYE ITOGI IZUCHENIIA PROBLEMY GIPOKSII]**

M. M. SEREDENKO (Akademiia Nauk Ukrainskoi SSR, Institut Fiziologii, Kiev, Ukrainian SSR) Fiziologicheskii Zhurnal (Kiev) (ISSN 0201-8489), vol. 30, May-June 1984, p. 355-362. In Russian. refs

Results of studies of hypoxic states performed by researchers of the Department of Hypoxic States of the Soviet Institute of Biochemistry are presented. The studies address the description of physiological properties of organisms during vital activity under conditions of a rarefied atmosphere and adaptation to mountain climate. Some factors causing mountain hypoxia and methods for its treatment are also examined. Special attention is given to the ontogenetic aspects of hypoxia, and to anomalous responses to hypoxia at early and late stages of ontogenesis. Age-related features of blood oxygenation mechanisms of the lungs are also studied. A theory is formulated on secondary tissue hypoxia as a result of discrepancies between oxygen supply and oxygen demand, and one of the least studied types of hypoxic states (hemic hypoxia) is examined. I.H.

**A84-39683\*** Stanford Univ., Calif.

**MECHANISMS OF NITROGEN RETENTION IN FOREST ECOSYSTEMS - A FIELD EXPERIMENT**

P. M. VITOUSEK (Stanford University, Stanford, CA) and P. A. MATSON (NASA, Ames Research Center, Moffett Field, CA) Science (ISSN 0036-8075), vol. 225, July 6, 1984, p. 51, 52. refs

(Contract NSF DEB-82-07207)

Intensive forest management led to elevated losses of nitrogen from a recently harvested loblolly pine plantation in North Carolina. Measurements of nitrogen-15 retention in the field demonstrated that microbial uptake of nitrogen during the decomposition of residual organic material was the most important process retaining nitrogen. Management practices that remove this material cause increased losses of nitrogen to aquatic ecosystems and the atmosphere. Author

**N84-27394\*#** Maryland Univ., College Park. Dept. of Neurology.

**SEX STEROIDS DO NOT AFFECT MUSCLE WEIGHT, OXIDATIVE METABOLISM OR CYTOSOLIC ANDROGEN RECEPTION BINDING OF FUNCTIONALLY OVERLOADED RAT PLANTARIS MUSCLES**

S. R. MAX and N. RANCE 1983 23 p refs Sponsored in part by NIH

(Contract NAG2-100)

(NASA-CR-173630; NAS 1.26:173630) Avail: NTIS HC A02/MF A01 CSCL 06C

The effects of sex steroids on muscle weight and oxidative capacity of rat planaris muscles subjected to functional overload by removal of synergistic muscles were investigated. Ten weeks after bilateral synergist removal, plantaris muscles were significantly hypertrophic compared with unoperated controls. After this period, the ability of the muscles to oxidize three substrates of oxidative metabolism was assessed. Experimental procedures are discussed and results are presented herein. Results suggest a lack of beneficial effect of sex hormone status on the process of hypertrophy and on biochemical changes in overloaded muscle. Such findings are not consistent with the idea of synergistic effects of sex steroids and muscle usage. R.S.F.

**N84-27395\*#** Ohio State Univ., Columbus. Dept. of Botany. **SUPPRESSION OF ASYMMETRIC ACID EFFLUX AND GRAVITROPISM IN MAIZE ROOTS TREATED WITH AUXIN TRANSPORT INHIBITORS OF SODIUM ORTHOVANADATE**

T. J. MULKEY and M. L. EVANS 1982 17 p refs Submitted for publication

(Contract NAGW-297; NSF PCM-81-03298)

(NASA-CR-173634; NAS 1.26:173634) Avail: NTIS HC A02/MF A01 CSCL 06C

In gravitropically stimulated roots of maize (*Zea mays* L., hybrid WF9 x 38MS), there is more acid efflux on the rapidly growing upper side than on the slowly growing lower side. In light of the Cholodny/Went hypothesis of gravitropism which states that gravitropic curvature results from lateral redistribution of auxin, the effects of auxin transport inhibitors on the development of acid efflux asymmetry and curvature in gravistimulated roots were examined. All the transport inhibitors tested prevented both gravitropism and the development of asymmetric acid efflux in gravistimulated roots. The results indicate that auxin redistribution may cause the asymmetry of acid efflux, a finding consistent with the Cholodny/Went hypothesis of gravitropism. As further evidence that auxin-induced acid efflux asymmetry may mediate gravitropic curvature, sodium orthovanadate, an inhibitor of auxin-induced H<sup>+</sup> efflux was found to prevent both gravitropism and the development of asymmetric acid efflux in gravistimulated roots. Author

**N84-27396#** University of South Florida, Tampa.

**AN INSTRUMENTAL CONDITIONING METHOD FOR ESTABLISHING CHRONIC AROUSAL Final Report, Apr. 1976 - Dec. 1983**

H. D. KIMMEL and M. R. MURRIN Dec. 1983 25 p (Contract DAMD17-76-C-6053; DA PROJ. 3M1-61102-BS-01) (AD-A140808) Avail: NTIS HC A02/MF A01 CSCL 05J

Eight Macaque monkeys received discriminative avoidance-punishment conditioning of the SCR while eight others were yoked controls. Half of each group had discriminative stimuli for 24 sessions and no stimuli for the next six sessions, while the other half had no stimuli for 24 sessions and stimuli for six sessions. Significantly more SCR's occurred during avoidance-punishment in experimental and yoked groups, but this difference vanished when actual time to respond was considered. Yoked subjects made more responses than experimental subjects, but only with discriminative stimuli present. Experimental subjects had higher HR in avoidance and punishment and during time out as compared to yoked controls. There was no difference in shock frequency with and without the stimulus, but shocks occurred during punishment than avoidance. Differences between these and previous results may have been due to species differences or to multiple equipment failures. GRA

**N84-27397#** Joint Publications Research Service, Arlington, Va. **USSR REPORT: LIFE SCIENCES BIOMEDICAL AND BEHAVIORAL SCIENCES**

22 Jun. 1984 126 p refs Transl. into ENGLISH from various Russian articles

(JPRS-UBB-84-013) Avail: NTIS HC A07/MF A01

Topics concerning biomedical, agricultural and behavioral technology are discussed. Subjects include environmental studies and modeling, epidemiology, nutrition, genetic engineering, immunology, human performance clinical medicine, and virology. Studies on nonionizing electromagnetic radiation and laser effects as well as conference proceedings are included.

**N84-27400#** Joint Publications Research Service, Arlington, Va. **GENETIC CONTROL AND PHENOTYPIC CORRECTION OF CELLULAR IMMUNE RESPONSE TO H-ANTIGEN OF SALMONELLA TYPHIMURIUM Abstract Only**

A. A. NASYROV, N. Y. ALEKSEYEVA, I. Y. MOSHIASHVILI, and R. M. KHAITOV *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-013) p 39 22 Jun. 1984 Transl. into ENGLISH from Patol. Fiziol. i Eksperim. Terapiya (Moscow), no. 4, Jul. - Aug. 1983 p 32-34

Avail: NTIS HC A07/MF A01

Genetic determinancy of cellular immune response to H-antigen (H-AG) of *S. typhimurium* is studied along with possibilities of correcting it by a series of synthetic polyelectrolytes. The experiments are performed on CBA, C57Bl/6l, CC57W, A/Sn mice and on (CBAXC57BL/6l) F(1) hybrids. The highest inhibition of macrophage migration is observed during immunization of mice with 60 microgram dose of H-AG. The highest quantity of the factor inhibiting migration (FIM) produced by lymphocytes is observed 6 days after immunization with H-AG, on the CBA mice and on (CBAXC57BL/6l) F(1) hybrids; the lowest, on the A/Sn and CL57W mice. Phenotypic correction of cellular and humoral immune response could be achieved with synthetic polyelectrolytes. The best effect is achieved with the copolymer of acrylic acid and N-vinylpyrrolidone. M.A.C.

**N84-27401#** Joint Publications Research Service, Arlington, Va. **MODELLING OF MULTI-SIGNAL IMMOBILIZED IMMUNOGENS Abstract Only**

K. P. KASHKIN and A. L. LIOZNER *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-013) p 39-40 22 Jun. 1984 Transl. into ENGLISH from Patol. Fiziol. i Eksperim. Terapiya (Moscow), no. 4, Jul. - Aug. 1983 p 73-82 Original language document previously announced in IAA as A84-22931 Avail: NTIS HC A07/MF A01

The immobilization of antigen (hapten) determinants on a polystyrene sorbent is described as a possible model for obtaining

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artificial immunogens capable of delivering a prescribed spectrum of signals with the aim of activating B-lymphocytes. An experiment was conducted to study the primary and secondary antibody response of a total population of mice spleen cells to hapten groups in conjunction with proteins, polypeptides, or monoamino acids. It is concluded that the proposed modeling approach shows promise for experimental and clinical development; one of its applications may be the immunization of cells of the lymphoid system outside the body in cases when the *in vivo* administration of the immunogen is impossible owing to the characteristics of the recipient.

B.J. (IAA)

**N84-27402#** Joint Publications Research Service, Arlington, Va. **LACK OF AN EFFECT OF CORPUSCULAR VACCINE AGAINST I PHASE Q-FEVER ON PERSISTENCE AND REACTIVATION OF COXIELLA BURNETII INFECTION IN MOUSE AND GUINEA PIGS TISSUE Abstract Only**

J. KAZAR and E. KOVACOVA *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-013) p 40 22 Jun. 1984 Transl. into ENGLISH from Acta Virologica (Bratislava), v. 27, no. 4, Sep. 1983 p 418-428  
Avail: NTIS HC A07/MF A01

The Presence of *C. burnetii* is investigated in the tissues of mice and guinea pigs immunized with corpuscular vaccine against I phase Q fever, from one to six months after infection with *C. burnetii*. Other experimental groups include animals injected with cortisone or cyclophosphamide (CPA) and mice which become pregnant during the course of the experiments. During early stages of infection, large quantities of rickettsiae accumulate in the spleen and liver. With time, these organs are cleared of these infectious agents but during the late stages of infection, it still persists in reproductive organs and in kidneys. The persistence of *C. burnetii* is not affected by immunization with the vaccine against Q fever. Treatment with cortisone appears to increase production of I and II phase antibodies, while treatment with CPA led to a decreased level of antibodies.

M.A.C.

**N84-27403#** Joint Publications Research Service, Arlington, Va. **USE OF RADIAL HEMOLYSIS METHOD IN GEL FOR DETECTION OF ANTIBODIES TO BUNYA VIRUS LEDNICE (TURLOCK VIRUS GROUP) Abstract Only**

D. MALKOVA, N. KRPEŠOVA, J. HOLUBOVA, and J. M. KOLMAN *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-013) p 41 22 Jun. 1984 Transl. into ENGLISH from Acta Virologica (Bratislava), v. 27, no. 5, Sep. 1983 p 439-441  
Avail: NTIS HC A07/MF A01

Due to its simplicity, specificity and economy, the reaction of radial hemolysis in gel (RHG) is used to detect antibodies in experiments with the Lednice 6118 virus of the Turlock group, Bunyaviridae family. This method gives reliable and specific results. No mass reactivity is noted with sera of other arboviruses. Comparison of antibody titres obtained in reactions in RHG, hemagglutination inhibition reaction and indirect immunofluorescence showed that RHG is a sensitive reaction.

M.A.C.

**N84-27404#** Joint Publications Research Service, Arlington, Va. **CLINICAL-IMMUNOLOGICAL SPECTRUM OF LEISHMANIASES Abstract Only**

E. Y. SHUYKINA *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-013) p 41 22 Jun. 1984 Transl. into ENGLISH from Med. Parazitologiya i Parazitarnyye Bolezni (Moscow), no. 5, Sep. - Oct. 1983 p 3-10  
Avail: NTIS HC A07/MF A01

Select characteristics of clinical immunological spectra of Leishmaniasis are analyzed on the basis of clinical manifestations, the response to infection and on the type of immunodepression. Two groups are identified; (1) infections caused by *L. donovani* and (2) those caused by the dermatropic species. The infections caused by *L. donovani* are characterized by typical clinical manifestations. In cases of cutaneous leishmaniasis the diffuse and tuberculoid forms were polar, depending on the type of acquired response (B or T). The other cutaneous and noncutaneous

leishmaniasis involved both systems of immunity and are intermediate between the poles of the spectrum of activities.

M.A.C.

**N84-27410#** Joint Publications Research Service, Arlington, Va. **ALLOMONADES: NEW GROUP OF VIBRIONACEAE FAMILY MICROORGANISMS Abstract Only**

G. P. KALINA, A. G. SOMOVA, V. A. NIKONOVA, T. P. TUROVA, T. I. GRAFOVA, L. S. PODOSINNIKOVA, M. I. LAPENKOV, and I. M. BADALOVA *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-013) p 76 22 Jun. 1984 Transl. into ENGLISH from Zh. Gigiyeny Epidemiol. Mikrobiologii i Immunol. (Moscow), v. 27, no. 3, 1983 p 271-279  
Avail: NTIS HC A07/MF A01

During evaluation of the applicability of the A-2 prime medium in separating acromonades, which develop on this medium, from vibrios which do not, a new group of microorganisms was identified. After thorough taxonomic investigation which included evaluation of phenotypic properties, statistical treatment of the results obtained, determination of phenotypic similarities according to Adanson-Sneath and study of the DNA composition and of the level of DNA hybridization, this group was identified as *Allomonas enterics* sp. nov. from the family Vibrionaceae.

Author

**N84-27425#** Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Abt. Weltraumbiologie.

**DO LIVING CELLS HAVE A GOOD SENSITIVITY TO GRAVITY [GIBT ES EINE GENERELLE SCHWERKRAFTEMPFFINDLICHKEIT LEBENDER ZELLEN]**

W. BREIGLEB *In its* Proc. of Sci. Meeting on the Occasion of the Inauguration of New Buildings for The DFVLR Inst. of Aerospace Med. p 87-97 Oct. 1983 refs In GERMAN  
Avail: NTIS HC A07/MF A01; DFVLR, Cologne DM 43

The influence of gravity on living cells was investigated. Three categories for the single cells of the multiple cells in plants were studied. The categories are: (1) metabolism control; (2) estimated sense performance of autonomously moving cells; (3) polarization by external stimulation during egg growth. It is found that the categories could be effective tools in metabolic control and in structure and movement of macromolecular cell structure.

Transl. by E.A.K.

**N84-27426#** Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Abt. Biophysik. **BIOPHYSICS SPACE RESEARCH [BIOPHYSIKALISCHE FORSCHUNG IM WELTRAUM]**

H. BUECKER *In its* Proc. of Sci. Meeting on the Occasion of the Inauguration of New Buildings for The DFVLR Inst. of Aerospace Med. p 99-103 Oct. 1983 refs In GERMAN  
Avail: NTIS HC A07/MF A01; DFVLR, Cologne DM 43

The influence of ionizing radiation on humans and the environment was examined. Ionizing radiation which is a natural environmental phenomenon under which all vents in the biosphere take place is discussed. Sources of the different components of this radiation of gamma quanta, alpha and beta particles and neutrons influence the radioisotopes of elements and nuclear reaction products, which are produced in the Earth atmosphere by cosmic particle bombardments. The biological workings of heavy ions of galactic cosmic radiation were examined. The late damage to biological tissues which may be caused by compactly ionized outer space radiation, which exists in heavy ions or reaction stars is investigated.

Transl. by E.A.K.

**N84-28361\*** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**METHOD FOR THE PREPARATION OF THIN-SKINNED ASYMMETRIC REVERSE OSMOSIS MEMBRANES AND PRODUCTS THEREOF Patent**

T. J. WYDEVEN, inventors (to NASA) (NAS-NRC, Washington, D.C.) and M. G. KATZ (NAS-NRC, Washington, D.C.) 26 Jun. 1984 7 p Filed 25 Jun. 1982 Supersedes N82-28444 (20 - 19, 2664) Sponsored by NASA (NASA-CASE-ARC-11359-1; US-PATENT-4,456,708; US-PATENT-APPL-SN-392092; US-PATENT-CLASS-521-141; US-PATENT-CLASS-521-142; US-PATENT-CLASS-521-149; US-PATENT-CLASS-264-41) Avail: US Patent and Trademark Office CSCL 07C

A method for preparing water insoluble asymmetric membranes from water soluble polymers is discussed. The process involves casting a film of the polymer, partially drying it, and then contacting it with a concentrated solution of a transition metal salt. The transition metal ions render the polymer insoluble and are believed to form a complex with it. Optionally, the polymer is crosslinked with heat or radiation. The most preferred polymer is poly(vinyl alcohol). The most preferred complexing salt is copper sulfate. The process and the metal ion linked membranes are discussed. The membranes are reverse osmosis membranes.  
Official Gazette of the U.S. Patent and Trademark Office

**N84-28362#** Army Research Inst. of Environmental Medicine, Natick, Mass.

**A RODENT WATER DISPENSING SYSTEM FOR USE IN HYPOBARIC CHAMBERS**

J. A. DEVINE Mar. 1984 13 p (Contract DA PROJ. 3M1-61102-BS-10) (AD-A141167; USARIEM-T-3/84) Avail: NTIS HC A02/MF A01 CSCL 14B

A water dispensing system for rodents has been developed for use in chronic research studies involving hypobaric chambers. The system removes an existing problem that has restricted long-term animal exposures due to limitations inherent in the typical water supply bottles. The bottle design used in previous systems makes it susceptible to leakage whenever the water surface tension is disturbed. This disturbance occurs when water or room temperatures change, when animals are drinking, or more dramatically when the barometric pressure changes during ascents to altitude. Exposed water on the chamber floor may produce secondary health and environmental concerns. Daily returns to sea level to replenish drinking water and clean the chamber become the only available solution but add a complicating research variable. With the present water dispensing system, water may be replenished on-line for indefinite operations; water is available to rodent ad libitum, independent of the pressure differential without leakage; the system is insensitive to water pressure and malfunctions due to mineral deposits; the amount of water consumed can be measured; and medications, drugs and vitamins may be administered. GRA

**N84-28363#** School of Aerospace Medicine, Brooks AFB, Tex. **MOTOR PERFORMANCE IN IRRADIATED RATS AS A FUNCTION OF RADIATION SOURCE, DOSE, AND TIME SINCE EXPOSURE Final Report, Jan. 1983 - Jan. 1984**

T. G. WHEELER, K. A. HARDY, L. B. ANDERSON, and S. RICHARDS Mar. 1984 16 p (Contract AF PROJ. 7757) (AD-A141209; USAFSAM-TR-84-8) Avail: NTIS HC A02/MF A01 CSCL 06R

The study reported here has employed a single species (rats) and a single motor task (rotarod), and has evaluated performance as a function of time after irradiation exposure across a fixed dose range (0-1200 rads) using four radiation sources (electrons, neutrons, protons, and X-rays). Only minor differences in performance were noted as a function of radiation source, with neutrons producing the largest deficits. All sources produced a clear dose-response curve for each of the four times (1, 8, 15, and 22 days after irradiation). The LD50/15 for the various

exposures were found to be: X-rays, 1125 rads; electrons, 810 rads; protons, 675 rads; and neutrons, 265 rads. GRA

**N84-28364#** Joint Publications Research Service, Arlington, Va. **USSR REPORT: LIFE SCIENCES, BIOMEDICAL AND BEHAVIORAL SCIENCES**

4 Jun. 1984 105 p Transl. into ENGLISH from various Russian articles (JPRS-UBB-84-011) Avail: NTIS HC A06/MF A01

This serial report contains news items, abstracts, and articles of scientific reports on aspects of biomedical and behavioral sciences including agrotechnology, biochemistry, biophysics, biotechnology, environment, epidemiology, genetics, human factors, medicine, microbiology, pharmacology, toxicology and psychology.

**N84-28442#** Walter Reed Army Inst. of Research, Washington, D.C.

**ANIMAL MODELS OF HUMAN PERFORMANCE: STRUCTURAL AND FUNCTIONAL APPROACHES TO EXTRAPOLATING FROM ANIMAL TO MAN**

T. F. ELSMORE *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 285-289 Apr. 1984 (AD-P003292) Avail: NTIS HC A99/MF A01 CSCL 05J

Research with non-human animals is performed to solve human problems. Two different means of extrapolating from behavioral experiments with animals to human behavior are described. The structural approach emphasizes topographical similarity between the animal test situation and the human situation of interest. The functional approach emphasizes behavioral functions and controlling variables, and minimizes the importance of topographical similarity. Two experiments are presented to illustrate the functional approach, one dealing with the effects of chronic marijuana use upon performance, and another dealing with the issue of memory deficits produced by chemical warfare antidotes. Author (GRA)

**N84-28443#** School of Aerospace Medicine, Brooks AFB, Tex. **ANIMAL MODELS FOR THE ASSESSMENT OF LASER INDUCED EYE DAMAGE**

D. N. FARRER *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 290-294 Apr. 1984 (AD-P003293) Avail: NTIS HC A99/MF A01 CSCL 06B

This review paper summarizes the experimental findings of laser induced eye damage experiments. This report describes experiments in which dependent variables range from histology and minimum ophthalmoscopically visible damage to the assessment of functional vision. Laser induced retinal lesions which are very small do not measurably alter functional vision although the fovea is permanently damaged. The assessment of functional vision and quantifiable losses depend upon operant behavioral methods to expose subjective visual acuity to examination in the laboratory animal. Quantifiable electrophysiological techniques offer promise for objective functional vision assessment alternatives. Author (GRA)

**N84-28445#** Old Dominion Univ., Norfolk, Va. Center for Applied Psychological Studies.

**A REVIEW AND EVALUATION OF RESEARCH CONCERNING THE PERFORMANCE EFFECTS OF NUCLEAR RADIATION**

B. B. MORGAN, JR., R. B. MOE, F. G. FREEMAN, and C. B. PHILPUT *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 300-304 Apr. 1984 (AD-P003295) Avail: NTIS HC A99/MF A01 CSCL 05J

This report summarizes the findings of a review of studies of the effects of ionizing radiation on the task performances of primates. This review indicates that muscular and cognitive performance are more sensitive to radiation effects than are sensory-perceptual or psychomotor performances. Within performance domains greater performance decrements were found to occur with higher exposure levels. A need is indicated for future research to expand the range of exposure levels and the performance tasks employed. Author (GRA)

## AEROSPACE MEDICINE

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

**A84-36596****FUNCTIONAL CONDITION OF SEAMEN ON TROPICAL COASTS [FUNKSIONAL'NOE SOSTOIANIE ORGANIZMA MORIAKOV V USLOVIAKH IUZHNOGO PRIMOR'IA]**

V. V. BERDYSHEV *Voenno-Meditsinskii Zhurnal* (ISSN 0026-9050), April 1984, p. 48-51. In Russian.

Physiological functional indicators are analyzed for seamen 18 to 25 years of age on a tropical coast during a period between voyages. Particular attention is given to indirect indicators of work capacity and CNS functions, indicators of nonspecific resistance and vitamin excretion, and indicators of metabolite excretion in the urine. The results are related to fatigue and recovery processes as well as to the dynamics of adaptation and readaptation. B.J.

**A84-36602****CYTOCHEMICAL AND CYTOGENETIC CHANGES IN BLOOD OF PERSONS WORKING WITH MICROWAVE ENERGY SOURCES [TSITOKHIMICHESKIE I TSITOGENETICHESKIE IZMENENIIA V KROVI LITS, RABOTAUSHCHIKH S ISTOCHNIKAMI MIKROVOLNOVOI ENERGII]**

V. V. SOKOLOV, L. A. IVANOVA, M. N. GORIZONTOVA, K. V. NIKONOVA, and M. N. SADCHIKOVA (*Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR*) *Gigiena Truda i Professional'nye Zabolevaniia*, Oct. 1983, p. 5-10. In Russian. refs

This paper presents data from a parallel cytochemical and cytogenetic analysis of the blood from 18 women engaged in electronic device testing and subjected to microwave radiation for the entire duration of their shift, and from 29 men, radiotechnical device regulators, who were subjected to intermittent irradiation. The women were exposed to ultra-high-frequency waves below 10 m/sq cm for a maximum exposure of 70 m-hr/sq cm per shift, and the men were subjected to exposures varying in intensity from several units to hundreds of microwatts per/square centimeter reaching a maximum at 200 m-hr/sq cm. The average length of time on the job for both groups was 13 years. While the morphological content of the blood of subjects from both groups was unchanged, enhanced activity of a number of enzymes located in the blood cell cytoplasm was observed. The activity of alkaline phosphatase in neutrophils also increased. The mitotic activity of the cells was manifested in the growing number of aneuploid and polyploid cells and in a tendency to increased chromosomal-type aberration. These shifts were more evident in the second group. J.N.

**A84-36604****COMPLEX EVALUATION OF THE CONDITION OF BLOOD CIRCULATION DURING MUSCULAR ACTIVITY (REVIEW OF THE LITERATURE) [KOMPLEKSNAIA OTSENKA SOSTOIANIIA KROVOOBRAASHCHENIIA PRI MYSHECHNOI DEIATEL'NOSTI /OBZOR LITERATURY/]**

A. V. MURAVEV and M. I. SIMAKOV (*Iaroslavskii Gosudarstvennyi Pedagogicheskii Institut, Yaroslavl, USSR*) *Teoriia i Praktika Fizicheskoi Kul'tury* (ISSN 0040-3601), Oct. 1983, p. 15-17. In Russian. refs

**A84-36606****DYNAMIC ACUITY OF VISION [DINAMICHESKAIA OSTROTA ZRENIIA]**

T. V. IAKUBOVSKAIA *Oftal'mologicheskii Zhurnal* (ISSN 0030-0675), no. 7, 1983, p. 429-431. In Russian. refs

A brief review of recent literature on the study of visual function using ophthalmoeconomic methods is presented. Particular attention is given to differences between the perception of moving objects and that of static objects. The requirements exacted by the highly dynamic environment of modern technology on

developing more complete methods of evaluating visual function are discussed with respect to pilot qualification. J.N.

**A84-36615****DETERMINATION OF RETINOL IN HUMAN BLOOD PLASMA BY THE METHOD OF HIGH PRESSURE LIQUID CHROMATOGRAPHY [OPREDELENIE RETINOLA V PLAZME KROVI CHELOVEKA METODOM ZHIDKOSTNOI KHROMATOGRAFII VYSOKOGO DAVLENIIA]**

A. V. SERGEEV, V. E. SHEVCHENKO, and M. V. KAGANOVICH (*Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR*) *Voprosy Meditsinskoi Khimii* (ISSN 0042-8809), vol. 29, Sept.-Oct. 1983, p. 54-58. In Russian. refs

A quantitative procedure for estimation of retinol in human blood plasma using high pressure liquid chromatography is presented. The proposed technique involves separation of the retinoids in a reversed-phase analytical column with C-19-retinoid used as an internal standard. The procedure was able to detect up to 0.015 micrograms of retinol per ml of blood plasma and may be used for routine clinical analyses. J.N.

**A84-36717****SENSITIVITY FOR VERTICAL RETINAL IMAGE DIFFERENCES**  
G. WESTHEIMER (California, University, Berkeley, CA) *Nature* (ISSN 0028-0836), vol. 307, Feb. 16, 1984, p. 632-634. refs (Contract NIH-EY-00220)

It is shown that while it is possible to detect size differences between the retinal images in the vertical direction, the sensitivity is at least one order of magnitude less than the horizontal differences. It had been generally accepted that vertical disparities cannot be detected, but there are clear reports of the ability of subjects to respond to relative differences in the vertical magnification of the images of the two eyes, the so-called induced size effect. It manifests itself in the appearance of a visual scene as if there had been an opposite horizontal magnification and is, therefore, in the correct direction if it is to be utilized in asymmetrical convergence. Author

**A84-36874****TREATMENT OF A 12-HOUR SHIFT OF SLEEP SCHEDULE WITH BENZODIAZEPINES**

W. F. SEIDEL, W. C. DEMENT (Stanford University, Stanford, CA), T. ROTH, T. ROEHRS, and F. ZORICK (Henry Ford Hospital, Detroit, MI) *Science* (ISSN 0036-8075), vol. 224, June 15, 1984, p. 1262-1264. Research supported by the Upjohn Co. refs

Normal sleepers underwent sleep recordings and daytime tests of sleep tendency, performance, and mood while being shifted 180 deg in their sleep-wake schedule. After two baseline 24-hour periods, subjects postponed sleep until noon. For the next three 24-hour periods, they were in bed from 1200 to 2000 and received triazolam, flurazepam, or placebo at bedtime in parallel groups. Placebo subjects showed significant sleep loss after the shift. Active medication reversed this sleep loss. Despite good sleep, flurazepam subjects appeared most impaired of the three groups on objective assessments of waking function: triazolam subjects were least impaired. Author

**A84-36926****THE SICKLE CELL TRAIT IN RELATION TO THE TRAINING AND ASSIGNMENT OF DUTIES IN THE ARMED FORCES. IV - CONSIDERATIONS AND RECOMMENDATIONS**

L. W. DIGGS *Aviation, Space, and Environmental Medicine* (ISSN 0095-0562), vol. 55, June 1984, p. 487-492. refs

**A84-36927****EFFECTS OF PERSONALITY ON BODY TEMPERATURE AND MENTAL EFFICIENCY FOLLOWING TRANSMERIDIAN FLIGHT**

W. P. COLQUHOUN (Medical Research Council, Perceptual and Cognitive Performance Unit, Brighton, England) *Aviation, Space, and Environmental Medicine* (ISSN 0095-0562), vol. 55, June 1984, p. 493-496. refs

Examination of the oral temperature rhythms in a group of young men after an eastward jet-flight across eight time-zones

revealed a specific disruption in the rhythm that gradually disappeared over a period of some 10 d. In the first 2 d, the magnitude of the disruption in individual subjects was significantly correlated with the extent of mean postflight loss of speed in performing an arithmetic calculations test, given four times per day in local daytime hours. Within the group, neurotic introverts exhibited the greatest, and neurotic extraverts the least initial rhythm disruption; these two personality groups also showed opposing time-of-day trends in postflight changes in the performance measure. The results are discussed in relation to flight scheduling and to other studies of shifts in activity schedule; they are tentatively accounted for in terms of a postulated dimension of circadian rhythm lability that could be primarily related to extraversion. Author

**A84-36928**  
**THE CONSEQUENCES OF IN-FLIGHT INCAPACITATION IN CIVIL AVIATION**

P. J. C. CHAPMAN (British Caledonian Airways, Ltd., Crawley, Sussex, England) Aviation, Space, and Environmental Medicine (ISSN 0095-0562), vol. 55, June 1984, p. 497-500. refs

A survey is presented of observations of 1300 simulator exercises in which subtle and sudden incapacitation (due to cardiovascular disorder) were programmed to occur during a critical phase of flight. The observations were made in order to identify requirements for realistic medical standards to be applied to flight crews aboard civilian aircraft. On the basis of the data it is shown that crashes due to all types of pilot incapacitation occur once in every 1000 million pilot hours, and crashes specifically due to cardiovascular-related pilot incapacitation occur once in every 10 to the 10th flight hours. The assessment of the risk of aircraft accident as a result of cardiac failure is expected to provide cardiologists with a good numerical index for deciding whether individual pilots are fit to fly. I.H.

**A84-36929\*** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**OXYGEN UPTAKE KINETICS OF CONSTANT-LOAD WORK - UPRIGHT VS. SUPINE EXERCISE**

V. A. CONVERTINO, D. J. GOLDWATER, and H. SANDLER (NASA, Ames Research Center, Biomedical Research Div., Moffett Field, CA; Arizona, University, Tucson, AZ) Aviation, Space, and Environmental Medicine (ISSN 0095-0562), vol. 55, June 1984, p. 501-506. refs

Supine and upright positions were used in a comparative study of the effects of constant load exercise on oxygen uptake (VO<sub>2</sub>), O<sub>2</sub> deficit, steady-state VO<sub>2</sub> and VO<sub>2</sub> following recovery from constant load work. Ten male subjects (36-40 yr.) performed one submaximal exercise test in the supine and one test in the upright position consisting of 5 min rest and 5 min cycle ergometer exercise at 700 kg/min followed by ten minutes of recovery. It is found that the significant difference in VO<sub>2</sub> kinetics during exercise in the upright compared to supine position resulted from changes in oxygen transport and utilization mechanisms rather than changes in mechanical efficiency. To the extent that data measured in the supine position can be used to estimate physiological responses to zero gravity, it is suggested that limitation of systemic O<sub>2</sub> consumption may be the result of slow rates of oxygen uptake during transient periods of muscular work. Significant reductions in the rate of steady-state VO<sub>2</sub> attainment at submaximal work intensities may produce an onset of muscle fatigue and exhaustion. I.H.

**A84-36930**  
**AEROBIC FITNESS AND THE HYPOHYDRATION RESPONSE TO EXERCISE-HEAT STRESS**

B. S. CADARETTE, M. N. SAWKA, M. M. TONER, and K. B. PANDOLF (U.S. Army, Research Institute of Environmental Medicine, Natick, MA) Aviation, Space, and Environmental Medicine (ISSN 0095-0562), vol. 55, June 1984, p. 507-512. refs

An investigation is made of the influence of aerobic fitness (VO<sub>2</sub> max) on physiological responses to exercise heat-stress when

euhydrated or hypohydrated. Eight male and six female subjects completed four exercise tests in hot and comfortable environments under conditions of euhydration and of hypohydration. Measurements were taken of final heart rate, final rectal temperature and total body sweat rate. No significant differences were found between the genders for any of the measurements. In the comfortable environment, no significant correlations were found between heart rate, rectal temperature, total body sweat and VO<sub>2</sub> max. In the hot-dry environment, rectal temperature and VO<sub>2</sub> max were significantly correlated when euhydrated before acclimation. Heart rate was significantly related to VO<sub>2</sub> max both before and after acclimation when euhydrated and hypohydrated. It is indicated from the data that aerobic fitness provides cardiovascular and thermoregulatory benefits before acclimation when euhydrated in the heat, but only cardiovascular benefits after acclimation. When hypohydrated in the heat, cardiovascular benefits are present for fit subjects both before and after acclimation. I.H.

**A84-36931\*** Brandeis Univ., Waltham, Mass.  
**ELICITATION OF MOTION SICKNESS BY HEAD MOVEMENTS IN THE MICROGRAVITY PHASE OF PARABOLIC FLIGHT MANEUVERS**

J. R. LACKNER (Brandeis University, Waltham, MA) and A. GRAYBIEL (U.S. Naval Aerospace Medical Center, Aerospace Medical Research Laboratory, Pensacola, FL) Aviation, Space, and Environmental Medicine (ISSN 0095-0562), vol. 55, June 1984, p. 513-520. refs  
 (Contract NAS9-15147)

Susceptibility to motion sickness was tested in 44 subjects during parabolic flight maneuvers in a KC-135 aircraft. The subjects were categorized as: (1) insusceptible; (2) moderately susceptible; or (3) highly susceptible to motion sickness during exposure to varying degrees of gravito-inertial force. After categorization, three types of head movements were evaluated to determine the effect on the subjects' baseline susceptibility. Ten cycles of head movements were made in three different parabolas until nausea was reached or 40 parabolas had been completed. All types of head movements significantly increased susceptibility for all categories; eyes-open conditions were always more stressful than eyes-closed conditions for each type of head movement. It is concluded that head movements in microgravity can elicit symptoms of motion sickness. It is suggested that head movements play an etiological role in space motion sickness. In ground based studies where head movements are necessary to elicit symptoms, they are also necessary to elicit adaptation to the microgravity environment. I.H.

**A84-36932**  
**MOTION SICKNESS INCIDENCE - DISTRIBUTION OF TIME TO FIRST EMESIS AND COMPARISON OF SOME COMPLEX MOTION CONDITIONS**

K. C. BURNS (Desmatics, Inc., State College, PA) Aviation, Space, and Environmental Medicine (ISSN 0095-0562), vol. 55, June 1984, p. 521-527. refs  
 (Contract N00014-79-C-0128; NR PROJECT 201-566)

A statistical mixture model is used to fit time-to-emesis data. The Weibull probability distribution is shown to provide a good fit for those subjects who either become sick or withdraw from the experiment within 2 h. The second part of the mixture accounts for those subjects who neither quit nor vomit within 2 h. The log-normal probability model is shown to give a poorer fit to the data and figures showing the relative fits of the estimated Weibull and log-normal distributions are provided. A nonparametric test is used to compare the five motion conditions of the correlation study. That test shows that there are significant differences in severity among the conditions. Author

A84-36938

**LYTIC SPONDYLOLISTHESIS IN HELICOPTER PILOTS**

P. FROOM (New York, State University, Stony Brook, NY), J. FROOM, D. VAN DYK, Y. CAINE, J. RIBAK, S. MARGALOT (Israel Air Force, Aeromedical Center, Ramat-Gan, Israel), and Y. FLOMAN (Hadassah University, Jerusalem, Israel) Aviation, Space, and Environmental Medicine (ISSN 0095-0562), vol. 55, June 1984, p. 556, 557. refs

Trauma to the back from the force of chronic stress is thought to be an etiologic factor in isthmic spondylolisthesis (SLL). The relationship of first degree spondylolisthesis to low back pain (LBP) is controversial. The prevalence of SLL in helicopter pilots who are subject to strong vibrational forces is compared with other air force personnel. Helicopter pilots had more than a four times higher prevalence of SLL (4.5 percent) than did cadets (1.0 percent) and transport pilots (0.9 percent). Low back pain was more frequent in pilots with SLL than in those without this lesion but in no case was the pain disabling or the defect progressive. It is concluded the SLL may be induced by vibrational forces and although SLL is associated with LBP, the pain has little clinical significance.

Author

A84-37178

**HYPERSENSITIVITY REACTIONS AND THEIR SIGNIFICANCE IN HUMAN PATHOLOGY - AUTOIMMUNE DISEASES (REAKTSII GIPERCHUVSTVITEL'NOSTI I IKH ZNACHENIE V PATOLOGII CHELOVEKA - AUTOIMMUNNYE BOLEZNI)**

A. K. AGEEV (Voenno-Meditsinskaia Akademiia, Leningrad, USSR) Arkhiv Patologii (ISSN 0004-1955), vol. 45, no. 11, 1983, p. 22-29. In Russian. refs

A84-37179

**ALLERGIC INFLAMMATION [ALLERGICHESKOE VOSPALENIE]**

V. P. BYKOVA (Ministerstvo Zdravookhraneniia RSFSR, Moskovskii Nauchno-Issledovatel'skii Institut Ukha, Gorla i Nosa, Moscow, USSR) Arkhiv Patologii (ISSN 0004-1955), vol. 45, no. 11, 1983, p. 29-36. In Russian. refs

Current ideas on allergic inflammation are reviewed in the light of the concept of immune inflammation. Immune inflammation is considered to differ both qualitatively and quantitatively from ordinary inflammation. The nature of this difference makes it possible to evaluate allergic (immune) inflammation as a biologically expedient type of defense-adaptive reaction in which the inflammatory response is optimally expressed due to the participation of immunological mechanisms.

B.J.

A84-37180

**IMMUNE COMPLEX DISEASES [IMMUNOKOMPLEKSNYE BOLEZNI]**

P. S. GUREVICH (Kurskii Meditsinskii Institut, Kursk, USSR) Arkhiv Patologii (ISSN 0004-1955), vol. 45, no. 11, 1983, p. 37-44. In Russian. refs

Three variants of the course of immune complex diseases (ICD) are distinguished: fulminant, acute, and chronic. The principal morphological manifestation of ICD is vasculitis (microangiopathy in the fulminant course) and its consequences in the form of various circulation disorders. It is noted that the renal glomeruli (glomerulonephritis) are often involved, and that immunopathological reactions in the form of hypersensitivity reaction or inhibition of immune response are significant in ICD.

B.J.

A84-37181

**CHARACTERISTICS OF THE INTERACTION OF LEUKOCYTES AND MICROBES IN THE INFECTION PROCESS (NEKOTORYE ZAKONOMERNOSTI VZAIMOOTNOSHENIIA LEIKOTSITOV KROVI I MIKROBOV V INFEKTSIONNOM PROTSESE)**

D. C. SARKISOV, A. A. PALTSYN, I. I. KOLKER, N. V. CHERVONSKAIA, V. G. POBEDINA, A. M. SVETUKHIN, and A. K. BADIKOVA (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Arkhiv Patologii (ISSN 0004-1955), vol. 45, no. 11, 1983, p. 51-58. In Russian. refs

A84-37183

**THE SIGNIFICANCE OF IMMUNODEFICIENCY STATES IN HUMAN PATHOLOGY [ZNACHENIE IMMUNODEFITSITNYKH SOSTOIANII V PATOLOGII CHELOVEKA]**

T. E. IVANOVSKAIA (II Moskovskii Gosudarstvennyi Meditsinskii Institut, Moscow, USSR) Arkhiv Patologii (ISSN 0004-1955), vol. 45, no. 11, 1983, p. 75-82. In Russian. refs

A classification and data are presented which serve to distinguish different types (cell-mediated, humoral, combined, complementary, and phagocytic) and nosological forms of primary, predominantly hereditary immunodeficiency syndromes. Also listed are pathological processes and diseases in secondary acquired immunodeficiency conditions may develop. It is suggested that the morphology of the thymus is the most informative characteristic for a pathologist with respect to the diagnosis of primary or secondary immunodeficiency syndrome.

B.J.

A84-37186

**SPONTANEOUS DISAPPEARANCE OF MYOCARDIAL ISCHEMIA DURING CONTINUOUS PHYSICAL EXERCISE [SPONTANNOE ISCHEZNOVENIE ISHEMII MIOKARDA VO VREMIA NEPRERYVNOGO FIZICHESKOGO NAPRIAZHENIIA]**

O. P. SHEVCHENKO, B. A. SIDORENKO, L. M. BATYRBEKOVA, and F. M. IAROSHEVSKAIA (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Kardiologiya (ISSN 0022-9040), vol. 23, Oct. 1983, p. 51-54. In Russian.

An investigation was made of five coronary patients showing transitory ST rise during spontaneous anginal attack. Myocardial ischemia was found to have an unusual pattern of response to physical (bicycle) exercise in all cases: several episodes of myocardial ischemia developed during one continuous loading, which were not accompanied by pain and disappeared spontaneously as the exercise continued. The pattern and depth of EKG changes were found to be similar to those of ischemic episodes associated with pain. It is proposed that the transitory stress-related functional constriction of the coronary arteries may determine this type of myocardial ischemia.

B.J.

A84-37187

**PSEUDOISCHEMIC CHANGES OF EKG DUE TO HYPERVENTILATION [LOZHNOISHEMICHESKIE IZMENENIIA EKG, OBUSLOVLENNYE GIPERVENTILIATSIEI]**

IU. N. SHTEINGARDT, T. G. MELNIK, and IA. V. POROVSKII (Tomskii Meditsinskii Institut, Tomsk, USSR) Kardiologiya (ISSN 0022-9040), vol. 23, Oct. 1983, p. 54-56. In Russian. refs

Physical exercise was found to induce pseudoischemic changes of the ST segment and T-wave inversion in a certain percentage of patients tested with neurocirculatory dystonia. It is noted that these EKG changes may be due to hyperventilation. It is shown that T-wave inversion cannot be a reliable indicator of coronary insufficiency, and that respiratory alkalosis, hypocapnia, the increased work of respiratory muscles, and hypoxemia are not direct causes of the hyperventilation changes. It is suggested that the observed changes are related to a disruption in the vegetative control of the cardiovascular system.

B.J.

A84-37188

**MEASUREMENT OF PRESSURE IN PERIPHERAL VEINS USING THE ULTRASONIC DOPPLER METHOD [IZMEREENIE DAVLENIIA V PERIFERICHESKIKH VENAKH S ISPOL'ZOVANIEM UL'TRAZVUKOVOGO DOPPLEROVSKOGO METODA]**

IU. M. BALA, N. I. BABENKO, and IU. N. GUSEV (Voronezhskii Meditsinskii Institut; Voronezhskaya Oblastnaia Klinicheskaya Bol'nitsa, Voronezh, USSR) Kardiologiya (ISSN 0022-9040), vol. 23, Oct. 1983, p. 61, 62. In Russian. refs

The use of the ultrasonic Doppler method for determining the pressure in the cubital vein is described. Fifty-four subjects (12 normal subjects, 19 patients with hypertension, and 23 coronary patients) were investigated, and it was found that patients with cardiovascular diseases had a somewhat elevated peripheral venous pressure. It is concluded that the method described is simple and noninvasive, is not time-consuming, and makes possible

the continuous monitoring of pressure in a major, easily accessible vein. B.J.

**A84-37189**  
**ON THE METHODOLOGY OF INTEGRAL RHEOGRAPHY [K METODIKE INTEGRAL'NOI REOGRAFI]**

A. A. MATSNEV (Tsentral'nyi Voennyi Klinicheskii Gospital', Krasnogorsk, USSR) *Kardiologiya* (ISSN 0022-9040), vol. 23, Oct. 1983, p. 62-65. In Russian. refs

It is maintained that Tishchenko's integral rheographic (IR) technique does not have an adequate metrological basis, and that this shortcoming affects the accuracy of the technique. The left-ventricular stroke volume is approximately proportional to body height and weight, and the difference between the two. It is suggested that the accuracy of Tishchenko's technique can be improved by taking into account this relationship. It is also argued that the Kedrov-Nyboer equation which is the basis of the formula for stroke volume does not have an adequate physical rationale, and that standard physical formulas seem preferable for calculating the stroke volume. It is concluded that different rheographs with wide frequency ranges can be used for IR. B.J.

**A84-37191**  
**BLOOD CIRCULATION IN HEALTHY PERSONS IN TURKMENIA'S ARID ZONE. I - INVESTIGATION IN HORIZONTAL AND ORTHOSTATIC POSITIONS [KROVOBRASHCHENIE U ZDOROVYKH LIUDEI V USLOVIYAKH ARIDNOI ZONY TURKMENII. I - ISSLEDOVANIE V GORIZONTAL'NOM I OPTOSTATICHESKOM POLOZHENII]**

A. B. BABAIEV, M. CH. CHARYEV, and G. A. GLEZER (Turkmenskii Meditsinskii Institut, Ashkhabad, Turkmenian SSR; Nauchno-Issledovatel'skii Institut po Biologicheskim Ispytaniyam Khimicheskikh Soedinenii, Moscow, USSR) *Kardiologiya* (ISSN 0022-9040), vol. 23, Oct. 1983, p. 76-82. In Russian. refs

**A84-37192**  
**CHANGES IN THE CONTENT OF BLOOD PLASMA LIPIDS AND APOLIPOPROTEINS IN THE COURSE OF ACUTE MYOCARDIAL INFARCTION [IZMENENIE SODERZHANIYA V PLAZME KROVI LIPIDOV I APOLIPOPROTEINOV V DINAMIKE OSTROGO INFARKTA MIOKARDA]**

E. A. NOEVA, N. V. PEROVA, and E. N. GERASIMOVA (Akademiya Meditsinskikh Nauk SSSR, Moscow, USSR) *Kardiologiya* (ISSN 0022-9040), vol. 23, Oct. 1983, p. 86-91. In Russian. refs

**A84-37194**  
**RARE CASES OF THE DISRUPTION OF THE CONDUCTIVITY AND RHYTHM OF THE HEART DURING SHORT-TERM HYPERTHERMIA OF THE ORGANISM [REDKIE SLUCHAI NARUSHENIYA PROVODIMOSTI I RITMA SERDTSA PRI KRATKOVREMENNOI GIPERTERMII ORGANIZMA]**

V. I. SOBOLEVSKII (Leningradskii Gosudarstvennyi Institut Fizicheskoi Kul'tury, Leningrad, USSR) *Kardiologiya* (ISSN 0022-9040), vol. 23, Oct. 1983, p. 108, 109. In Russian.

**A84-37196**  
**PHYSIOLOGICAL-HYGIENIC INVESTIGATION OF REGIMES OF PRELIMINARY HEAT ADAPTATION [FIZIOLOGO-GIGIENICHESKOE ISSLEDOVANIE REZHIMOV PREDVARIATEL'NOI TEPLOVOI ADAPTATSII]**

G. N. NOVOZHILOV, V. P. KOVALENKO, S. G. TERESHCHENKO, and D. I. MASHIANOV *Voенно-Meditsinskii Zhurnal* (ISSN 0026-9050), Nov. 1983, p. 36-38. In Russian. refs

A physiological-hygienic evaluation of three regimes of preliminary heat adaptation (PHA) was carried out with the aim of developing the most effective regime of accelerated PHA for physically well-developed and sufficiently trained individuals preparing for intense physical work in a hot climate. These three regimes are: (1) two and one-half hours stay in a hot chamber for five days; (2) two hours stay for seven days; and (3) a one hour stay for 10 days. It is shown that the most effective regime of PHA involves daily exposures of two hours for seven days at a temperature of 42 C and a relative humidity of 50 percent. B.J.

**A84-37197**  
**METHODS AND MEANS FOR IMPROVING THE WORK CAPACITY OF FLIGHT PERSONNEL [METODY I SREDSTVA POVYSHENIYA RABOTOSPOBOSTI LETNOGO SOSTAVA]**  
 V. A. BODROV *Voенно-Meditsinskii Zhurnal* (ISSN 0026-9050), Nov. 1983, p. 40-44. In Russian. refs

An examination is made of the functional states that can lead to short-term or long-term reduction of the work capacity of flight personnel. Two basic ways to improve this work capacity are considered: (1) the optimization of the object, content, conditions, and organization of flight activity; and (2) methods of direct action on the pilot. B.J.

**A84-37198**  
**CERTAIN IMMUNOLOGICAL MECHANISMS OF THE PHYSIOLOGICAL ADAPTATION OF SEAMEN TO VOYAGE CONDITIONS AT LOW LATITUDES [NEKOTORYE IMMUNOLOGICHESKIE MEKHANIZMY ADAPTATSII ORGANIZMA MORIAKOV K USLOVIYAM PLAVANIYA V NIZKIKH SHIROTAKH]**

I. A. SAPOV and A. A. POVAZHENKO *Voенно-Meditsinskii Zhurnal* (ISSN 0026-9050), Nov. 1983, p. 44, 45. In Russian. refs

**A84-37199**  
**THE USE OF MATHEMATICAL METHODS TO PREDICT DISEASES OF CIRCULATORY-SYSTEM ORGANS [ISPOL'ZOVANIE MATEMATICHESKIKH METODOV DLIYA PROGNOZIROVANIYA ZABOLEVANIY ORGANOV KROVOBRASHCHENIYA]**

P. I. KOGALENOK, L. B. CHIZHOV, and A. M. MARKOV *Voенно-Meditsinskii Zhurnal* (ISSN 0026-9050), Nov. 1983, p. 49, 50. In Russian. refs

**A84-37318**  
**CONDITION OF THE UPPER RESPIRATORY TRACT IN FACTORY WORKERS EXPOSED TO NICKEL SULFATE FUMES [SOSTOYANIE VERKHNIKH DYKHATEL'NYKH PUTEI U RABOCHIKLE PROMYSHLENNYKH PREDPRIIATII PRI VOZDEISTVII PAROV SERNOKISLOGO NIKELIYA]**

V. N. DROZDOV (Krymskii Meditsinskii Institut, Ukrainian SSR) *Vestnik Otorinolaringologii* (ISSN 0042-4668), May-June 1984, p. 56-58. In Russian.

**A84-37319**  
**ETIOLOGY AND PATHOGENESIS OF MENIERE'S DISEASE [ETIOLOGIYA I PATOGENEZ BOLEZNI MEN'ERA]**

O. A. BUIANOVSKAIIA (II Moskovskii Gosudarstvennyi Meditsinskii Institut, Moscow, USSR) *Vestnik Otorinolaringologii* (ISSN 0042-4668), May-June 1984, p. 76-84. In Russian. refs

It has been established that the basis of Meniere's disease is endolymphatic hydrops. This paper presents a review of the literature on the cause and place of origin of this disease, and considers increased secretion, disturbance of normal adsorption, and biochemically altered endolymphs. The endolymphatic sac is responsible for a variety of functions: endolymph secretion, metabolism of mucopolysaccharides, endolymph resorption, protein metabolism, phagocytosis, filtration, and regulation of pressure. It has been shown that changes in the structure and function of the endolymphatic sac occur in Meniere's disease. Precise data on the composition and origin of labyrinthine fluids is considered to have an important theoretical and practical significance for the study of the disease. Different theories of the formation of endolymphs and perilymphs are reviewed, and the role of the vascular cavity as a source of endolymphatic potential is considered. Attention is also given to obstruction of the cochlear aqueduct as a local cause of the disease. J.N.

A84-37802

**LOCALIZATION OF THE CORTICAL AGENCY FOR THE CONTROL OF POSTURAL SYNERGY IN THE FRONTAL LOBE OF THE BRAIN [O LOKALIZATSII KORKOVOGO PREDSTAVITEL'STVA UPRAVLENIIA POZNOI SINERGIEI V LOBNOI DOLE MOZGA]**

A. M. ELNER (Akademiia Nauk SSSR, Institut Problem Peredachi Informatsii, Moscow, USSR) and G. A. GABIBOV (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Zhurnal Nevropatologii i Psikiatrii im. S. S. Korsakova (ISSN 0044-4588), vol. 83, no. 12, 1983, p. 1775-1780. In Russian. refs

The muscular activity of the legs and the trunk was investigated in 27 patients with verified tumors of the frontal lobes of the brain. Abnormalities of the anticipated postural muscular activity are shown to be associated with the lesion of the median part of the premotor region. It is concluded that the supplementary motor area deals with the control of postural synergy and involves the muscles of both sides of the body. B.J.

A84-37803

**CLASSIFICATION OF ELECTROMYOGRAMS WITH LOCAL LEAD [O KLASSIFIKATSII EMG PRI LOKAL'NOM OTVEDENII]**

M. A. CHOBOTAS and V. M. CHOBOTAS (Ministerstvo Zdravookhraneniia Litovskoi SSR, Nauchno-Issledovatel'skii Institut Eksperimental'noi i Klinicheskoi Meditsiny, Vilnius, Lithuanian SSR) Zhurnal Nevropatologii i Psikiatrii im. S. S. Korsakova (ISSN 0044-4588), vol. 83, no. 12, 1983, p. 1784-1787. In Russian. refs

It is maintained that Buchthal's (1957) classification of electromyograms has become obsolete because of the increasing number of EMG studies that employ needle electrode leads. The main shortcoming of this classification is that it does not make it possible to differentiate and evaluate motor unit activity expressed as volley bursts of oscillations, which can be of particular significance in the diagnosis of radiculitides, Parkinson's disease, neuromuscular lesions in thyrotoxicosis, and other disorders. A new classification of electromyograms with needle electrode leads is proposed which distinguishes types I, II, IIIa, IIIb, and IV of the electromyogram. B.J.

A84-37804

**CIRCADIAN RHYTHM OF CATECHOLAMINE EXCRETION, AND THE EFFECT OF L-DOPA AND NACOME IN THE CASE OF CERTAIN DISEASES OF THE NERVOUS SYSTEM [SUTOCHNYI RITM EKSKRETSII KATEKHOLAMINOV, VLIANIE L-DOFA I NAKOMA PRI NEKOTORYKH ZABOLEVANIIAKH NERVNOI SISTEMY]**

I. S. IADGAROV (I Moskovskii Meditsinskii Institut, Moscow, USSR) Zhurnal Nevropatologii i Psikiatrii im. S. S. Korsakova (ISSN 0044-4588), vol. 83, no. 12, 1983, p. 1792-1796. In Russian. refs

The activity of the sympathoadrenal system was investigated in 132 patients with CNS diseases (such as parkinsonism, deforming muscular dystonia, Huntington's chorea, and asthenic neurosis) on the basis of fluorometric determinations of catecholamine (CA) excretion. The results confirm reported data concerning the role of CA in the pathogenesis of the aforementioned diseases. There was revealed a disruption of the circadian rhythm of CA excretion as well as a deficiency of DOPA and dopamine synthesis and deposition following a single dose of L-DOPA and nacome. B.J.

A84-37806

**SYNDROME OF THE PREMATURE REPOLARIZATION OF THE CARDIAC VENTRICLES IN ATHLETES [SINDROM PREZHDEVREMENNOI REPOLARIZATSII ZHELUDOKHOV SERDTSA U SPORTSMENOV]**

L. A. BUTCHENKO, I. L. VENEVTSEVA, and V. L. BUTCHENKO (Leningradskii Institut Uovershenstvovaniia Vrachei, Leningrad; Tul'skii Oblastnoi Vrachebno-Fizkul'turnyi Dispanser, Tula, USSR) Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), Dec. 1983, p. 16-18. In Russian. refs

A84-37807

**ONCE AGAIN ON THE METHODOLOGY OF THE IMMUNOLOGICAL EXAMINATION OF ATHLETES [ESHCHE RAZ O METODOLOGII IMMUNOLOGICHESKOGO OBSLEDOVANIIA SPORTSMENOV]**

G. E. ARONOV and N. I. IVANOVA (Nauchno-Issledovatel'skii Institut Meditsinskikh Problem Fizicheskoi Kul'tury, Kiev, Ukrainian SSR) Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), Dec. 1983, p. 18-20. In Russian.

A84-37808

**SUMMARY OF A DISCUSSION ON SPORTS MEDICINE [K ITOGAM DISKUSSII O PREDMETE SPORTIVNOI MEDITSINY]**

N. D. GRAEVSKAIA and S. K. ELISEEVA Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), Dec. 1983, p. 41-44. In Russian.

A84-37809

**SAUNA AS A MEANS TO IMPROVE RESISTANCE TO COLD [SAUNA KAK SPEDSTVO, POVYSHAIUSHCHEE KHOLODOVUII USTOICHIVOST']**

P. V. LAZARENKO, T. G. SIMONOVA, A. IA. TIKHONOVA, and M. A. IAKIMENKO (Akademiia Meditsinskikh Nauk SSSR, Novosibirsk, USSR) Voprosy Kurortologii, Fizioterapii i Lechebnoi Fizicheskoi Kul'tury (ISSN 0042-8787), Nov.-Dec. 1983, p. 56. In Russian. refs

A84-37815

**DIFFERENTIAL THRESHOLD IN PSYCHOACOUSTICS [O DIFFERENTSIAL'NOM POROGE V PSIKHOAKUSTIKE]**

I. A. INDLIN (Nauchno-Issledovatel'skii Kinematografii i Fotografii, Moscow, USSR) Psikhologicheskii Zhurnal, vol. 4, Nov.-Dec. 1983, p. 62-70. In Russian. refs

Experiments were conducted with continuous and discontinuous standard stimuli in order to decide whether a subthreshold region of perception in psychoacoustics exists. It is shown that a differential threshold in Fechner's sense (as a stimulus threshold) does not exist. This threshold does exist, however, on the sensation axis under certain conditions. B.J.

A84-37826

**VASCULAR REACTIONS IN THE LOWER LIMBS OF HUMANS DURING CHANGES OF POSTURE [SOSUDISTYE REAKTSII V NIZHNIKH KONECHNOSTIAKH CHELOVEKA PRI PEREMENE POLOZHENIIA TELA]**

A. IA. RYZHOV, V. I. TKHOREVSKII, V. V. IVANOV, and L. A. BELITSKAIA (Kalininskii Gosudarstvennyi Universitet, Kalinin; Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Gigiena Truda i Professional'nye Zabolevaniia, Nov. 1983, p. 1-6. In Russian. refs

The quantitative characteristics of the peripheral vascular reactions were investigated in the limbs of women 18-44 years of age in the horizontal, antiorthostatic (-15 deg), and orthostatic (+75 deg) postures. Transition to orthostatic posture is shown to be accompanied by hypertensive reactions of the leg muscles, the manifestation of these reactions depending on the initial level of the vascular tonus. Antiorthostatic posture is found to be characterized by a decreased vascular tonus in the legs. It is concluded that the optimal correlation between the arterial and venous pressure in the crus plays an important role in providing the orthostatic resistance of the vessels. B.J.

A84-37827

**THE EFFECT OF WORK WITH A HIGH DEGREE OF NERVOUS-EMOTIONAL STRESS ON THE CIRCADIAN RHYTHM OF THE VEGETATIVE NERVOUS SYSTEM [VLIANIE RABOTY S BOL'SHIM NERVNO-EMOTSIONAL'NYM NAPRIAZHENIEM NA SUTOCHNIU RITMIKU VEGETATIVNOI NERVNOI SISTEMY]**

K. CHIZYNSKI (Institut Meditsiny Truda, Lodz, Poland) Gigiena Truda i Professional'nye Zabolevaniia, Nov. 1983, p. 6-9. In Russian. refs

In an investigation of 92 operators at a steam power plant, a number of physiological parameters were recorded before and

after work during all three shifts at the plant. The results were analyzed statistically using the diversity criterion, and diversities were compared on the basis of the Student t-criterion for the two means. It is noted that variations in physiological parameters under three-shift work are similar to the circadian rhythm of physiological functions in humans. It is concluded that the work of the steam plant operator (work which involves intense nervous-emotional stress) does not cause disturbances of the circadian rhythm of the vegetative system. B.J.

**A84-37828**  
**INVESTIGATION OF THE DEVELOPMENT OF FATIGUE DURING MUSCULAR WORK UNDER EXPOSURE TO LOCAL VIBRATION [IZUCHENIE RAZVITIIA UTOMLENIIA PRI MYCHECHNOI RABOTE V USLOVIAKH VOZDEISTVIA LOKAL'NOI VIBRATSII]**

IU. V. MOIKIN, A. V. GOVORKOV, D. N. KRIUKOVA, I. G. KUDRIAVTSEV, and A. S. POBEREZHSKAIA (Akademiia Meditsinskikh Nauk SSSR; Nauchno-Issledovatel'skii Traktornyi Institut, Moscow, USSR) Gigiena Truda i Professional'nye Zabolevaniia, Nov. 1983, p. 9-13. In Russian. refs

Experiments were performed with a vibration test machine to study the development and manifestation of fatigue under exposure to local vibration of varying parameters (frequencies of 32 and 125 Hz, and a vibration rate equal to or twice as great as the maximum allowable level) and during physical strain of 75, 50, and 25 percent of the maximum possible intensity. Various effects of vibration on the human neuromuscular system function were revealed in relation to the intensity of static strain and the parameters of local vibration. The need to develop improved differentiated standards of local vibration with respect to the vibration-intensity characteristics is emphasized. B.J.

**A84-37832**  
**CONDITION OF THE CENTRAL HEMODYNAMICS AND MICROCIRCULATION IN LOCOMOTIVE ENGINEERS SUFFERING FROM HYPERTENSION [SOSTOIANIE TSENTRAL'NOI GEMODINAMIKI I MIKROTSIRKULIATSII U MASHINISTOV LOKOMOTIVNYKH BRIGAD, STRADAIUSHCHIKH GIPERTONICHESKOI BOLEZN'IU]**

M. G. KOBZAR (Dnepropetrovskii Meditsinskii Institut, Dnepropetrovsk, Ukrainian SSR) Gigiena Truda i Professional'nye Zabolevaniia, Nov. 1983, p. 44, 45. In Russian. refs

**A84-37833**  
**FEATURES OF THE CLINICAL DEVELOPMENT OF VIBRATIONAL NOISE PATHOLOGY IN MINERS FROM THE DONETSK COAL BASIN [OSOBENNOSTI KLINICHESKOGO TECHENIIA VIBRATSIONNO-SHUMOVOI PATOLOGII U GORNORABOCHIKH DONBASSA]**

M. L. VELSKAIA, M. A. NEKHOROSHEVA, G. I. GRISHANOVA, S. I. KONOVALOVA, V. I. DZHERELEI, A. M. MARIN, I. G. GONCHAR, V. M. VALUTSINA, N. G. SAVENKOVA, and T. V. KUDINOVA (Institut Gigieny Truda i Profzabolevanii, Donetsk, Ukrainian SSR) Gigiena Truda i Professional'nye Zabolevaniia, Nov. 1983, p. 46, 47. In Russian.

**A84-37835**  
**FEATURES OF VASCULAR REACTION TO CHILLING IN ANTARCTIC POLAR EXPLORERS WITH RESPECT TO THE LENGTH OF WINTER STAY AND TO PROFESSION [OSOBENNOSTI SOSUDISTOI REAKTSII NA OKHLAZHDENIE U POLIARNIKOV ANTARKTIDY V ZAVISIMOSTI OT DLITEL'NOSTI ZIMOVKI I PROFESSIONAL'NOI DEIATEL'NOSTI]**

S. G. KRIVOSHCHIEKOV (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Gigiena Truda i Professional'nye Zabolevaniia, Nov. 1983, p. 58, 59. In Russian. refs

**A84-37840**  
**COMPUTER TOMOGRAPHY AND THE DIAGNOSIS OF NEOPLASTIC PROCESSES IN THE ORBITAL CAVITY [KOMP'YUTERNAIA TOMOGRAFIIA V DIAGNOSTIKE OB'EMNYKH PROTSESSOV GLAZNITSY]**

A. N. KONOVALOV, V. N. KORNIENKO, G. A. GABIBOV, and V. A. CHEREKAEV (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Vestnik Oftal'mologii (ISSN 0042-465X), Nov.-Dec. 1983, p. 26-30. In Russian. refs

**A84-37841**  
**DYNAMIC REFRACTION IN BINOCULAR VISION CONDITIONS [DINAMICHESKAIA REFRAKTSIIA V USLOVIAKH BINOKULIARNOGO ZRENIIA]**

S. L. SHAPOVALOV, T. I. MILIAVSKAIA, and E. A. EVSEEV (Gosudarstvennyi Nauchno-Issledovatel'skii Institut Grazhdanskoi Aviatsii, Moscow, USSR) Vestnik Oftal'mologii (ISSN 0042-465X), Nov.-Dec. 1983, p. 48-51. In Russian.

Laser refractometry was used to obtain refraction patterns of the binocular vision of 36 flight crew members with either a slight or medium degree of ametropia. The present analysis considers the type of ametropia, the age of the subject, and the presence of anisometropia. In cases of anisometropia, the binocular optical apparatus either corresponds to the clinical refraction of the leading eye or occupies an intermediate position between the refractions of both eyes. Particularly significant deviations in the value of refraction in vision by both eyes was observed in the zone of close sight (33 cm distant). These variations are individual and do not correspond to any calculation equations. J.N.

**A84-37848**  
**CONTROLLED HYPERTHERMIA [UPRAVLIAEMAIA GIPERTERMIIA]**

F. BALLIUZEK and A. DZHAGINIAN (Leningradskii Sanitarno-Gigienicheskii Meditsinskii Institut, Leningrad, USSR) Nauka i Zhizn' (ISSN 0028-1263), Dec. 1983, p. 112-116. In Russian.

The use of controlled hyperthermia as a therapeutic method to treat serious sicknesses is considered. Particular attention is given to work done at the Leningradskii Sanitarno-Gigienicheskii Meditsinskii Institut (the Leningrad Health Institute), and the future prospects of controlled hyperthermia are examined. B.J.

**A84-38346**  
**NEURAL MECHANISM OF CARDIAC DYSRHYTHMIAS DURING +GX STRESS**

K.-Y. LIU, K.-P. CHIA, and Y.-Y. HSUE (Institute of Space Medico-Engineering, Beijing, People's Republic of China) IN: International Symposium on Space Technology and Science, 13th, Tokyo, Japan, June 28-July 3, 1982, Proceedings. Tokyo, AGNE Publishing, Inc., 1982, p. 1621-1626. refs

Cardiac dysrhythmia is one of the main limiting factors of human tolerance to +Gx stress. According to the author's observations made in early years, it was supposed that the direct cause of its occurrence is the imbalance of autonomic activities elicited reflexively from the pressure rise in the low pressure side of the cardiovascular system, rather than the mechanical effect from hemodynamic changes. Two groups of animal experiments were made, and their results proved that the postulation is true. A block diagram is given to show the whole process. Author

**A84-38347**  
**REACTION OF THE CARDIOVASCULAR SYSTEM TO CEREBRAL ISCHEMIA DURING THE TAKE-OFF OF THE SPACECRAFT**

K. MIYAKAWA (Shinshu University, Matsumoto, Nagano, Japan) IN: International Symposium on Space Technology and Science, 13th, Tokyo, Japan, June 28-July 3, 1982, Proceedings. Tokyo, AGNE Publishing, Inc., 1982, p. 1627-1632.

The acute cerebral ischemia, which is expected during the take-off of the spacecraft, triggers a response of the cardiovascular system which results in an elevation of systemic arterial pressure more than twice as high as its value at rest. This response was

considered to well oppose the expected cerebral ischemia and was quantitatively investigated from hemodynamic viewpoint. During this acute hypertension, the retention of blood appeared, first in the Wind-kessel of the aortic system and then in the pulmonary circulatory system, developing in the direction from the left atrium toward the central vein. This centralization of blood during cerebral ischemia is explained by the assumption that the determinant of the ceiling of the hypertension response is the ejection force of the ventricle. Author

**A84-38349****GRAVITATIONAL EFFECTS ON MUSCLE WORK PERFORMANCE AND ENERGY METABOLISM IN HUMAN MUSCLE**

T. FUKUNAGA, H. YATA, A. MATSUO, and K. HYODO (Tokyo, University, Tokyo, Japan) IN: International Symposium on Space Technology and Science, 13th, Tokyo, Japan, June 28-July 3, 1982, Proceedings. Tokyo, AGNE Publishing, Inc., 1982, p. 1639-1642. refs

The effects of a hydrostatic pressure change on muscle work metabolism were examined with human adult males in arm-elevation trials. The six subjects had their arms suspended at three different levels: up, level, and down. Hand grip exercises were performed in each position. Data were recorded on forearm blood flow, blood pressure, partial pressures of O<sub>2</sub> and CO<sub>2</sub>, and the pH of the venous blood before and after exercise. Blood flow and blood pressure declined in the upraised arm, but oxygen consumption was unaffected. A lessening of the lumen of the resistance vessels may have occurred in the upraised arm, thereby decreasing the blood flow and increasing the oxygen utilization.

M.S.K.

**A84-38501****CENTRAL REGULATION OF THE SENSORY STREAM IN THE HUMAN VISUAL SYSTEM [TSENTRAL'NAIA REGULIATSIIA SENSORNOGO POTOKA V ZRITEL'NOI SISTEME CHELOVEKA]**

A. M. IVANITSKII, I. A. KORSKOV, and V. L. TATKO (Vsesoiuznyi Nauchno-Issledovatel'skii Institut Obschchei i Sudebnoi Psikiatrii, Moscow, USSR) Fiziologiya Cheloveka (ISSN 0131-1646), vol. 10, May-June 1984, p. 339-346. In Russian. refs

A component study of evoked potentials of the visual cortex is made during the formation of the psychological disposition in 21 healthy persons under light stimuli (a triad of LED flashes). Attention is given to the effect of the disposition of the subjects on the characteristics of the early components, beginning 40 ms after stimulation. Two mechanisms mediating errors of perception are identified: (1) active regulation of the sensory stream, realizing operational psychological dispositions of the subjects; and (2) spontaneous fluctuations of the perceptual characteristics of the analyzer, not associated with the aforementioned dispositions. It is also shown that discrimination in the near-threshold region is assured by an emphasis on objectively existing differences in stimulus intensity. B.J.

**A84-38502****PROBLEM OF THE LATERALITY FEATURES OF VISUAL PERCEPTION [K PROBLEME LATERAL'NYKH OSOBNOSTEI ZRITEL'NOGO VOSPRIIATIIA]**

N. G. MANELIS and N. V. GREBENNIKOVA (Akademiya Nauk SSSR, Institut Psikhologii, Moscow, USSR) Fiziologiya Cheloveka (ISSN 0131-1646), vol. 10, May-June 1984, p. 347-351. In Russian. refs

The visual recognition of geometrical figures by the left and right hemispheres was investigated in 10 healthy right-handed persons 25 to 45 years of age. This tachistoscope study involved the recognition of simple figures (e.g., a square or triangle) and double figures (e.g., a square within a square). An error analysis shows that the right hemisphere was more successful than the left one in recognizing the double figures. The most common error of the left hemisphere was to perceive the double figure as a simple one. It is suggested that the left hemisphere first perceives

the outer shape of the figure and then perceives the presence of an inner figure. B.J.

**A84-38503****THE EFFECT OF SYNTHETIC HYPOPHYSIAL NEUROPEPTIDES ON THE OPERATION OF THE HUMAN VISUAL ANALYZER [DEISTVIE SINTETICHESKIKH GIPOFIZARNYKH NEUROPEPTIDOV NA RABOTU ZRITEL'NOGO ANALIZATORA CHELOVEKA]**

V. V. KOLBANOV, V. D. BAKHAREV, L. A. RYZHOVA, P. V. ZAGRIADSKII, V. N. NEZAVIBATKO, M. A. PONOMAREVA-STEPNAIA, and L. I. ALFEEVA (Voenno-Meditsinskaia Akademiya, Leningrad, USSR) Fiziologiya Cheloveka (ISSN 0131-1646), vol. 10, May-June 1984, p. 358-363. In Russian. refs

Data are presented concerning the effect of the synthetic hypophysial neuropeptides Met-Glu-His-Phe-Pro-Gly-Pro and DGAVP on the dark adaptation of the human visual analyzer and the magnitude of visual fields under mesopic illumination. It is shown that the neuropeptides, especially DGAVP, have a pronounced accelerating effect on the adaptation. This effect is strongest when the level of analyzer operation is lowered; the neuropeptides have a pronounced therapeutic effect in the case of disturbances of visual perception in patients who have had strokes, and in patients with cerebral atherosclerosis and craniocerebral traumas. B.J.

**A84-38504****CRITICAL INTERVAL OF DISCRETENESS AS A FUNCTION OF THE DURATION OF STIMULUS SIGNALS [KRITICHESKII INTERVAL DISKRETNOSTI KAK FUNKTSIIA DLITEL'NOSTI STIMULIKUIUSHCHIKH SIGNALOV]**

A. S. BORODIN, A. A. IAROSHENKO, and S. V. POBACHENKO (Tomskii Gosudarstvennyi Universitet, Tomsk, USSR) Fiziologiya Cheloveka (ISSN 0131-1646), vol. 10, May-June 1984, p. 364-369. In Russian. refs

Experimental results concerning the time resolution of the human skin analyzer are presented. It is shown that the critical interval of discreteness (KID) as an indicator of functional mobility depends on the duration of stimulus-signal messages. Attention is given to the form of the functional dependence which begins to occur at message durations less than 100 ms, when it is impossible to identify the stimulus quality. The limiting factor of necessary changes of KID is the total time of perception, which occurs in the range 40-140 ms. Also presented are results which illustrate the noncriticality of the area and site of stimulation for the occurrence of the aforementioned dependence. B.J.

**A84-38505****CHANGES IN THE RELATIONSHIPS OF THE BIOPOTENTIALS OF BRAIN ZONES FOR DIFFERENT LEVELS OF WORK CAPACITY [IZMENENIE SOOTNOSHENIIA BIOPOTENTIALOV ZON MOZGA PRI RAZLICHNYKH UROVNIKHN RABOTOSPOBOSTI]**

IU. A. PETROV (Leningradskii Gosudarstvennyi Institut Fizicheskoi Kul'tury, Leningrad, USSR) Fiziologiya Cheloveka (ISSN 0131-1646), vol. 10, May-June 1984, p. 370-374. In Russian. refs

Spatial relations of brain bipotentials during intense bicycle exercise were studied in 31 athletes, who voluntarily stopped the exercise after becoming fatigued (6-10 minutes after the start). Correlation and coherent EEG analysis indicates that a restructuring of the cortical functional system of interrelated activity occurs during cyclic work in different periods of work capacity. This system expands and becomes more complicated in the period of compensated fatigue, evidently providing for mobilization of the reserves of the functional adaptive-response system. Later, in the period of decompensated fatigue, this system breaks down with a simultaneous sharp decline in work capacity. B.J.

A84-38506

**ELECTROPHYSIOLOGICAL INDICATORS OF THE SYSTEMIC ACTIVITY OF THE BRAIN WITH REGARD TO MOBILIZATION OF FUNCTIONAL RESERVES DURING MUSCULAR FATIGUE [ELEKTROFIZIOLOGICHESKIE POKAZATELI SISTEMNOI DEIATEL'NOSTI MOZGA PO MOBILIZATSII FUNKSIONAL'NYKH REZERVOV PRI MYSHECHNOM UTOMLENII]**

E. B. SOLOGUB, O. V. STAROSTINA, and A. S. RADCHENKO (Leningradskii Gosudarstvennyi Institut Fizicheskoi Kul'tury, Leningrad, USSR) Fiziologiya Cheloveka (ISSN 0131-1646), vol. 10, May-June 1984, p. 375-384. In Russian. refs

A84-38507

**THE EFFECT OF ALCOHOL ON EVOKED ELECTRICAL ACTIVITY IN HEALTHY PERSONS [VLIANIE ALKOGOLIA NA VYZVANNUIU ELEKTRICHESKUIU AKTIVNOSTI' U ZDOROVYKH LITS]**

O. A. GENKINA (Vsesoiuznyi Nauchno-Issledovatel'skii Institut Obschchei i Sudebnoi Psikhiiatrii, Moscow, USSR) Fiziologiya Cheloveka (ISSN 0131-1646), vol. 10, May-June 1984, p. 391-394. In Russian. refs

The effect of different doses of alcohol on evoked electrical activity was investigated in healthy persons (11 women and 8 men) 25 to 36 years of age. Evoked-potential responses to literal stimuli (letters of the Cyrillic alphabet), presented in the left and right fields of vision, were registered. It is shown that a small dose of alcohol (0.41 g/kg) does not affect the evoked electrical activity of the brain. Distinct regional differences were detected in the effect of a medium dose (0.82 g/kg) on the cortex of the large hemispheres. The evoked potential in the central zone was inhibited in a more pronounced way than in the visual and associative zones. B.J.

A84-38508

**RESPONSIVITY OF THE CARDIOVASCULAR SYSTEM IN THE CASE OF HYPERTENSION [REAKTIVNOSTI' SERDECHNO-SOSUDISTOI SISTEMY PRI GIPERTONICHESKOI BOLEZNI]**

V. A. ALMAZOV, B. G. BERSHADSKII, and T. A. EVDOKIMOVA (I Leningradskii Meditsinskii Institut, Leningrad, USSR) Fiziologiya Cheloveka (ISSN 0131-1646), vol. 10, May-June 1984, p. 417-420. In Russian. refs

Fourteen healthy males and 66 males with hypertension were investigated in an effort to find a hemodynamic basis for increased hypertensive responsivity in patients with hypertension. Attention is directed toward the relationship between shifts of cardiac index (CI) and specific peripheral resistance (SPR); in normal conditions as well as in hypertension, pressor responses induced by physical exercise occur due to an increase in cardiac output as the vascular tonus decreases. Inasmuch as the CI and SPR are less pronounced in hypertensive patients than in healthy persons, it can be concluded that insufficient vasodilatation is responsible for the intensification of arterial-pressure responses during hypertension. B.J.

A84-38509

**PULMONARY BLOOD FLOW AND OXYGENATION OF ARTERIAL BLOOD IN HEALTHY PERSONS DURING 7-DAY HYPOKINESIA [LEGOCHNYI KROVOTOK I OKSIGENATSIIA ARTERIAL'NOI KROVI ZDOROVOGO CHELOVEKA PRI 7-SUTOCHNOI GIPOKINEZII]**

E. M. NIKOLAENKO, V. E. KATKOV, S. V. GVOZDEV, V. V. CHESTUKHIN, and M. I. VOLKOVA (Ministerstvo Zdravookhraneniia SSSR, Nauchno-Issledovatel'skii Institut Transplantologii i Iskusstvennykh Organov, Moscow, USSR) Fiziologiya Cheloveka (ISSN 0131-1646), vol. 10, May-June 1984, p. 421-425. In Russian. refs

The pattern of changes of oxygenation of arterial blood was investigated in three series of studies of 7-day antiorthostatic hypokinesia (AH) at -15 deg in healthy males. A progressive reduction of PaO<sub>2</sub> was observed to the third day, with a subsequent increase to the seventh day. The total pulmonary blood flow did

not change during the AH, but the regional blood flow in lung zones ventilated by dead-volume gas was found to increase. Arterial hypoxemia during AH was determined by a shift of the log-normal distribution of ventilation-perfusion relations in the lungs toward lower as well as toward higher values, which cannot be explained solely by a gravitational factor. B.J.

A84-38510

**CHANGES IN THE PROPAGATION VELOCITY OF A PULSE WAVE IN EXTREMITY ARTERIES DURING MUSCLE CONTRACTION [IZMENENIIA SKOROSTI RASPROSTRANENIIA PUL'SOVOI VOLNY PO ARTERIIAM KONECHNOSTI VO VREMIA SOKRASHCHENIIA MYSHTS]**

I. A. V. KANTSANS and P. P. OZOLIN (Latviiskii Nauchno-Issledovatel'skii Institut Eksperimental'noi i Klinicheskoi Meditsiny, Riga, Latvian SSR) Fiziologiya Cheloveka (ISSN 0131-1646), vol. 10, May-June 1984, p. 426-429. In Russian. refs

Changes in the viscoelastic properties of the walls of the brachial and radial arteries during the contraction of the muscles surrounding the arteries were investigated in young males (athletes and nonathletes). During weak static (10 percent of maximum voluntary force) or dynamic loading, the velocity of a pulse wave propagating in the arteries was found to decrease. During intense static contraction (30-60 of the maximum voluntary force), this velocity increased, which was followed by an intense decrease after the loading. In athletes (runners) the decrease in the pulse-wave velocity during running is more pronounced than in untrained persons. B.J.

A84-38511

**RESPONSES OF THE RENIN-ALDOSTERONE SYSTEM TO WATER LOADING [K VOPROSU O REAKTSIIAKH RENIN-AL'DOSTERONOVOI SISTEMY NA VODNO-NAGRUCHOCHNYE PROBY]**

I. G. DLUSSKAIA Fiziologiya Cheloveka (ISSN 0131-1646), vol. 10, May-June 1984, p. 435-439. In Russian. refs

The excretion of aldosterone with the urine and the renin activity of the blood plasma were investigated in subjects after water loading and in astronauts during water loading before and after space flight. It is shown that 2-percent water load has an insignificant effect on the initially normal activity of the renin-aldosterone system (RAS). The 2-percent water load can lead to a short-term inhibition of the activity of the RAS if its initial activity is high. An elevated level of aldosterone activity before the water load can be accompanied, in the hours immediately following, by a relative retention of the received water. B.J.

A84-38512

**RELATIONSHIPS BETWEEN BIVALENT CATIONS, THE FUNCTION OF THE INSULAR APPARATUS OF THE PANCREAS, AND CALCIUM-REGULATING HORMONES WITH CHANGES OF GLUCOSE CONTENT IN THE BLOOD [VZAIMOOTNOSHENIIA MEZHDU DVUKHVALENTNYMI KATIONAMI, FUNKTSIEI INSULIARNOGO APPARATA PODZHELUDOCNOI ZHELEZY I KAL'TSIUREGULIRUIUSHCHIMI GORMONAMI PRI IZMENENII SODERZHANIIA GLIUKOZY V KROVI]**

G. K. ZOLOEV, V. D. SLEPUSHKIN, R. A. IAKOVLEVA, E. O. GIMRIKH, and V. F. MORDOVIN (Akademii Meditsinskikh Nauk SSSR, Tomsk, USSR) Fiziologiya Cheloveka (ISSN 0131-1646), vol. 10, May-June 1984, p. 450-453. In Russian. refs

A84-38514

**DYNAMICS OF INTERHEMISPHERIC ASYMMETRY DURING VARIATIONS OF THE GEOMAGNETIC FIELD [DINAMIKA MEZHPOLUSHARNOI ASIMMETRII PRI IZMENENII GEOMAGNITNOGO POLIA]**

O. S. RAEVSKAIA and G. V. RYZHIKOV (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Fiziologiya Cheloveka (ISSN 0131-1646), vol. 10, May-June 1984, p. 471-473. In Russian. refs

EEG investigations of 15 healthy persons (right-handed males) 19 to 27 years of age were performed in order to study the pattern of interhemispheric asymmetry with changes of the geomagnetic field. Sudden changes of geomagnetic field strength are shown to lead to a weakening of the interhemispheric asymmetry as well as to a weakening of the functional asymmetry of the hands. It is suggested that it is possible to use the stability and markedness of the indicators of functional asymmetry (along with other indicators) to characterize the adaptation of the human body to geomagnetic variations. B.J.

A84-38515

**CHANGES OF SENSITIVITY TO ADRENALIN DURING ADAPTATION TO HEAT [IZMENENIE CHUVSTVITEL'NOSTI K ADRENALINU V PROTSESSE TEPLOVOI ADAPTATSII]**

N. I. KOSENKOV (Voенno-Meditsinskaia Akademiia, Leningrad, USSR) Fiziologiya Cheloveka (ISSN 0131-1646), vol. 10, May-June 1984, p. 478, 479. In Russian. refs

Ten male volunteers 29 to 35 years of age were tested in a climate controlled chamber at an air temperature of 49 C for two hours in the course of five days. The subjects exercised on a bicycle machine at 50-100 W, and adrenalin was administered electrophoretically in the right and left forearms. The sensitivity of skin vessels to adrenalin was shown to increase on the third to fifth days. After the removal of the heat effect, the sensitivity to adrenalin on the fourth day still remains high; the recovery of the sensitivity to adrenalin occurs after 15 days. B.J.

A84-38558

**RELATIONSHIP OF HYPOXIC VENTILATORY RESPONSE TO EXERCISE PERFORMANCE ON MOUNT EVEREST**

R. B. SCHOENE, S. LAHIRI, P. H. HACKETT, R. M. PETERS, JR., J. S. MILLEDGE, C. J. PIZZO, F. H. SARNQUIST, S. J. BOYER, D. J. GRABER, K. H. MARET (Washington, University, Seattle, WA) et al. Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol. 56, June 1984, p. 1478-1483. Research supported by the National Geographic Society, Servier Laboratories, Explorers Club, NSF, and U.S. Army. refs

(Contract NIH-HL-24335; NIH-HL-26533; N01-HR-2915)

A84-38562

**THERMAL ADJUSTMENT TO COLD-WATER EXPOSURE IN RESTING MEN AND WOMEN**

W. D. MCARDLE, J. R. MAGEL, T. J. GERGLEY, R. J. SPINA, and M. M. TONER (Queens College, Flushing, NY; U.S. Army, Research Institute of Environmental Medicine, Natick, MA) Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol. 56, June 1984, p. 1565-1571. refs

(Contract DAMD17-80-C-0150)

A84-38563

**THERMAL ADJUSTMENT TO COLD-WATER EXPOSURE IN EXERCISING MEN AND WOMEN**

W. D. MCARDLE, J. R. MAGEL, R. J. SPINA, T. J. GERGLEY, and M. M. TONER (Queens College, Flushing, NY; U.S. Army, Research Institute of Environmental Medicine, Natick, MA) Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol. 56, June 1984, p. 1572-1577. refs

(Contract DAMD17-80-C-0150)

A84-39001

**CHARACTERISTICS OF NYSTAGMUS IN PATIENTS WITH OTITIS MEDIA SUPPURATIVA BASED ON THE FINDINGS OF AEROCALORIC TESTS [OSOBENNOSTI NISTAGMENNOI REAKTSII U BOL'NYKH KHRONICHESKIM GNOINYM SREDNIM OTITOM PO DANNYM VOZDUSHNOI KALORICHESKOI PROBY]**

A. A. DAINIAK (II Moskovskii Gosudarstvennyi Meditsinskii Institut, Moscow, USSR) Vestnik Otorinolaringologii (ISSN 0042-4668), Nov.-Dec. 1983, p. 25-29. In Russian. refs

A study has been made of changes in the intensity of nystagmus in relation to the size of the tympanic membrane or tympanum perforation following radical middle ear surgery in patients with otitis media suppurativa. By using the method of bithermal aerocaloric stimulation of the labyrinths, it has been shown that the intensity of nystagmus correlates with the perforation size, i.e., with the type of otitis media suppurativa, this correlation being manifested as a statistically significant increase of the labyrinth asymmetry coefficient. The results of the study can be useful in evaluating the function of the semicircular canals using the method of bithermal aerocalorization. V.L.

A84-39002

**THE POSSIBILITY OF PREDICTING THE INCIDENCE OF DISEASE AMONG WORKERS ENGAGED IN REINFORCED CONCRETE PRODUCTION [O VOZMOZHNOI PROGNOZIROVANIIA ZABOLEVAEMOSTI RABOCHIKH V PROIZVODSTVE ZHELEZOBETONNYKH IZDELII]**

N. F. BORISENKO, A. G. GLUSHCHENKO, IU. A. LITVINOVA, A. P. IVAKHNO, M. N. BARANOVA, and V. V. DOBRIANSKII (Kievskii Meditsinskii Institut, Kiev, Ukrainian SSR) Gigiena Truda i Professional'nye Zabolevaniia, Dec. 1983, p. 5-8. In Russian. refs

A84-39003

**SOME DATA FROM SOCIAL-HYGIENIC STUDIES OF THE VIBRATION SICKNESS IN WORKERS OF THE MACHINE-BUILDING INDUSTRY [NEKOTORYE DANNYE PO SOTSIAL'NO-GIGIENICHESKOMU IZUCHENIU VIBRATSIONNOI BOLEZNI SREDI RABOTAIUSHCHIKH V MASHINOSTROITEL'NOI PROMYSHLENNOSTI]**

IU. G. ELLANSKII, E. P. KOLPAKOVA, and G. V. AIDINOV (Tsentral'nyi Nauchno-Issledovatel'skii Institut Ekspertizy Trudospobnosti i Organizatsii Truda Invalidov, Rostov-on-Don, USSR) Gigiena Truda i Professional'nye Zabolevaniia, Feb. 1984, p. 6-8. In Russian.

A84-39004

**THE HYGIENIC EFFECTIVENESS OF NOISE REDUCTION AT IRON AND STEEL WORKS [GIGIENICHESKAIA EFFEKTIVNOST' SMIZHENIIA SHUMA NA PREDPRIIATIIAKH CHERNOI METALLURGII]**

V. N. IVANCHENKO, A. V. KOLGANOV, M. V. RATNER, I. N. DUDNIK, V. V. MUKHIN, T. IA. VOLYNKO, I. A. SUKHORUKOVA, and N. A. ANTONOV (Institut Gigieny Truda i Profzabolevanii, Donetsk, Ukrainian SSR) Gigiena Truda i Professional'nye Zabolevaniia, Feb. 1984, p. 9, 10. In Russian.

A84-39005

**A HYGIENIC EVALUATION OF THE WORKING CONDITIONS AND THE HEALTH OF PERSONNEL ENGAGED IN THE DRILLING OF SUPERDEEP HOLES [GIGIENICHESKAIA OTSENKA USLOVII TRUDA I SOSTOIANIE ZDOROV'IA RABOTAIUSHCHIKH PRI BURENII SVERKHGLUBOKIKH SKVAZINII]**

I. I. ALEKPEROV, A. N. MELKUMIAN, A. I. ZAMCHALOV, M. D. GLIKSHTEIN, K. A. ALI-ZADE, and M. I. VINOKUROVA (Institut Gigieny Truda i Profzabolevanii, Sumgait, Azerbaidzhan SSR) Gigiena Truda i Professional'nye Zabolevaniia, Dec. 1983, p. 8-12. In Russian. refs

A84-39006

**COMPUTER-AIDED DIAGNOSTICS OF OCCUPATIONAL DISEASES AMONG ELECTRIC WELDERS [K VOPROSU O VYCHISLITEL'NOI DIAGNOSTIKE PROFESSIONAL'NYKH ZABOLEVANIU U ELEKTROSVARSHCHIKOV]**

G. E. DEINEGA, V. I. PRILUTSKII, and N. A. KORENEVSKII (Donetskii Meditsinskii Institut, Donetsk, Ukrainian SSR) Gigiena Truda i Professional'nye Zabolevaniia, Dec. 1983, p. 12-15. In Russian. refs

A84-39007

**NATURAL IMMUNITY AND THE BLOOD SYSTEM OF METAL WORKERS IN RELATION TO AGE, LENGTH OF SERVICE, AND TYPE OF JOB [SOSTOIANIE ESTESTVENNOGO IMMUNITETA I SISTEMY KROVI U METALLURGOV V ZAVISIMOSTI OT VOZRASTA, TRUDOVOGO STAZHA I PROFESSIONAL'NOI PRINADLEZHNOСТИ]**

S. A. KLESHCHENOGOV (Akademiia Meditsinskikh Nauk SSSR, Novokuznetsk, USSR) Gigiena Truda i Professional'nye Zabolevaniia, Feb. 1984, p. 16-20. In Russian. refs

A84-39008

**ADAPTATION AND COMPENSATION AS QUALITATIVELY DIFFERENT STATES [ADAPTATSIIA I KOMPENSATSIIA KAK KACHESTVENNO RAZLICHNYE SOSTOIANIIA]**

O. G. ALEKSEEVA (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Gigiena Truda i Professional'nye Zabolevaniia, Dec. 1983, p. 23-26. In Russian. refs

The phenomena of adaptation and compensation are examined from the philosophical standpoint in the light of the findings of recent studies. Despite the ambiguity of the existing nomenclature and different interpretations of certain stages in the transition from health to disease, two qualitatively different states are generally singled out. One of these states is closer to health (adaptation) and the other is closer to disease (compensation). The qualitative difference between the two states consists in the method by which the body accommodates to external influences and in the degree of stress on the regulatory systems. V.L.

A84-39009

**CLINICAL-DIAGNOSTIC SIGNIFICANCE OF THE STUDY OF CYCLIC NUCLEOTIDES AND PROSTAGLANDIN F2-ALPHA DURING VIBRATION SICKNESS [KLINIKO-DIAGNOSTICHESKOE ZNACHENIE ISSLEDOVANIIA TSIKLICHESKIKH NUKLEOTIDOV I PROSTAGLANDINA F2-ALPHA PRI VIBRATSIONNOI BOLEZNI]**

A. K. KHADZHIEV (Tashkentskii Meditsinskii Institut, Tashkent, Uzbek SSR) Gigiena Truda i Professional'nye Zabolevaniia, Feb. 1984, p. 46-48. In Russian. refs

A84-39010

**ELECTROMYOGRAPHIC INDICATION OF HYPODYNAMIC DISTURBANCES OF THE NEUROMUSCULAR APPARATUS DURING ACUPUNCTURE [ELEKTROMIOGRAFICHESKIE PROIAVLENIIA GIPODINAMICHESKIKH RASSTROISTV NERVNO-MYSHECHNOGO APPARATA V PROTSESSE REFLEKSOFERAPII]**

A. G. DUBROVIN, A. M. VASILENKO, B. P. SHESTKOV, and I. U. P. MAKAROV (Institut Refleksoterapii, Moscow, USSR) Gigiena Truda i Professional'nye Zabolevaniia, Dec. 1983, p. 45-47. In Russian. refs

A84-39012

**A COMBINED HYGIENIC EVALUATION OF INDUSTRIAL FACTORS OF LOW AND MEDIUM INTENSITY ACTING SIMULTANEOUSLY [ODNOCHISLOVAIA GIGIENICHESKAIA OTSENKA PROIZVODSTVENNYKH FAKTOROV MALOI I SREDNEI INTENSIVNOСТИ PRI IKH SOCHETANNOM VOZDEISTVII]**

N. KH. AMIROV (Kazanskii Meditsinskii Institut, Kazan, USSR) Gigiena Truda i Professional'nye Zabolevaniia, Feb. 1984, p. 51, 52. In Russian. refs

A84-39013

**A CHARACTERIZATION OF SLEEP DISORDERS IN OCCUPATIONAL DISEASES CAUSED BY EXPOSURE TO ANTIBIOTICS [K KHARAKTERISTIKE RASSTROISTV SNA PRI PROFESSIONAL'NYKH ZABOLEVANIIAKH, VYZVANNYKH VOZDEISTVIEM ANTIBIOTIKOV]**

E. A. GNESINA and V. V. LYSOVA (Institut Gigieny Truda i Profzabolevaniia, Gorki, USSR) Gigiena Truda i Professional'nye Zabolevaniia, Dec. 1983, p. 50-52. In Russian. refs

A84-39016

**THE EFFECT OF HIGH AMBIENT TEMPERATURE ON THE DEVELOPMENT OF HYPOXIC EFFECTS IN THE MYOCARDIUM [K VOPROSU O VLIANII POVYSHENNOI TEMPERATURY OKRUZHAIUSHCHEI SREDY NA RAZVITIE GIPOKSICHESKIKH IAVLENIU V MIOKARDE]**

M. A. VERKHOTIN and A. I. BARKALAI (Ministerstvo Zdravookhraneniia SSSR, Institut Biofiziki, Moscow, USSR) Gigiena i Sanitariia (ISSN 0016-9900), Dec. 1983, p. 14-16. In Russian.

The present study is concerned with the effect of elevated temperature on the enzymic activity of lactate dehydrogenase (LDH). It is shown that in a state of rest, the heat factor increases the activity of the LDH isoenzymes specific to the myocardium. The heat associated with physical exercise increases the activity of the LDH isoenzymes specific to skeletal muscles. It is suggested that under the conditions studied, increased LDH enzymatic activity is indicative of hypoxia in the myocardium and skeletal muscles. V.L.

A84-39018

**THE EXAMINATION STRESS AS AN INDICATOR OF THE ADAPTATION-TROPHIC FUNCTION OF THE NERVOUS SYSTEM [EKZAMENATSIONNYI STRESS KAK INDIKATOR ADAPTATSIONNO-TROFICHESKOI FUNKTSII NERVNOI SISTEMY]**

N. IA. VOLKIND (Krasnoarskii Gosudarstvennyi Pedagogicheskii Institut, Krasnoyarsk, USSR) (Vsesoiuznaia Konferentsiia po Fiziologii Vegetativnoi Nervnoi Sistemy, 5th, Yerevan, Armenian SSR, July 3, 1982) Gigiena i Sanitariia (ISSN 0016-9900), Dec. 1983, p. 76-78. In Russian. refs

A84-39019

**CERTAIN PROBLEMS OF CHRONOMEDICINE AND HEALTH [NEKOTORYE PROBLEMY KHROMOMEDITSINY I ZDOROV'IA]**

I. U. P. LISITSYN and N. V. POLUNINA (II Moskovskii Gosudarstvennyi Meditsinskii Institut, Moscow, USSR) Sovetskaiia Meditsina, no. 12, 1983, p. 74-77. In Russian. refs

A84-39021

**RELATIONSHIP BETWEEN OTORHINOLARYNGOLOGICAL PATHOLOGY AND THE INTERNAL ORGANS [O VZAIMOSVIAZI PATOLOGII LOR- I VNUTRENNIKH ORGANOV]**

V. A. VOLOKHOV, A. I. MIKULIANICH, and G. L. KORNELIUK (Voenno-Meditsinskii Zhurnal (ISSN 0026-9050), Dec. 1983, p. 62-64. In Russian.

A84-39022

**THE SIXTH SENSE [SHESTOE CHUVSTVO]**

Nauka i Zhizn' (ISSN 0028-1263), no. 12, 1983, p. 33-35. In Russian.

Theoretical considerations are presented on the sense of equilibrium (called here the 'sixth sense') regulated by the vestibular apparatus. Particular attention is given to cases in which the visual and gravitational verticals do not coincide, and to the occurrence of sea and space sickness. B.J.

A84-39234

**THE MEDICAL ASPECTS OF A FLIGHT TO MARS**

D. WOODARD and A. R. OBERG IN: The case for Mars; Proceedings of the Conference, Boulder, CO, April 29-May 2, 1981. San Diego, CA, Univelt, Inc., 1984, p. 173-180. (AAS PAPER 81-239)

Perhaps the greatest problem concerning a manned flight to Mars is related to uncertainties regarding the effect of a number of flight-related factors on the physical health and well-being of the crew. Of particular importance appears the long duration of the flight, which is probably two and a half years. The flight would involve a long exposure to various forms of radiation. Other questions are related to the prospect of having to survive the debilitating effects of zero gravity, and the further complication of having to survive the g-forces of landings both on Mars and later again on earth. The medical problems of such a flight are considered, taking into account the overall response of the human body to a zero-gravity environment, health countermeasures to reduce the worst side-effects of long-term space flight, design factors which can avoid health problems, and the medical supplies and facilities which might be needed to maintain health during the flight. G.R.

A84-39235

**MODIFICATIONS OF CONVENTIONAL MEDICAL-SURGICAL TECHNIQUES FOR USE IN NULL GRAVITY**

R. M. BEATTIE, JR. IN: The case for Mars; Proceedings of the Conference, Boulder, CO, April 29-May 2, 1981. San Diego, CA, Univelt, Inc., 1984, p. 181-184. refs (AAS PAPER 81-240)

The possibility is considered that during the mission at least one person of the crew will experience clinical death by cardio-pulmonary arrest. Microgravity-related physical conditions will make all human resuscitative efforts difficult. It is, therefore, recommended that the crew have well rehearsed standing orders for methods of clinical resuscitation. A Ready Area is to be prepared with mechanical chest compression, intermittent positive pressure ventilatory, and appropriate emergency adjective resuscitative equipment. Attention is given to details concerning the standing orders, and the equipment needed for the Ready Area. G.R.

N84-26636# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

**VISUAL PERCEPTION THROUGH WINDSCREENS: EFFECTS OF MINOR OCCLUSIONS AND HAZE ON OPERATOR PERFORMANCE**

W. W. KAMA *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures p 825-848 Dec. 1983 (AD-P003223) Avail: NTIS HC A08/MF A01 CSCL 01C

Current specifications and acceptance procedures regarding the size and number of minor defects (optical occlusions) permitted on aircraft transparencies reflect a marked lack of uniformity. Size requirements ranging from 0.035 to 0.25 inch and numbers allowed varying from 1 per square foot to 20 per zone are noted. Additionally, there is, at the present time, no objective means for determining when a transparency should be replaced due to the amount of halation found in it. To address these two problems, two experiments were devised and performed in the Windscreen Facility of the Air Force Aerospace Medical Research Laboratory. The first study sought to determine the effects of size and number (density per unit area) of minor optical defects contained in an aircraft transparency on the performance of a simulated air-to-air target acquisition task while the second sought to determine what relationship, if any, existed between the amount of haze emanating from a transparency and the amount of an observer's field-of-view (FOV) or visual field that is lost (rendered unusable) due to the presence of the haze. GRA

N84-27411# Joint Publications Research Service, Arlington, Va. **EFFECT OF DECIMETER WAVES ON PHYSICAL-CHEMICAL STATE OF MEMBRANES, THYMOCYTE CHROMATIN AND IMMUNOLOGICAL REACTIVITY OF AN ORGANISM** Abstract Only

Z. A. SOKOLOVA, S. M. ZUBIKOVA, I. D. FRENKEL, S. B. PERSHIN, and V. M. BOGOLYUBOV *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-013) p 77 22 Jun. 1984 Transl. into ENGLISH from Vopr. Kurortol., Fizioterapii i Lechebnoy Fiz. Kultury (Moscow), no. 2, Mar. - Apr. 1983 p 6-10 Original language document previously announced in IAA as A83-40567

Avail: NTIS HC A07/MF A01

The various effects of decimeter waves on the structural condition of nuclear chromatin and the cytoplasmic and nuclear membranes of thymocytes, depending on their location, were studied in healthy rabbits. Results show that decimeter waves activate the genetic system of thymus cells and intensify the effects of 7-(p-methoxybenzylamino)-4-nitrobenzoxymethyl and chlorotetracycline which are connected with the membranes of the cell and the nucleus of thymocytes, during irradiation of the thyroid gland, as well as reduce these parameters during action on the projection zone of the adrenal glands and the temporal parietal region. At the same time, corresponding changes in the proliferating processes in the lymph tissues were observed. The mechanisms of these shifts are examined. N.B. (IAA)

N84-27412# Joint Publications Research Service, Arlington, Va. **CHANGE IN SPECTRUM OF BLOOD HORMONES UNDER INFLUENCE OF CENTIMETER RANGE MICROWAVES** Abstract Only

L. A. NIKOLAYEVA and V. S. ULASHCHIK *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-013) p 77-78 22 Jun. 1984 Transl. into ENGLISH from Vopr. Kurortol., Fizioterapii i Lechebnoy Fiz. Kultury (Moscow), no. 2, Mar. - Apr. 1983 p 11-13

Avail: NTIS HC A07/MF A01

The effect of centimeter range microwaves (CMW) on the functions of hypophysis, adrenals, thyroid and pancreatic glands was evaluated experimentally. The experiments were done on chinchilla rabbits, exposing them to a single and repeated courses of CMW 20 min at intensities of 50, 90 and 170 mW/sq. cm. The following determinations were performed in plasma: ACTH, somatotrophic hormone, cortisol, thyroxin, triiodothyronin and insulin. A single exposure to 50 and 90 mW/sq cm dose led to the largest increases in secretions of various glands. High doses appeared to depress the secretory function. Hypophysis and adrenal hormones were affected more than any other hormones. Serial application of CMW led to decreased productivity of endocrine glands. Author

N84-27413# Joint Publications Research Service, Arlington, Va. **GENE MUTATIONS, CHROMOSOME ABERRATIONS AND SURVIVABILITY AFTER X-RAY IRRADIATION OF CHINESE HAMSTER CELL CULTURE UNDER CONDITIONS OF CYSTEAMINE PROTECTION** Abstract Only

T. V. YESILOVA and T. P. FEOKTISTOVA *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-013) p 82 22 Jun. 1984 Transl. into ENGLISH from Biol. Nauki (Moscow), no. 7, Jul. 1983 p 92-97

Avail: NTIS HC A07/MF A01

Experimental results were reported to the determination of protective action of cysteamine on the yield of genetic mutations, chromosome aberrations and cell kill during reproduction, evidently due to damage of genetic structures. The experiments were performed on transplanted fibroblast cells of Chinese hamsters, clone 431 in which 80% of the cells had pseudodiploidy. A dose-modifying factor of 2 was established for chromosome aberrations and cell inactivation and a factor of 2.8 for the gene mutations. The data obtained led to a conclusion that there are general protective mechanisms which include the reaction of cysteamine on the radiation-chemical level and possible effect on the reparative processes. Author

**N84-27415\*** National Aeronautics and Space Administration, Washington, D. C.

**AEROSPACE MEDICINE AND BIOLOGY: A CONTINUING BIBLIOGRAPHY WITH INDEXES (SUPPLEMENT 259)**

Jun. 1984 129 p refs

(NASA-SP-7011(259); NAS 1.21:7011(259)) Avail: NTIS HC

\$7.00 CSCL 06E

A bibliography containing 476 documents introduced into the NASA scientific and technical information system in May 1984 is presented. The primary subject categories included are: life sciences, aerospace medicine, behavioral sciences, man/system technology, life support, and planetary biology. Topics extensively represented were space flight stress, man machine systems, weightlessness, human performance, mental performance, and spacecraft environments. Abstracts for each citation are given.

R.S.F.

**N84-27416\*#** Federation of American Societies for Experimental Biology, Bethesda, Md.

**RESEARCH OPPORTUNITIES IN MUSCLE ATROPHY Final Report**

G. J. HERBISON, ed. (Thomas Jefferson Univ. Hospital, Philadelphia) and J. M. TALBOT, ed. Washington NASA Apr. 1984 90 p refs

(Contract NASW-3728)

(NASA-CR-3796; NAS 1.26:3796) Avail: NTIS HC A05/MF A01

CSCL 06P

Muscle atrophy in a weightless environment is studied. Topics of investigation include physiological factors of muscle atrophy in space flight, biochemistry, countermeasures, modelling of atrophied muscle tissue, and various methods of measurement of muscle strength and endurance. A review of the current literature and suggestions for future research are included.

M.A.C.

**N84-27417\*#** Federation of American Societies for Experimental Biology, Bethesda, Md.

**RESEARCH OPPORTUNITIES IN BONE DEMINERALIZATION, PHASE 3 Final Report**

S. A. ANDERSON, ed. and S. H. COHN, ed. (Brookhaven National Lab.) Washington NASA Apr. 1984 76 p refs

(Contract NASW-3728)

(NASA-CR-3795; NAS 1.26:3795) Avail: NTIS HC A05/MF A01

CSCL 06P

An overview of bone demineralization during space flight, observations in bone demineralization and experiments related to bone loss planned for Spacelab flights, and suggestions for further research are investigated. The observations of the working group focused upon the following topics: (1) pathogenesis of bone demineralization, (2) potential for occurrence of renal stones consequent to prolonged hypercalciuria, (3) development of appropriate ground based and inflight models to study bone demineralization, (4) integration of research efforts, and (5) development of effective countermeasures.

M.A.C.

**N84-27418#** Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Inst. fuer Flugmedizin.

**ARE LIVING CELLS SENSITIVITY TO GRAVITY?**

Oct. 1983 132 p refs In GERMAN; ENGLISH summary Meeting held in Cologne, 10 Mar. 1982 Report will also be announced as Translation (ESA-TT-857)

(DFVLR-MITT-83-19; ESA-TT-857) Avail: NTIS HC A07/MF

A01; DFVLR, Cologne DM 43

A summary of the research and development program in aerospace medicine and a discussion on analogies of control mechanisms in flight guidance and medicine, results from the different departments are presented. Models describing the influence of mechanical energy on man and for the evaluation of work load of pilots are examined. The relationship between personality and efficiency, the influence of gravity on cells and on the human cardiovascular system, and aspects and results of biophysics space research are discussed. The new deep diving

simulator (TITAN) and biochemical research on the effects of unphysiological oxygen supply are outlined.

**N84-27419#** Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Inst. fuer Flugmedizin.

**THE RESEARCH PROGRAM OF THE INSTITUTE FOR AEROSPACE MEDICINE [DAS FORSCHUNGSPROGRAMM]**

K. E. KLEIN *In its* Proc. of Sci. Meeting on the Occasion of the Inauguration of New Buildings for The DFVLR Inst. of Aerospace Med. p 9-14 Oct. 1983 In GERMAN

Avail: NTIS HC A07/MF A01; DFVLR, Cologne DM 43

Goals, tasks, research and development in aerospace medicine are outlined. Psychological, biological, biophysical, research in the human, animal and plant environment, is discussed. Important aspects of aeronautics, space transportation or oceanography are outlined. Biological models were developed to study the influence of technology on the human body.

Transl. by E.A.K.

**N84-27420#** Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Forschungsbereich Flugmechanik.

**ANALOGIES BETWEEN CONTROL MECHANISMS IN FLIGHT GUIDANCE AND MEDICINE [ANALOGIEN BEI REGELUNGSVORGAENGEN IN DER FLUGFUEHRUNG UND IN DER MEDIZIN]**

F. THOMAS *In its* Proc. of Sci. Meeting on the Occasion of the Inauguration of New Buildings for The DFVLR Inst. of Aerospace Med. p 15-25 Oct. 1983 In GERMAN

Avail: NTIS HC A07/MF A01; DFVLR, Cologne DM 43

The relationship between flight control systems and air traffic control are examined. The two systems developed individually from each other, yet the contact between the two disciplines gave information to the development of aerospace sciences. It is found that: (1) physicians and engineers can make progress and exchange ideas in the field of expertise; (2) technological and engineering inventions, can be applied to medical science; (3) technological and engineering inventions can be applied to medical science; and (4) the system oriented reorganization of self-regulation of component oriented symptomatic treatment is the preferred medical therapy.

Transl. by E.A.K.

**N84-27421#** Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Abt. Verkehrsmedizin.

**A MECHANICAL MODEL OF THE HUMAN BODY AND ITS APPLICATION [EIN MECHANISCHES MODELL DES MENSCHLICHEN KOERPERS UND SEINE ANWENDUNG]**

H. L. VOGT *In its* Proc. of Sci. Meeting on the Occasion of the Inauguration of New Buildings for The DFVLR Inst. of Aerospace Med. p 27-43 Oct. 1983 In GERMAN

Avail: NTIS HC A07/MF A01; DFVLR, Cologne DM 43

Human reaction to mechanical vibration and shock was evaluated. Shock tests led to direct solution of the problem. A mathematical model to calculate the reactions of the human body and its compensation system was developed. Mathematical models of humans have the advantage that they are rather easy to curve, when the human dynamic characteristics are known. The design and validation of the dynamic response index model are shown by centrifugal setting.

Transl. by E.A.K.

**N84-27427#** Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Inst fuer Flugmedizin.

**THE DEEP DIVING SIMULATOR TITAN: PHYSIOLOGICAL PROBLEMS OF STAYS IN LARGE WATER DEPTHS [DER TIEFTAUCHSIMULATOR TITAN PHYSIOLOGISCHE PROBLEME BEIM AUFENTHALT IN GROSSEN WASSERTIEFEN]**

H. D. FUST *In its Proc. of Sci. Meeting on the Occasion of the Inauguration of New Buildings for The DFVLR Inst. of Aerospace Med.* p 105-119 Oct. 1983 refs In GERMAN

Avail: NTIS HC A07/MF A01; DFVLR, Cologne DM 43

The effects of pressure and drop in pressure on humans was investigated in deep water environments. The different reactions to identical physiological problems, and the reaction and consequence on humans are examined. The various biophysical and medical measurements of human reactions to very deep waters were conducted with diving simulators. The TITAN measures overpressure in a gaseous atmosphere or in water. The TITAN interior is described and technical data are presented.

Transl. by E.A.K.

**N84-27428#** Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Abt. Biochemie. **THE EFFECTS OF NONPHYSIOLOGICAL OXYGEN SUPPLY ON THE ORGANISM [DER EINFLUSS UNPHYSIOLOGISCHER SAUERSTOFF-VERSORGUNG AUF DEN ORGANISMUS]**

G. SCHAEFER *In its Proc. of Sci. Meeting on the Occasion of the Inauguration of New Buildings for The DFVLR Inst. of Aerospace Med.* p 121-130 Oct. 1983 refs In GERMAN

Avail: NTIS HC A07/MF A01; DFVLR, Cologne DM 43

The effects of nonphysiological oxygen supply to human and mammalian organs was investigated. Different methods to measure the oxygen supply are described. The coordinated absorption of the molecular oxygen in the hemoglobin allows a relatively light addition and rate of O<sub>2</sub> which corresponds with the pO<sub>2</sub> of the environment. Central nervous excitation and inhibition effect are caused by equal electric signals, yet are modulated to the nerve cells by neurotransmitters. The physiological function of the GABA is not an inhibiting factor on the neuromuscular activity. It is suggested that one of the many possible GABA effects are reduced and this may prevent stress causing situations in humans.

Transl. by E.A.K.

**N84-27429#** Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Engineering Science and Mechanics.

**A NON-DIMENSIONAL ANALYSIS OF CARDIOVASCULAR RESPONSE TO COLD STRESS. PART 1: IDENTIFICATION OF THE PHYSICAL PARAMETERS THAT GOVERN THE THERMOREGULATORY FUNCTION OF THE CARDIOVASCULAR SYSTEM Interim Progress Report, Jun. - Sep. 1983**

D. J. SCHNECK Bethesda, Md. Naval Medical Research Inst. 1 Sep. 1983 89 p refs

(AD-A138710; NMRI-83-51) Avail: NTIS HC A05/MF A01 CSDL 06S

Whether in combat-type situations, or during peace-time, Man constantly strives to increase the envelope of human performance capabilities. One environmental factor that appears to seriously impede such capabilities is the ambient temperature within which the performance takes place. Cold stress and or the consequences of hypothermia can lead to adverse effects that range from severe impairment of physiological function to death, itself. The prevailing belief today is that vascular changes and tissue hypoxia are directly responsible for all types of local cold injury, and that variation in the clinical features or manifestations reflects variation in the nature of the insult and the host response. With this in mind, this study has examined the human cardiovascular system in terms of its four basic elements. The fluid (blood), the pump (Heart), the flow pipes (vascular system), and the control mechanisms (intrinsic factors, the central and autonomic nervous systems, and the endocrine system). Then, cardiovascular thermoregulation has been described in terms of how each of these elements responds to cold stress, with the ultimate intent of performing a non-dimensional

analysis of this response. As a first step towards such an analysis, some 400 physical and chemical parameters that govern the thermoregulatory function of the cardiovascular system have been identified. GRA

**N84-27430#** Georgia Inst. of Tech., Atlanta. **DEVELOPMENT OF AN EM-BASED LIFEFORM MONITOR Annual Technical Report**

J. SEALS, S. M. SHARPE, and M. L. STUDWELL Mar. 1984 67 p

(Contract N00014-82-C-0390)

(AD-A140583; ATR-2) Avail: NTIS HC A04/MF A01 CSDL 06B

Georgia Tech is currently conducting a program to develop an electromagnetically-based lifeform monitor capable of evaluating the medical status of battlefield casualties from extremely long ranges (10-100 meters). This lifeform monitor operates by measuring and analyzing scattered electromagnetic fields to detect respiratory-related and cardiac-related body motions in the casualty being evaluated. Because antenna-based techniques are used to perform the required scattered field measurements, the instrumentation being developed on this program achieves true remote operation. That is, personnel being evaluated do not wear or carry a biomedical transducer or any other type of auxiliary device. This fact greatly enhances the attractiveness and potential usefulness of this approach. GRA

**N84-27431#** Brown Univ., Providence, R. I. Center for Neural Science.

**AUTOMATIC CONTROL OF A VISUAL PHYSIOLOGY EXPERIMENT, USING MIMC**

D. RYAN, S. VEILLETTE, and J. D. DANIELS 24 Apr. 1984 51 p

(Contract N00014-81-K-0136)

(AD-A140607; TR-13) Avail: NTIS HC A04/MF A01 CSDL 06P

We automated a visual physiology experiment that formerly was performed manually. The control of a light stimulus was synchronized with the collection of nerve cell response from kitten visual cortex, using Digital Equipment Corporation's MIMC. The computer was integrated into several aspects of the experiment, ranging from data manipulation, storage, and histogramming, to the control of the stimulus sweep, orientation, speech, and duration. The computer also directed nerve spike output to a screen, a printer and a floppy disc memory. Author (GRA)

**N84-27432#** Yale Univ., New Haven, Conn.

**THERMOREGULATION: LONG-TERM MICROWAVE EFFECTS Final Report, 1 Feb. 1983 - 31 Jan. 1984**

E. R. ADAIR 17 Apr. 1984 3 p

(Contract N00014-83-K-0076; RR0-4108)

(AD-A140844; JBP-ONR-2) Avail: NTIS HC A02/MF A01 CSDL 06R

A pilot study investigated the consequences of chronic exposure to 2450-MHz CW microwaves, or sham exposure, in a cold (18 deg C) environment on the thermoregulatory responses, both behavioral and physiological, of squirrel monkeys. Two animals exposed to microwaves exhibited responses that were little different from those measured in animals residing in thermoneutral environments while two sham-exposed animals sustained thermoregulatory deficits. These tentative findings require replication. GRA

**N84-27433#** Royal Air Force Inst. of Aviation Medicine, Farnborough (England).

**MENTAL PERFORMANCE IN MILD OXYGEN DEFICIENCY**

L. INNES and M. F. ALLNUTT Jun. 1967 17 p refs

(IAM-409; BR89879) Avail: NTIS HC A02/MF A01

The effects of a simulated 10,000 ft altitude on mental ability over a 100 min period were studied, using the WAIS Digit Span, Coding Test, Letter Test, Test of 'g' Culture Fair, and a Complex Discrimination Test. Ten young male subjects were divided into two groups, one performing the tests while breathing ambient air

and the other while breathing a 15.4% oxygen in nitrogen mixture. The pre-exposure period for both groups prior to testing was 30 min. Differences between the groups are not significant at any stage. There are consistent indications, however, that the 10,000 ft breathing mixture causes longer times to understand new problems, and slower reaction times for most test items, although accuracy is not affected. Author (ESA)

**N84-27434#** National Inst. of Mental Health, Rockville, Md. Lab. of Neurophysiology.

**NEUROPHYSIOLOGICAL APPROACHES TO HIGHER BRAIN FUNCTIONS**

E. V. EVARTS, Y. SHINODA (Tokyo Medical and Dental Univ.), and S. P. WISE Feb. 1984 320 p refs (PB84-175769; NIHM-84-388) Avail: NTIS HC A14/MF A01 CSCL 06P

Strategies for studying neural circuits involved in higher brain function are examined. The capacity of an animal to elaborate plans for impending action, exemplifies a higher brain function amenable to neurophysiological study. GRA

**N84-27435** Wisconsin Univ., Madison.

**THE INFLUENCE OF SLEEP STATE ON VENTILATORY CONTROL IN HUMANS Ph.D. Thesis**

A. D. BERSSENBRUGGE 1983 232 p  
Avail: Univ. Microfilms Order No. DA8400478

The influence of sleep state on both mechanical and chemical determinants of breathing in healthy humans is examined. Ventilatory compensation to brief inspiratory resistive mechanical loads during wakefulness included a compensatory increase in central inspiratory activity, and a preservation of tidal volume and minute ventilation. Arousal is a critical compensation to loading since the ability to defend minute ventilation is severely compromised during sleep. The roles of sleep state, hypoxia and hypocapnia in the genesis of hypoxia-induced periodic breathing (HIBP) are assessed. A selective influence of sleep state on the integrated response to respiratory afferent stimuli is shown. While sleep state had no effect on acclimatization, it is a crucial determinant of both mechanical load compensation and ventilatory pattern stability under conditions of hypocapnic hypoxia.

Dissert. Abstr.

**N84-28365#** Joint Publications Research Service, Arlington, Va. **PHYSIOLOGICAL RESPONSIVENESS OF OPERATORS IN RELATION TO WORK AND HOMEOSTATIC DISORDERS Abstract Only**

L. V. DONSKAYA, V. V. BADKHEN, and I. A. DUBININA *In its* USSR Rept.: Life Sci., Biomed. and Behavioral Sci. (JPRS-UBB-84-011) p 27 4 Jun. 1984 Transl. into ENGLISH from Fiz. Cheloveka (Moscow), v. 10, no. 1, Jan. - Feb. 1984 p 81-85

Avail: NTIS HC A06/MF A01

The physiological responsiveness of 55 male and female operators with hypertension was compared with the corresponding physiological parameters in 25 normotensive operators, in a study involving evaluation of hemodynamic parameters and a battery of psychophysiological indicators which determine occupational performance. The results demonstrated that the hypertensive operators could be characterized as having increased peripheral vascular resistance (by ca. 15%), increased BP, increased cerebrovascular tonus with attendant decreased cerebrovascular systolic filling, and a depressed CNS functional state. Many of these parameters showed a further degree of deterioration at the end of a working day. These observations underline the heavy physiological toll exacted by the nature of the operator's work, and the differences between the responses of normotensive individuals and those with homeostatic disorders reflected by hypertension. Author

**N84-28366#** Joint Publications Research Service, Arlington, Va. **FUNCTIONAL STATUS IN RELATION TO WORK, PERFORMANCE AND HEALTH Abstract Only**

Y. G. SOLONIN, S. B. MASLENTSEVA, Z. M. KUZNETSOVA, V. A. KOZLOVSKIY, and S. L. USTYANTSEV *In its* USSR Rept.: Life Sci., Biomed. and Behavioral Sci. (JPRS-UBB-84-011) p 28 4 Jun. 1984 Transl. into ENGLISH from Fiz. Cheloveka (Moscow), v. 10, no. 1, Jan. - Feb. 1984 p 66-71  
Avail: NTIS HC A06/MF A01

Ergometric, physiological and sanitary-statistical studies were conducted on individuals in various occupations to determine correlates between an individual's physiological status, his work performance and general health. As a result of the examination of some 4186 workers, on the basis of physiological and health criteria, they could be divided into three categories in terms of morbidity and physical performance: 20-29 year old, 30-39 year old and 40-49 year olds. The physiological status and performance of workers, as well as their general health. Such studies provide invaluable data pertinent to applied physiology in determining optimum physical demands that is placed on workers and the duration for which such work is done without having an adverse effect on health. The heavier the physical work the more serious the consequences for performance and health, and the negative factors are cumulative with age and duration of employment. Author

**N84-28370#** Joint Publications Research Service, Arlington, Va. **PROBLEMS AND PERSPECTIVES OF ALPINE WORK PHYSIOLOGY Abstract Only**

A. A. AYDARALIYEV *In its* USSR Rept.: Life Sci., Biomed. and Behavioral Sci. (JPRS-UBB-84-011) p 66 4 Jun. 1984 Transl. into ENGLISH from Fiz. Cheloveka (Moscow), v. 10, no. 1, Jan. - Feb. 1984 p 11-15

Avail: NTIS HC A06/MF A01

A brief survey is presented of certain practical problems pertaining to human adaptation to high altitudes and work performance under such conditions, in light of the fact that approximately 12 to 15% of personnel assigned to such regions do not show an adequate level of adaptation. These facts indicate that special medical expertise has to be developed for the selection of suitable works, and to provide for physiological evaluation and appropriate training to facilitate adaptation. Other problems that have to be resolved deal with the management of various medical conditions under alpine situations and, in particular, the clinical manifestations and diagnosis and treatment of deadadaptation that may arise for various reasons. Under the conditions prevalent in the Tian Shan and the Pamirs factors other than low oxygen tension are also of key importance, such as excessive ultraviolet and infrared irradiation, the electrical properties of the air and the soil, and extreme differences in daytime and nighttime temperatures. Author

**N84-28371#** Joint Publications Research Service, Arlington, Va. **EFFECTS OF LONG-TERM EXPOSURE TO LOW POSITIVE TEMPERATURES ON COLD-INDUCED VASODILATION Abstract Only**

M. Y. GEDYMIN, M. N. YEVLAMPYIEVA, I. S. KANDROR, and A. G. LEKSIN *In its* USSR Rept.: Life Sci., Biomed. and Behavioral Sci. (JPRS-UBB-84-011) p 67 4 Jun. 1984 Transl. into ENGLISH from Fiz. Cheloveka (Moscow), v. 10, no. 1, Jan. - Feb. 1984 p 52-58

Avail: NTIS HC A06/MF A01

Studies were conducted on the effects of long term exposure to temperatures of 5 to 10 C on cold-induced vasodilation in 20 male tunnel construction workers in Eastern Siberia and South Ossetia. The 25 to 40 year old subjects had a work history of 3 years under the conditions specified. Evaluation of the various physiological parameters demonstrated that the pain perceived at the time of immersion of a hand into cold water was not due to vasoconstriction as generally assumed, but to vasodilation and increased blood filling of the affected extremity, which occurs concomitantly with recovery from initial numbness. Long term occupational exposure to low temperatures was seen to delay the

onset of vasodilation after immersion of the hand in cold water, and was ascribed to enhanced functional tonus of the sympathetic system which interferes with peripheral vasodilation. These observations were taken to indicate that long term employment in a job, involving exposure to low temperatures, exerts negative effects of adaptive mechanisms of the entire organism with predominance of sympathetic influences. Corrective measures must include steps to enhance physiological responsiveness and tolerance of cold, such as appropriate hot/cold showers and other means. Author

**N84-28372#** Joint Publications Research Service, Arlington, Va. **CIRCULATORY DYNAMICS IN EXPEDITIONARY TOUR OF DUTY Abstract Only**

S. G. KRIVOSHCHEKOV and Y. A. TATAUROV *In its* USSR Rept.: Life Sci., Biomed. and Behavioral Sci. (JPRS-UBB-84-011) p 67-68 4 Jun. 1984 Transl. into ENGLISH from Fiz. Cheloveka (Moscow), v. 10, no. 1, Jan. - Feb. 1984 p 86-93  
Avail: NTIS HC A06/MF A01

Circulatory dynamics were evaluated in 19 Ukrainian oil and gas field workers, 24 to 26 years of age, transported for two week tours of duty to the Northern Tyumen Oblast from Ivano-Frankovsk. The flight of 4500 km was 10 h in duration, crossed three time zones and three climatic zones. The two week tour of duty in Tyumen (at the Severnyy Var'yegan oilfield) was alternated with a two week rest period in Ukraine. Evaluation of the physiological status of the workers in the summertime showed that their aerobic (physical) work capacity in Tyumen was diminished, falling to 20 to 25% below the norm at the end of the tour of duty. At midpoint in the tour of duty, adaptive mechanisms are directed at preserving the physical reserve capacities and largely involve cholinergic regulatory mechanisms, manifested by a gradual and continuous decrease in the heart rate, BP, minute volume and stroke volume. The return flight to Ukraine does not involve any additional fatigue or other manifestations of jet lag, but is followed by gradual improvements in the various hemodynamic parameters and an increase in work capacity. During the stay in Tyumen circadian differences in the various hemodynamic indicators tend to become less pronounced. Author

**N84-28373#** Joint Publications Research Service, Arlington, Va. **OCCUPATIONAL EFFICIENCY IN RELATION TO PSYCHOPHYSIOLOGICAL CHARACTERISTICS Abstract Only**

V. G. YUROVSKIKH *In its* USSR Rept.: Life Sci., Biomed. and Behavioral Sci. (JPRS-UBB-84-011) p 68 4 Jun. 1984 Transl. into ENGLISH from Fiz. Cheloveka (Moscow), v. 10, no. 1, Jan. - Feb. 1984 p 94-103  
Avail: NTIS HC A06/MF A01

An evaluation was made of psychophysiological characteristics which predispose to successful performance at work in the case of punch press operators, lathe hands, and machinists, based on the analysis of 584 cases of work-related trauma. Analysis of the causative factors revealed that 26 to 35% of the accidents were due to technical failure, 13 to 18% due to improper management, and 49 to 59% were the fault of the workers themselves. Further examination showed that 47% of the cases were due to improper or inadequate motor performance of the workers, 10% to inattention or perception errors, and 32 to 36% were due to delays in decision making and operational follow-through as a result of shortcomings in mentation, memory or attention. Statistical analysis of the various psychophysiological tests demonstrated that inadequate CNS function leading to sensorimotor dysfunction is the key factor leading to work-related trauma. Other factors that are less contributory but still exceedingly important include inappropriate organization of work procedures and poor management practices. Author

**N84-28374#** Joint Publications Research Service, Arlington, Va. **INDIVIDUAL RESPONSES TO COMBINED HEAT AND PHYSICAL LOAD Abstract Only**

A. T. MARYANOVICH, V. S. BALANDIN, A. K. BEKUZAROV, and G. M. LAPIKOV *In its* USSR Rept.: Life Sci., Biomed. and Behavioral Sci. (JPRS-UBB-84-011) p 69 4 Jun. 1984 Transl. into ENGLISH from Fiz. Cheloveka (Moscow), v. 10, no. 1, Jan. - Feb. 1984 p 104-111 Original language document was announced as A84-25115

Avail: NTIS HC A06/MF A01

Eight healthy males 29-34 years of age were exposed to an environment with an air temperature of 49 C, a relative humidity of 20 percent, and an air velocity of 0.5 m/s; the exposure consisted of two-hour periods for five consecutive days and was accompanied by repeated bicycle exercise. In conditions of this combined thermal and physical load, an inverse relationship was found between the degree of disturbance of the thermal balance of the body and the strain level of the homeostatizing systems, manifested in a sensation of discomfort. In these conditions the character of the response of the individual (a smaller disturbance of the thermal balance of the body under high strain or vice versa) is determined by individual features, not associated with the level of physical work capacity or perspiration level. Author

**N84-28375#** Joint Publications Research Service, Arlington, Va. **EFFECTS OF ADAPTATION TO HOT CLIMATE ON THERMORECEPTION Abstract Only**

T. V. KOZYREVA and M. A. YAKIMENKO *In its* USSR Rept.: Life Sci., Biomed. and Behavioral Sci. (JPRS-UBB-84-011) p 69-70 4 Jun. 1984 Transl. into ENGLISH from Fiz. Cheloveka (Moscow), v. 10, no. 1, Jan. - Feb. 1984 p 117-119 Original language document was announced as A84-25117

Avail: NTIS HC A06/MF A01

Tests were performed on persons living at least three years in a hot climate (Ashkhabad) and in various Siberian cities (the control group) but spending most of their time in heated buildings. The tests, performed on 106 persons 20-35 years of age 65 living in Siberia, the rest in Ashkhabad, involved the evaluation on multiple temperature-sensitive spots on both arms, hot on one arm and cold on the other. It is found that heat adaptation leads to changes in the functioning of the temperature analyzer. The number of skin receptors sensitive to high temperatures is significantly reduced in persons living in a hot climate. During heat adaptation, the character of the skin-temperature dependence of the number of functioning cold receptors does not change. Author

**N84-28376#** Joint Publications Research Service, Arlington, Va. **EFFECTS OF NATURAL LIGHT CONDITIONS ON BIORHYTHMS IN POLAR DWELLERS Abstract Only**

M. P. MOSHKIN *In its* USSR Rept.: Life Sci., Biomed. and Behavioral Sci. (JPRS-UBB-84-011) p 70 4 Jun. 1984 Transl. into ENGLISH from Fiz. Cheloveka (Moscow), v. 10, no. 1, Jan. - Feb. 1984 p 126-129 Original language document was announced as A84-25119

Avail: NTIS HC A06/MF A01

The paper presents a comparative analysis of the circadian rhythms of a number of physiological indicators recorded in workers at the Antarctic station of Molodexhnaia in 1974 in winter during the polar night and in autumn under various levels of solar radiation. It is shown that changes in the circadian rhythms of body temperature, myocardial contractility, diastolic pressure, and urinary steroid excretion on cloudy days with reduced illumination have the same trend as in the polar-night period. The synchronizing effect of light on physiological rhythms relies on the participation of such neuroendocrine structures as the retina, the suprachiasmatic nucleus of the hypothalamus, the upper cervical sympathetic ganglia, and the epiphysis. B.J. (IAA)

**N84-28377#** Joint Publications Research Service, Arlington, Va.  
**VARIATIONS IN EEG IN RELATION TO BRAIN FUNCTIONAL STATUS Abstract Only**

Y. A. ZHIRMUNSKAYA and N. A. ANOKHINA *In its* USSR Rept.: Life Sci., Biomed. and Behavioral Sci. (JPRS-UBB-84-011) p 71 4 Jun. 1984 Transl. into ENGLISH from Fiz. Cheloveka (Moscow), v. 10, no. 1, Jan. - Feb. 1984 p 130-138 Original language document was announced as A84-25120  
 Avail: NTIS HC A06/MF A01

A classification of background EEG patterns, consisting of 20 distinct groups within the five basic EEG types, is developed for describing diffuse EEG changes. The classification makes possible a sufficiently rigorous evaluation of the degree and possible mechanisms of disturbances of brain electrical activity. Changes in integral EEG patterns can be caused not only by the affection of the cerebral cortex at the microstructural level but also by disturbances of cortex activity from nonspecific systems of the limbic-reticular complex. The classification may therefore be used to evaluate the functional condition of the brain not only in sick persons without gross disturbances of the nervous system but also in healthy persons in extreme environments. B.J. (IAA)

**N84-28378#** Joint Publications Research Service, Arlington, Va.  
**BIOFEEDBACK REGULATION OF PULMONARY VENTILATION Abstract Only**

I. S. BRESLAV, A. M. SHMELEVA, A. T. NORMATOV, and V. P. FROLOVA *In its* USSR Rept.: Life Sci., Biomed. and Behavioral Sci. (JPRS-UBB-84-011) p 71-72 4 Jun. 1984 Transl. into ENGLISH from Fiz. Cheloveka (Moscow), v. 10, no. 1, Jan. - Feb. 1984 p 139-143  
 Avail: NTIS HC A06/MF A01

Studies are conducted on the effectiveness of biofeedback regulation of pulmonary ventilation in three 40 to 43 year old male subjects, two tachypnoics and one bradypnoic. In the former two cases, control of pulmonary ventilation at the desired level is achieved essentially by an increase in the depth of respiration and by an increase in the rate of breathing. The control of pulmonary ventilation is postulated to involve direct cortical stimulation of the respiratory musculature via the corticospinal pathways, bypassing the bulbo-pontine mechanism of respiratory regulation. M.A.C.

**N84-28379#** Joint Publications Research Service, Arlington, Va.  
**SPATIOTEMPORAL STRUCTURE OF QUANTA OF INDUSTRIAL WORK AND ITS PHYSIOLOGICAL BASIS Abstract Only**

G. V. RYZHIKOV and S. Y. KLASSINA *In its* USSR Rept.: Life Sci., Biomed. and Behavioral Sci. (JPRS-UBB-84-011) p 72 4 Jun. 1984 Transl. into ENGLISH from Fiz. Cheloveka (Moscow), v. 10, no. 1, Jan. - Feb. 1984 p 144-152  
 Avail: NTIS HC A06/MF A01

Physiological studies conducted on eleven female controllers of optoelectronic systems to determine the spatiotemporal structure of a quantum of work performed by these 20 to 24 year old subjects. The parameters under analysis consist of the EKG, hand EMG, and respiratory rate, and mathematical description of their interrelationships. The work pattern can be described by a succession of discrete quanta, each quantum representing a control phase under specific autonomic control. The spatial configuration of a quantum is determined by the quantity and order in which the phases follow one another, while the temporal component is predicated on the relationships between the durations of the various phases. M.A.C.

**N84-28380#** Joint Publications Research Service, Arlington, Va.  
**EFFECTS OF SHORT-TERM HEAT ADAPTATION ON CERTAIN INDICATORS OF PHYSICAL CAPACITY FOR WORK Abstract Only**

K. N. KACHANOVSKIY *In its* USSR Rept.: Life Sci., Biomed. and Behavioral Sci. (JPRS-UBB-84-011) p 73 4 Jun. 1984 Transl. into ENGLISH from Fiz. Cheloveka (Moscow), v. 10, no. 1, Jan. - Feb. 1984 p 163-165  
 Avail: NTIS HC A06/MF A01

The effects of short term heat adaptation on the capacity to perform physical work evaluated in the case of eight 28 to 30 year old males exposed to temperatures of 48 C for 2 h per day for 5 days, in combination with periods of activity on an exercise cycle. Before and after each heat exposure, measurements are made of the time required to attain a speed of 60 rpm on an exercise cycle with a 450 W load, and of several physiological parameters. After the 5-day period, muscular strength increased by 19.3% over initial value, while tolerance of static exertion equal to 2/3 of maximum muscle strength decreased, on the average, from 16.43 to 7.96%, resulting in a concomitant decrease in the absolute work capacity coefficient from 2.0 to 1.4. M.A.C.

**N84-28381#** Joint Publications Research Service, Arlington, Va.  
**CRITERIA OF HUMAN COLD ADAPTATION Abstract Only**

M. A. YAKIMENKO, T. G. SIMONOVA, T. V. KOZYREVA, and P. V. LAZARENKO *In its* USSR Rept.: Life Sci., Biomed. and Behavioral Sci. (JPRS-UBB-84-011) p 73-74 4 Jun. 1984 Transl. into ENGLISH from Gig. Sanit. (Moscow), no. 1, Jan. 1984 p 7-9  
 Avail: NTIS HC A06/MMF A01

Comparative evaluations are made of certain physiological parameters of two groups of men to define those parameters indicative of adaptation to cold. One group of these 20 to 30 year old subjects is engaged in office work without any outdoor jobs. Acclimatization to cold in the second category of subjects is indicated by statistically fewer cutaneous cold spots, greater efficiency in the utilization of oxygen, lower mean skin temperature, and more efficient shivering thermogenesis. Cold adaptation is marked by metabolic changes that result in less heat loss during respiration because of a decreased respiratory minute volume and less convective heat loss from the skin. The estimated cost of energy to maintain thermal balance in the body is decreased by 20% in the group with outdoor occupations. M.A.C.

**N84-28384#** Joint Publications Research Service, Arlington, Va.  
**RESPONSE OF CARDIAC RHYTHM TO INFORMATION LOAD Abstract Only**

A. I. STANKUS and Y. N. SOKOLOV *In its* USSR Rept.: Life Sci., Biomed. and Behavioral Sci. (JPRS-UBB-84-011) p 76-77 4 Jun. 1984 Transl. into ENGLISH from Psikhologicheskii Zh. (Moscow), v. 5, no. 1, Jan. - Feb. 1984 p 55-61  
 Avail: NTIS HC A06/MF A01

Cardiovascular response occurs, not only to physical load stress, but also to mental and emotional stress and processing of information. Information processing involves the vegetative system which is basically involved in regulation of cardiac rhythm frequency (CR). The study of CR changes during an information load of increasing intensity is presented, under conditions of various types of vegetative regulation of CR. Measurement procedures employed include polygraph recordings of heart rhythmograms, EKG, respiration, plethysmograms (hand and head), SRG, muscle tone (hand), EEGs, voice, answers to questions and commands. The load is the ask of identifying presented sound frequencies and correlation of newly presented sound information, aided by computer processing. The initial level of the CR governs the extent of acceleration due to an informational load. Predominantly parasympathetic regulation of CR contributes to decreased response to the load and restoration of CR frequency. M.A.C.

**N84-28385#** Joint Publications Research Service, Arlington, Va.  
**INFLUENCE OF LEVEL OF ADAPTATION TO LIGHT UPON ESTIMATION OF BRIGHTNESS Abstract Only**

K. N. NADIROVA and A. N. SOKOLOV *In its* USSR Rept.: Life Sci., Biomed. and Behavioral Sci. (JPRS-UBB-84-011) p 77 4 Jun. 1984 Transl. into ENGLISH from Psikhologicheskii Zh. (Moscow), v. 5, no. 1, Jan. - Feb. 1984 p 71-73  
 Avail: NTIS HC A06/MF A01

The effect of prior adaptation to exposure of subjects to light of three intensities (dark, average and bright) upon the ranking of the brightness of light is investigated. The experimental device consisted of a slide projector and a photometer. Setup of the device, levels of exposure, time of exposure, and ranking of brightness of stimulus (seen monocularly as a spot on a screen) are described. Distribution of subjects' ranking of stimulus brightness, for the three levels of adaptation, are portrayed in graph form. The highest curve of distribution of ranking scores is for the prior dark adaptation; a lower position is recorded for the average, and lowest curve for the bright adaptation. Plotting of the points of the curves yielded a characteristic Z-shape, not a parallel curve. The influence of the limited scale of rankings, top and bottom gradings, on distributions of rankings is discussed.

M.A.C.

**N84-28386#** Joint Publications Research Service, Arlington, Va.  
**ROLE OF FEEDBACK IN REGULATION OF IDEOMOTOR MOVEMENTS Abstract Only**

T. G. GORYACHEVA and S. A. KAPUSTIN *In its* USSR Rept.: Life Sci., Biomed. and Behavioral Sci. (JPRS-UBB-84-011) p 77-78 4 Jun. 1984 Transl. into ENGLISH from Psikhologicheskii Zh. (Moscow), v. 5, no. 1, Jan. - Feb. 1984 p 74-78  
 Avail: NTIS HC A06/MF A01

The study of regulation of ideomotoric movements in development or motor skills is investigated. Research on the nature of ideomotoric movements is discussed, particularly the physiological mechanisms of the ideomotoric act. The tests involve classic use of ideomotoric control of the swing of a pendulum attached to the subject's index finger. Conditions of this experiment are described. Control of oscillatory movement essentially depended on perception of the action. It is suggested that control of pendulum movement is realized based on Bernshteyn's reflex ring principle.

M.A.C.

**N84-28387#** Joint Publications Research Service, Arlington, Va.  
**PERCEPTION OF BINAURAL TEMPORAL SHIFTS Abstract Only**

A. A. TEREPIG *In its* USSR Rept.: Life Sci., Biomed. and Behavioral Sci. (JPRS-UBB-84-011) p 78 4 Jun. 1984 Transl. into ENGLISH from Psikhologicheskii Zh. (Moscow), v. 5, no. 1, Jan. - Feb. 1984 p 79-84  
 Avail: NTIS HC A06/MF A01

In movement of a sound source in a horizontal plane, the sound signals can have amplitudinal and temporal differences; study of the effect of these parameters upon lateralization of sound images usually employs headphones. Lateralization of sound images related to binaural shifts is examined. An automatic device is developed which could study three test subjects simultaneously. Details of this device are described. In 25% of people, the mechanism for evaluating binaural phase shifts operates poorly or not at all. All test subjects perceived the binaural temporal shifts, provided there was a binaural shift of fronts along with the phase shift. The binaural shift of fronts is considered a more important parameter than the binaural phase shift. Lateralization experiments on sound images requires clear distinction of phase shifts from the binaural temporal shift, and the shift mechanisms are not the same.

M.A.C.

**N84-28388\*** National Aeronautics and Space Administration.  
 Langley Research Center, Hampton, Va.

**MEDICAL CLIP Patent**

R. M. BAUCOM, inventor (to NASA) 22 Nov. 1983 6 p Filed 15 May 1981 Supersedes N81-29768 (19 - 20, p 2817)  
 (NASA-CASE-LAR-12650-1; US-PATENT-4,416,266;  
 US-PATENT-APPL-SN-264381; US-PATENT-CLASS-128-325;  
 US-PATENT-CLASS-128-346; US-PATENT-CLASS-24-560)  
 Avail: US Patent and Trademark Office CSCL 06B

An X-ray transparent and biological inert medical clip for treating aneurisms and the like is described. A graphite reinforced composite film is molded into a unitary structure having a pair of hourglass-like cavities hinged together with a pair of jaws for grasping the aneurism extending from the wall of one cavity. A silicone rubber pellet is disposed in the other cavity to exert a spring force through the hinge area to normally bias the jaws into contact with each other.

Official Gazette of the U.S. Patent and Trademark Office

**N84-28389\*** National Aeronautics and Space Administration.  
 Langley Research Center, Hampton, Va.

**PROCESS OF MAKING MEDICAL CLIP Patent**

R. M. BAUCOM, inventor (to NASA) 15 May 1984 6 p Filed 10 Feb. 1983 Supersedes N84-15764 (22 - 06, p 887) Division of abandoned US-Patent-SN-264381, filed 15 May 1981  
 (NASA-CASE-LAR-12650-2; US-PATENT-4,447,943;  
 US-PATENT-APPL-SN-465363; US-PATENT-CLASS-29-423;  
 US-PATENT-CLASS-29-451; US-PATENT-CLASS-156-191;  
 US-PATENT-CLASS-156-285; US-PATENT-CLASS-156-289;  
 US-PATENT-CLASS-156-382; US-PATENT-APPL-SN-264381)  
 Avail: US Patent and Trademark Office CSCL 06B

An X-ray transparent and biologically inert medical clip for treating aneurisms and the like is disclosed, as well as a process for its production. A graphite reinforced composite film is molded into a unitary structure having a pair of hourglass-like cavities which are hinged together with a pair of jaws for grasping the aneurism extending from the wall of one cavity. A silicone rubber pellet is disposed in the other cavity to exert a spring force through the hinge area to normally bias the jaws into contact with each other.

Official Gazette of the U.S. Patent and Trademark Office

**N84-28390\*#** National Academy of Sciences - National Research Council, Washington, D. C.

**GUIDELINES FOR HEALTH SURVEILLANCE IN THE NASA (NATIONAL AERONAUTICS AND SPACE ADMINISTRATION) WORKPLACE Final Report**

Feb. 1984 42 p refs  
 (Contract NASW-3749; N00014-80-C-0161)  
 (NASA-CR-173677; NAS 1.26:173677; PB84-175660) Avail:  
 NTIS HC A03/MF A01 CSCL 06J

The adequacy of biomedical data sheets used by the NASA medical staff for NASA employees and contractors was assessed. Procedures for developing medical histories, conducting medical examinations, and collecting toxicity data were reviewed. Recommendations for employee health maintenance and early detection of work-related abnormalities are given. R.S.F.

**N84-28391\*#** National Aeronautics and Space Administration.  
 Lyndon B. Johnson Space Center, Houston, Tex.

**HIGH RESOLUTION BONE MINERAL DENSITOMETRY WITH A GAMMA CAMERA**

A. LEBLANC, H. EVANS, S. JHINGRAN, and P. JOHNSON 20 May 1983 6 p refs  
 (NASA-TM-85386; NAS 1.15:85386) Avail: NTIS HC A02/MF A01 CSCL 06B

A technique by which the regional distribution of bone mineral can be determined in bone samples from small animals is described. The technique employs an Anger camera interfaced to a medical computer. High resolution imaging is possible by producing magnified images of the bone samples. Regional densitometry of femurs from oophorectomised and bone mineral loss.

Author

**N84-28392#** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

**VERIFICATION OF AN ALTITUDE DECOMPRESSION SICKNESS PREVENTION PROTOCOL FOR SHUTTLE OPERATIONS UTILIZING A 10.S PSI PRESSURE STAGE**

J. M. WALIGORA, D. J. HERRIGAN, JR., J. CONKIN, and A. T. HADLEY, III Jun. 1984 48 p refs  
(NASA-TM-58259; S-534; NAS 1.15:58259) Avail: NTIS HC A03/MF A01 CSCL 06E

Three test series involving 173-man tests were conducted to define and verify a pre-extravehicular activity (EVA) denitrogenation procedure that would provide acceptable protection against altitude decompression sickness while minimizing the required duration of oxygen (O<sub>2</sub>) prebreathe in the suit prior to EVA. The tests also addressed the safety, in terms of incidence of decompression sickness, of conducting EVA's on consecutive days rather than on alternate days. The tests were conducted in an altitude chamber, subjects were selected as representative of the astronaut population, and EVA periods were simulated by reducing the chamber pressure to suit pressure while the subjects breathed O<sub>2</sub> with masks and worked at EVA representative work rates. A higher than anticipated incidence of both venous bubbles (55%) and symptoms (26%) was measured following all denitrogenation protocols in this test. For the most part, symptoms were very minor and stabilized, diminished, or disappeared in the six-hour tests. Instances of clear, possible, or potential systemic symptoms were encountered only after use of the unmodified 10.2 psi protocol and not after the modified 10.2 psi protocol, the 3.5-hour O<sub>2</sub> prebreathed protocol, or the 4.0-hour O<sub>2</sub> prebreathe protocol. The high incidence of symptoms is ascribed to the type and duration of exercise and the sensitivity of the reporting technique to minor symptoms. Repeated EVA exposures after only 17 hours did not increase symptom or bubble incidence. Author

**N84-28393#** Texas Univ. Health Science Center, San Antonio. Dept. of Pharmacology.

**THE ROLE OF NEURAL REFLEXES IN CONTROL OF THE CARDIOVASCULAR SYSTEM DURING STRESS Final Progress Report**

V. S. BISHOP Feb. 1984 18006 p  
(Contract AF-AFOSR-3657-78; AF PROJ. 2312)  
(AD-A140938; AFOSR-84-0398TR) Avail: NTIS HC A02/MF A01 CSCL 06E

The inhibitory influence of vagal afferents on the cardiovascular systems was determined in studies with anesthetized cats and conscious dogs. Results indicate that vagal afferents exert a tonic influence on vasopressin release in conscious dogs. It was also found that these afferents may play a keen role in the regulation of renin secretory rate during conditions which may alter cardiopulmonary blood volume. A number of studies illustrated the importance of cardiac vagal receptors in the regulation of vascular resistance and the inotropic state of the heart. Data also indicated that cardiac vagal receptors may serve as part of a negative feedback system to regulate sympathetic outflow to the heart. Author (GRA)

**N84-28394#** New York Univ., New York.

**NEUROMAGNETIC INVESTIGATION OF WORKLOAD AND ATTENTION Annual Technical Report, 1 Jan. - 31 Dec. 1983**

L. KAUFMAN 31 Jan. 1984 18017 p  
(Contract F49620-82-K-0014; AF PROJ. 2313)  
(AD-A140946; AFOSR-84-0397TR) Avail: NTIS HC A02/MF A01 CSCL 05J

The purpose of this project is to measure the brain's magnetic field, and use these data to isolate sources of fields within the brain that are differentially affected by workload and attention. A subsidiary goal is to determine if multiple or single sources underlie components of the event related potential, and to locate these sources. During the current report period progress was made in instrumentation, data handling, and in experiments involving brain activity which was differentially affected by the state of attention of the subject. Modifications to our primary sensing system permitted an improvement in the signal-to-noise ratio by a factor

of four. Experiments with this system had a major impact on the design of a multi-sensor array, which will be used on this project this year. A scanner for mapping the field about the head was designed and constructed. Software for handling multi-channel information was created. A means for communicating with a CYBER and a VAX computer for handling large amounts of data was implemented. Author (GRA)

**N84-28395#** MacAulay-Brown, Inc., Fairborn, Ohio.

**HUMAN RESPONSE TO PYRIDOSTIGMINE BROMIDE Final Report**

J. I. WILLIAMS Mar. 1984 57 p  
(Contract F33615-80-C-0514; AF PROJ. 2729)  
(AD-A140960; AFAMRL-TR-84-004) Avail: NTIS HC A04/MF A01 CSCL 06O

The amount of pyridostigmine which can be tolerated without severe side effects appears to be related to the degree of impairment of neuromuscular transmission. Myasthenic patients may routinely ingest as much as several grams of pyridostigmine per day. Surgical patients whose normal nerve transmission is blocked by muscle relaxants can tolerate intravenous doses equivalent to oral doses of 300-600 mg. The studies in military personnel indicate that doses of 30 mg at eight hour intervals are tolerated by persons with normal neuromuscular transmission. Based on the results of the military studies and the general lack of side effects other than overdose symptoms cited in the medical literature after thirty years of extensive use, it can be concluded that administration of pyridostigmine to normal subjects is probably safe at low doses, i.e. 30 mg at 8 hour intervals. Although normal subjects may tolerate somewhat higher doses without excessive side effects and without diminished task performance, there are no published reports of such studies. GRA

**N84-28396#** Naval Health Research Center, San Diego, Calif.

**AEROBIC/CALISTHENIC AND AEROBIC/CIRCUIT WEIGHT TRAINING PROGRAMS FOR NAVY MEN: A COMPARATIVE STUDY Interim Report**

E. J. MARCINIK, J. A. HODGDON, K. MITTLEMAN, and J. J. O'BRIEN Jan. 1984 14 p  
(Contract M00-96-PN)  
(AD-A140971; NAVHLTHRSCHC-84-6) Avail: NTIS HC A02/MF A01 CSCL 05I

Analyses of generic shipboard work tasks indicate that the majority of assigned duties involve heavy lifting, carrying, pushing, and pulling efforts. Findings of this investigation show that aerobic/circuit weight training elicited significantly higher scores than aerobic/calisthenic training for the majority of upper and lower torso muscular strength measures. These data suggest that a 15-minute circuit weight training regimen be considered to augment current Navy aerobic oriented physical conditioning programs for enhanced physical readiness. Author (GRA)

**N84-28397#** Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

**TRANSIENT EVOKED POTENTIAL IN A CRITICAL EVENT DETECTION TASK M.S. Thesis**

S. A. HUDDLESON Feb. 1984 295 p  
(AD-A141335; AD-E950524; AFIT/GSO/EE/84M-1) Avail: NTIS HC A13/MF A01 CSCL 05J

An experiment was designed to investigate late positive components of the transient evoked potential elicited by detection of a perceptually complex critical event. Areas of investigation included spatial distribution, motor response effects, stimulus duration effects, possible contingent negative variation effects, components of the event which immediately preceded the critical event, and value as a workload metric. Subjects watched a series of visual stimuli presented on a video screen. Each stimulus was a pattern of seven binary digits in a single row. Periodically, the number of consecutive '1's in the pattern built up to four. Four consecutive ones indicated a critical event. Subjects were instructed to depress a button when they detected a critical event. Electrodes recorded EEG at the parietal, central, and frontal midline scalp locations with opposing mastoids used for reference and ground.

Reaction times and response accuracy were also recorded.

GRA

**N84-28398#** Oulu Univ. (Finland). Dept. of Physics.  
**ABSOLUTE PHOTOPEAK EFFICIENCY VALUES FOR AN  
INTRINSIC WELL-TYPE GE DETECTOR IN THE GAMMA RAY  
REGION 0.1 TO 3.0 MEV**

R. RIEPPO 1984 10 p refs  
(REPT-2(1984); ISBN-951-42-1737-3; ISSN-0780-9727) Avail:  
NTIS HC A02/MF A01

The absolute photopeak efficiency values for a 90.5 cu cm intrinsic well-type Ge-detector of active volume were calculated. The maximum value in the two figures for a gaseous source is 0.8. For water and compact bone the efficiency values are slightly lower throughout the whole gamma ray energy region. Results are valid for blood and muscle, too, due to their total absorption coefficients nearly equal to that of water as a function of gamma ray energy.  
Author (ESA)

**N84-28399#** Oesterreichisches Forschungszentrum Seibersdorf  
G.m.b.H., Vienna. Inst. fuer Biologie.

**POLY (ADP-RIBOSE) IN NUCLEOIDS**

G. BRKIC (Institute of Nuclear Science and Boris Kidric Laboratory for Radiobiology), A. TOPALOGLOU, and H. ALTMANN Feb. 1984 16 p refs Sponsored by International Atomic Energy Agency

(OEFZS-4267; BL-450/84) Avail: NTIS HC A02/MF A01

In nucleoids, prepared from CHO cells, synthesized poly (ADP-ribose) (PAR) were determined. The acceptor protein was detected by a electrophoretic method, as a single protein band with a molecular weight of 10,000 Dalton. The radioactivity from NAD<sup>+</sup> bound to this protein is 15% of the whole PAR synthesized in the cells.  
Author (ESA)

**N84-28400#** Oesterreichisches Forschungszentrum Seibersdorf  
G.m.b.H., Vienna. Inst. fuer Strahlenschutz.

**RADIATION PROTECTION PROBLEMS CAUSED BY  
NONIONIZING ELECTROMAGNETIC RADIATION IN AUSTRIA**

K. E. DUFTSCHMID Mar. 1984 20 p refs Presented at 11th IRPA Regional Congr., Vienna, Sep. 1983

(OEFZS-4268; ST-112/84) Avail: NTIS HC A02/MF A01

An interdisciplinary study group was established to investigate radiation protection problems caused by nonionizing electromagnetic radiation. The project is designed to identify major fields of concern, to establish appropriate techniques of measurement and control, and to develop a basis for legislation.  
Author (ESA)

**N84-28401#** Oesterreichisches Forschungszentrum Seibersdorf  
G.m.b.H., Vienna. Inst. fuer Strahlenschutz.

**THE AUSTRIAN PRIMARY STANDARD FOR IONIZING  
RADIATION DOSIMETRY RESULTS OF INTERNATIONAL  
INTERCOMPARISONS**

K. E. DUFTSCHMID and A. LEITNER (Bundesamt fuer Eich- und Vermessungswesen) Mar. 1984 20 p refs Presented at IMEKO Tech. Comm. on Meteorol. Intern. Symp., Budapest, 1983 (OEFZS-4269; ST-113/84) Avail: NTIS HC A02/MF A01

The Austrian Dosimetry Laboratory setup for radiation dosimetry is described. For photon radiation in the energy range up to 500 keV, 3 free-air-parallel-plate-chambers covering the range of 7 to 30 kV, 20 to 100 kV and 50 to 500 kV are used. For gamma radiation, mainly of Cesium 137 and Cobalt 60, graphite cavity absolute chambers with measured volume are applied. For high energy photon and electron radiation, e.g., in radiotherapy, a portable graphite calorimeter is used as primary standard for absorbed dose measurement. Measurement accuracy is determined by international intercomparisons.  
Author (ESA)

**N84-28402#** Research Inst. of National Defence, Stockholm (Sweden). Dept. 5.

**REPORT ON A VISIT TO ENGLAND, 7-10 NOVEMBER 1983**

L. E. LARSSON and B. C. R. STROEMBLAD Mar. 1984 139 p refs Partly in SWEDISH and ENGLISH (FOA-C-59009-H1; ISSN-0347-7665) Avail: NTIS HC A07/MF A01

The organization, the financial terms, and the future prospects of defence medicine research in the U.K. were studied. It is found that the cooperation between the Army, Air Force; and Navy institutes works very well. Naval medicine; applied research on environmental and underwater medicine; problems arising after rescue from submerging; high sustained accelerations; motion sickness; breathing apparatus; recruitment; selection; training were examined.  
Author (ESA)

**N84-28444#** Naval Aerospace Medical Research Lab., Pensacola, Fla.

**THE ASSESSMENT OF NONIONIZING RADIATION HAZARDS**

J. DELORGE /in AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 295-299 Apr. 1984

(AD-P003294) Avail: NTIS HC A99/MF A01 CSCL 05J

Naval personnel frequently occupy environments susceptible to microwave energy from weapons systems and communication devices. Several scientific reports have indicated that behavior can be modified by relatively low levels of microwave energy, but the detrimental or beneficial nature of these behavioral effects are not immediately apparent. A series of experiments employing a behavior whose affective nature could be assessed and which was analogous to human behavior was conducted with several species of animals. Rats, squirrel monkeys, and rhesus monkeys trained on operant tasks were exposed to microwave radiation and produced data suggestive of a possible extrapolation to man in similar situations. The results show that behavioral changes are related to increases in colonic temperature. In monkeys the average increase in colonic temperature associated with changes in response rate was 1 C. Response rate did not change in the absence of concomitant temperature increases.  
Author (GRA)

## 53

### BEHAVIORAL SCIENCES

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

**A84-36523**

**FLIGHT TESTS FOR THE ASSESSMENT OF TASK  
PERFORMANCE AND CONTROL ACTIVITY**

H.-J. PAUSDER and D. HUMMES (Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Institut fuer Flugmechanik, Brunswick, West Germany) American Helicopter Society, Journal (ISSN 0002-8711), vol. 29, April 1984, p. 34-41. refs

The tests were performed with the helicopters BO 105 and UH-1D. Closely connected with tactical demands the six test pilots' task was to minimize the time and the altitude over the obstacles. The data reduction yields statistical evaluation parameters describing the control activity of the pilots and the achieved task performance. The results are shown in form of evaluation diagrams. Additionally dolphin tests with varied control strategy were performed to get more insight into the influence of control techniques. From these test results recommendations can be derived to emphasize the direct force control and to reduce the collective to pitch crosscoupling for the dolphin. Previously announced in STAR as N82-23213  
T.M.

A84-36595

**MEDICAL AND PSYCHOLOGICAL QUESTIONS OF THE PROFESSIONAL RELIABILITY OF FLIGHT CREWS [MEDIKO-PSIKHOLOGICHESKIE VOPROSY PROFESSIONAL'NOI NADEZHSTI LETNOGO SOSTAVA]**V. A. BODROV *Voenna-Meditsinskii Zhurnal* (ISSN 0026-9050), April 1984, p. 45-47. In Russian. refs

The understanding of what is meant by 'personal factors' and by 'human factors' in the study of sources of flight crew error is discussed. A definition of the term 'human factor' is developed in which pilot error is viewed not only as a result of individual features, i.e. from the position of 'personal factor', but with consideration of general human ability in the system 'pilot-aircraft-environment-organization of activity'. The role of military aviation doctors in determining regimentation, rest and recreation, and diet is also considered. J.N.

A84-36625

**SMOOTH EYE-MOVEMENT CONTROL WITH SECONDARY VISUAL FEEDBACK**Y. Y. ZEEVI (Technion - Israel Institute of Technology, Haifa, Israel; MIT, Cambridge, MA) and E. PELI (Retina Foundation, Eye Research Institute; Tufts University, Boston, MA) *Optical Society of America, Journal, A: Optics and Image Science* (ISSN 0740-3232), vol. 1, June 1984, p. 628-634. Research supported by the U.S.-Israel Binational Science Foundation. refs (Contract F33625-82-K-0011)

A signal derived from continuous measurement of eye position is displayed on a visual frame of reference, thereby closing a secondary visual feedback (2VFB) loop. The distance between a target and the displayed gaze point provides the subject with an extra, artificial position error. Experiments show that subjects can use the 2VFB to generate smooth eye movements, even in the absence of any smoothly moving independent targets. Under these conditions, both direction and velocity can be brought under voluntary control by the subjects. As a control signal for the smooth-eye-movement mode, the 2VFB is robust and easily manipulated and provides an attractive means for the investigation of the smooth-movement control system in a variety of tasks and under different conditions. Author

A84-36749

**DESYNCHRONIZATION OF THE ORAL TEMPERATURE CIRCADIAN RHYTHM AND INTOLERANCE TO SHIFT WORK**A. REINBERG (CNRS; Fondation A. de Rothschild, Paris, France), P. ANDLAUER (Gillette France, Annecy, Haute-Savoie, France), J. DE PRINS, W. MALBECQ (Bruxelles, UniversiteLibre, Brussels, Belgium), N. VIEUX, and P. BOURDELEAU (Shell Francaise, Le Petite Couronne, Seine-Maritime, France) *Nature* (ISSN 0028-0836), vol. 308, March 15, 1984, p. 272-274. Research supported by the CNAMTS-France. refs (Contract DA-ERO-82-134)

The present study tested the hypothesis that subjects with a good tolerance to shift work maintain the circadian period tau of their temperature rhythm equal to 24 h, while tau may differ from 24 h when subjects exhibit one or several clinical signs of intolerance. These latter are mainly: persisting sleep disturbance, persisting fatigue, changes in mood and behavior, and digestive troubles, from gastritis to overt peptic ulcer. These symptoms were used here to classify the subjects studied. Medications, including all types of sleeping pills, are ineffective. As was the case in the present study, some subjects may tolerate shift work for 35 yr, reaching 57 yr of age without complaint, while others, after several months or many years, quite rapidly (within 6 months) develop symptoms of intolerance. Author

A84-36939

**THE ADAPTABILITY RATING FOR MILITARY AERONAUTICS - AN HISTORICAL PERSPECTIVE OF A CONTINUING PROBLEM**J. G. MILLS and D. R. JONES (USAF, School of Aerospace Medicine, Brooks AFB, TX) *Aviation, Space, and Environmental Medicine* (ISSN 0095-0562), vol. 55, June 1984, p. 558-562. refs

Healthy candidates for military flying training may vary considerably in their ability and in their motivation to fly. A variety of tests are used to predict flying ability, but motivation may be assessed only through such subjective measures as a semistructured interview. This paper reviews the historical background of such interviews in the U.S. Army and the U.S. Air Force, and suggests some possible improvements. Author

A84-37261

**PERFORMANCE AND SENSORY ASPECTS OF WORK IN COLD ENVIRONMENTS A REVIEW**A. ENANDER (National Board of Occupational Safety and Health, Dept. of Occupational Medicine, Solna, Sweden) *Ergonomics* (ISSN 0014-0139), vol. 27, April 1984, p. 365-378. refs

Research results on manual function and other performance measures together with subjective effects relevant to work in cold environments are reviewed. Although results from different studies vary, there is general agreement that negative effects on tactile sensitivity and manual function can occur under relatively moderate cooling conditions. Exposure to cold in the workplace is characterized by slow cooling, long exposure times, and brief pauses permitting only superficial warming, and these factors are shown to produce performance decrement. Nonspecific effects of cold are also discussed, including the psychological adaptation among individuals habituated to cold environments. I.H.

A84-37262

**EFFECT OF SLEEP DEPRIVATION ON SELF-SELECTED WORKLOAD**S. J. LEGG and D. R. HASLAM (Army Personnel Research Establishment, Farnborough, Hants., England) *Ergonomics* (ISSN 0014-0139), vol. 27, April 1984, p. 389-396. refs

Psychophysical methods are used to establish maximum acceptable workloads (MALs) for industrial repetitive lifting tasks, under conditions of sleep deprivation. Two groups of soldiers (a sleep-deprived group and a control group) were required continuously to reassess their decisions concerning MALs over a three-week period of partial sleep-deprivation alternating with full sleep-deprivation. At the end of the study, no statistically significant difference in MAL was found between the two groups, and the pattern of load adjustment adopted by the subjects was the same. It is concluded that the assessment of MAL using psychophysical methods is unaffected by sleep deprivation. I.H.

A84-37263

**THE DIVISION OF ATTENTION BETWEEN A PRIMARY TRACKING TASK AND SECONDARY TASKS OF POINTING WITH A STYLUS OR SPEAKING IN A SIMULATED SHIP'S-GUNFIRE-CONTROL TASKS**J. MARTIN (University College, London; Sperry Gyroscope, Ltd., Bracknell, Berks., England), J. LONG, and D. BROOME (University College, London, England) *Ergonomics* (ISSN 0014-0139), vol. 27, April 1984, p. 397-408. refs

The effects of two alternative secondary-task configurations upon a primary tracking task were assessed experimentally. The primary task was a simulation of a ship's-gunfire-control task. The simulation featured a compensatory tracking task, incorporating the effects of ships' motion into the display. The secondary task involved either pointing (designating a location on the screen with a stylus) or speaking the co-ordinates of the location. All tasks were tested under single- and dual-task conditions. Speed and error scores were recorded for the secondary tasks; tracking error score for the primary task. The results showed: (1) simultaneous pointing with a stylus adversely and significantly affected tracking, (2) simultaneous speaking degraded tracking only slightly and non-significantly, (3) simultaneous tracking did not adversely affect

either pointing or speaking and (4) pointing took about half the time of speaking. The results are discussed with respect to their possible application to the ship's-gunfire-control task. Speaking as secondary task is recommended on this evidence over pointing. A number of related issues are raised and discussed. The results are also interpreted within the wider context of recent research on divided attention. Author

**A84-37798****THE EFFECTS OF FAMILIAR SIZE ON JUDGMENTS OF SIZE AND DISTANCE - AN INTERACTION OF VIEWING ATTITUDE WITH SPATIAL CUES**

A. HIGASHIYAMA (Osaka Prefecture, University, Sakai, Japan) Perception and Psychophysics (ISSN 0031-5117), vol. 35, no. 4, April 1984, p. 305-312. refs

The cue-conflict and viewing-attitude hypotheses about the effects of familiar size on judgments of size and distance are examined in two experiments. In the first experiment, observers estimated the size and distance of familiar targets with apparent or assumptive instructions under three different spatial cue conditions. In the second experiment, observers performed tasks similar to those in the first experiment with no specific instructions. The experiments found that: (1) assumptive instructions facilitate the effects of familiar size in both size and distance judgments, but reducing spatial cues does not, and (2) viewing attitude changes from the apparent to the assumptive when available spatial cues are reduced. It is concluded that the viewing-attitude hypothesis gives a better account of the effects of familiar size, but that the cue-conflict hypothesis cannot be abandoned because the number of conflicting cues contributes to the formation of the viewing attitude. I.H.

**A84-37799\*** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**MOVING ATTENTION - EVIDENCE FOR TIME-INVARIANT SHIFTS OF VISUAL SELECTIVE ATTENTION**

R. REMINGTON and L. PIERCE (NASA, Ames Research Center, Moffett Field, CA) Perception and Psychophysics (ISSN 0031-5117), vol. 35, no. 4, April 1984, p. 393-399. refs

Two experiments measured the time to shift spatial selective attention across the visual field to targets 2 or 10 deg from central fixation. A central arrow cued the most likely target location. The direction of attention was inferred from reaction times to expected, unexpected, and neutral locations. The development of a spatial attentional set with time was examined by presenting target probes at varying times after the cue. There were no effects of distance on the time course of the attentional set. Reaction times for far locations were slower than for near, but the effects of attention were evident by 150 msec in both cases. Spatial attention does not shift with a characteristic, fixed velocity. Rather, velocity is proportional to distance, resulting in a movement time that is invariant over the distances tested. Author

**A84-37805****NEUROTIC DISORDERS IN PERSONS ENGAGED IN INTENSE INTELLECTUAL WORK [NEVROTICHESKIE RASSTROISTVA U LITS ZANIATYKH NAPRIAZHENNYM UMSTVENNYM TRUDOM]**

A. A. SOMUNDZHIAN (Ministerstvo Zdravookhkaneniia SSSR, Tbilisskii Institut Uovershenstvovaniia Vrachei, Tbilisi, Georgian SSR) Zhurnal Nevropatologii i Psikiatrii im. S. S. Korsakova (ISSN 0044-4588), vol. 83, no. 12, 1983, p. 1850-1853. In Russian.

The paper presents results of a clinical examination of 73 neurotic patients whose occupations involve intense intellectual work. The etiology, pathogenesis, and clinical course of the neurotic disorders are investigated, and attention is given to manifestations of vegetative dysfunction. B.J.

**A84-37811****THE USE OF PHYSIOLOGICAL INDICATORS FOR OCCUPATIONAL SELECTION [ISPOL'ZOVANIE FIZIOLOGICHESKIKH POKAZATELEI PRI PROFESSIONAL'NOM OTBORE]**

IU. G. SHIROKOV, S. A. ZININA, L. M. NABOKINA, and V. A. MOROZOVA (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Gigiena i Sanitariia (ISSN 0016-9900), Nov. 1983, p. 90, 91. In Russian.

The present study illustrates the effectiveness of occupational selection on the basis of psychophysiological indicators for factory workers. A method is proposed for obtaining a generalized physiological picture of an occupation, making it possible to predict work performance. A formula is presented for predicting the performance of workers engaged in the production of automobile tires. B.J.

**A84-37812****THE 'LAWS OF GESTALT' AND THE PHASE NATURE OF PERCEPTION ['ZAKONY GESHTAL'TA' I FAZNOST' VOSPRIIATIIA]**

A. A. MITKIN (Akademiia Nauk SSSR, Institut Psikhologii, Moscow, USSR) Psikhologicheskii Zhurnal, vol. 4, Nov.-Dec. 1983, p. 30-38. In Russian. refs

The history, experimental data, and theoretical principles of gestalt psychology are considered. A critical analysis of the concept of the 'laws of gestalt' is performed. The features of gestalt theory are compared with those of the phase theory and of the systems approach to the problem of perception. B.J.

**A84-37813****THE MAGNITUDE OF SENSATIONS, OBJECTIVE RESPONSES OF THE ORGANISM TO STIMULI OF INCREASING INTENSITY, AND THE STRENGTH OF THE NERVOUS SYSTEM [VELICHINA OSHCHUSHCHENII, OB'EKTIVNYE REAKTSII ORGANIZMA NA STIMULY VOZRASTAIUSHCHEI INTENSIVNOSTI I SILA NERVNOI SISTEMY]**

N. I. CHUPRIKOVA and T. A. RATANOVA (Akademiia Pedagogicheskikh Nauk SSSR, Moscow, USSR) Psikhologicheskii Zhurnal, vol. 4, Nov.-Dec. 1983, p. 39-47. In Russian. refs

The paper reviews the literature on the problem of individual differences of psychophysical scales (i.e., variability in the scaling of the strength of sensations) as studied using methods of subjective psychophysics. Data acquired in a number of psychophysical experiments with similar stimuli are examined. B.J.

**A84-37814****INTERRELATIONSHIP BETWEEN SPEECH AND ACTION IN CONDITIONS OF OPERATOR ACTIVITY [VZAIMOSVIAZ' RECHI DEISTVIA V USLOVIAKH OPERATORSKOI DEIATEL'NOSTI]**

N. V. KRYLOVA and A. K. BOKOVIKOV (Akademiia Nauk SSSR, Institut Psikhologii, Moscow, USSR) Psikhologicheskii Zhurnal, vol. 4, Nov.-Dec. 1983, p. 48-53. In Russian. refs

Results of a study on the temporal and logical relationship between speech and action in conditions of operator activity are presented. The operator activity investigated included actions associated with search, the reception and processing of information, the recognition of objects and situations, and the making of decisions and the completion of separate motor actions. Speech was also included in the form of an on-going commentary by the operator relating (1) the form of an object and characteristics of its motion, (2) the form and motion of a marker, (3) operation regimes, (4) situation analysis, and (5) analysis and self-evaluation of operator activity and performance. Both simultaneous and successive performance of the commentary and actions were demonstrated while successfully controlling the object's motion. J.N.

A84-37816

**THE ACTIVITY OF THE INDIVIDUAL AND THE COLLECTIVE AS A DEVELOPING SYSTEM [AKTIVNOST' LICHNOSTI I KOLLEKTIV KAK RAZVIVAIUSHCHAIASIA SISTEMA]**A. K. DUSAVITSKII (Khar'kovskii Gosudarstvennyi Universitet, Kharkov, Ukrainian SSR) *Psikhologicheskii Zhurnal*, vol. 4, Nov.-Dec. 1983, p. 75-83. In Russian. refs

A84-37817

**PSYCHIC STATES OF HUMANS IN SPECIAL CONDITIONS OF ACTIVITY [PSIKHICHESKIE SOSTOIANIIA CHELOVEKA V OSOBYKH USLOVIIAKH DEIATEL'NOSTI]**N. D. ZAVALOVA and V. A. PONOMARENKO *Psikhologicheskii Zhurnal*, vol. 4, Nov.-Dec. 1983, p. 92-105. In Russian. refs

The relationship between the psychic states of operators and the unreliability of actions (mistaken actions) is examined with reference to the performance of aircraft pilots in hazardous conditions. A new class of phenomena, i.e., the unawareness of situations, is identified, and it is shown how altered psychic states lead to the disintegration of the subjective reflection of reality. The nature of psychic reflection is considered along with the violation of such reflection at different levels and in different psychic states. An experimental validation is given of predictive features which describe the alteration of psychic states. B.J.

A84-37818

**THE EFFECT OF INDIVIDUAL FEATURES OF MEMORY ON THE PRODUCTIVITY OF THE SOLUTION TO OPERATIONAL PROBLEMS [VLIIANIE INDIVIDUAL'NYKH OSOBNOSTEI PAMIATI NA PRODUKTIVNOST' RESHENIIA OPERATIVNYKH ZADACH]**L. D. GORBUNOVA *Psikhologicheskii Zhurnal*, vol. 4, Nov.-Dec. 1983, p. 106-108. In Russian. refs

A84-37819

**DEVICE FOR OPERATIVE MEASUREMENT OF DOMINANCE AND LEADERSHIP [PRIBOR DLIA OPERATIVNOGO IZMERENIIA DOMINANTNOSTI I LIDERSTVA]**T. A. MATALINA (Leningradskii Elektrotekhnicheskii Institut, Leningrad, USSR) and E. IA. SEMENIUK *Psikhologicheskii Zhurnal*, vol. 4, Nov.-Dec. 1983, p. 122-127. In Russian. refs

A device for determining the presence of dominance and leadership in the behavior of interacting partners is described. In tests which lasted 30 s each the average value of productivity of joint activity, the time-averaged relative inputs of the partners, and an index of discord were calculated for each pair of test subjects. The proposed homeostat-based model may be used as a tool to diagnose and control the effect of psychotherapy on patients with functional neuroses stemming from unfulfilled aspirations to leadership, as well as for evaluating the compatibility of crew members. J.N.

A84-38499#

**PSYCHOLOGICAL STATES (MOOD, AFFECT OR EMOTION) EXPERIENCED BY JASDF PILOTS THROUGH FLYING DUTIES. II - FLYING CONDITIONS AND PILOTS' FEELINGS**M. OKAUE and H. ARUGA (Japan Air Self-Defense Force, Aeromedical Laboratory, Tachikawa, Tokyo, Japan) *Japan Air Self Defence Force, Aeromedical Laboratory, Reports* (ISSN 0023-2858), vol. 24, Dec. 1983, p. 189-202. In Japanese, with abstract in English.

A84-38513

**THE FUNCTIONAL STRUCTURE OF PLACEBO RESPONSES [FUNKSIONAL'NAIA STRUKTURA PLATSEBO-REAKTSII]**V. I. MEDVEDEV, E. K. ZAVIALOVA, B. V. OVCHINNIKOV, and S. T. POSOKHOVA (Voenno-Meditsinskaia Akademiia, Leningrad, USSR) *Fiziologiya Cheloveka* (ISSN 0131-1646), vol. 10, May-June 1984, p. 458-464. In Russian. refs

Test results are presented concerning the characteristics of the placebo effect in young males (19 to 24 years old) in conditions of rest and in young males (18 to 20 years old) performing work activity in conditions of emotional and physical stress. It is noted

that the placebo effect is a psychoregulating effect that really changes the functional state and activity in humans. The placebo effect is a dynamic state arising due to self-regulation mechanisms and structurally uniting diverse shifts of psychic, psychophysiological, and physiological processes in accordance with the goals and conditions of activity and personality features. The development of the placebo effect depends significantly on the conditions of activity, and the regulating effect of the placebo is determined by emotional features. B.J.

A84-39704

**PILOT JUDGEMENT TRAINING VALIDATION EXPERIMENT**G. DE BAGHEERA-BUCH (Transport Canada, Ottawa, Canada) *International Journal of Aviation Safety* (ISSN 0264-6803), vol. 2, June 1984, p. 29-34.

The results of an experiment which evaluated the effectiveness of pilot judgement training manuals developed for the FAA are reported. Two groups of student pilots were involved in the study. One group received a pre-test and post test as well as an observational flight, and a second group received instruction from the pilot judgement training manuals. The results indicate that there were significant differences in the quality of evaluative judgements made by newly licensed pilots who studied the training manual when compared with those made by pilots who had not used the manual. A majority of the subjects felt that the similar material should be included as a requirement for a private pilot's license, and that they would be more conscious of their own judgements in the future. I.H.

A84-39712

**AN ANALYSIS OF CREW CO-ORDINATION PROBLEMS IN COMMERCIAL TRANSPORT AIRCRAFT**J. L. WHEALE (RAF, Institute of Aviation Medicine, Farnborough, Hants., England) *International Journal of Aviation Safety* (ISSN 0264-6803), vol. 2, June 1984, p. 83-89. refs

This report describes a survey of co-ordination problems and attitudes amongst a sample of 250 commercial airline pilots. The results indicate that co-ordination problems are most likely when workload is high. Deviation from standard operating procedures was also identified by the pilots as a major source of co-ordination problems. Disputes on the flight deck were more likely if one crew member had an interaction style that was difficult to cope with, or was deviating from normal role behavior, or held attitudes about the operation of the aircraft that differed significantly from other crew members. The data indicate that social psychological factors can have a strong influence on co-ordination behavior and the variables which influence teamwork are discussed. Author

**N84-27398# Joint Publications Research Service, Arlington, Va. PHYSIOLOGICAL ASSESSMENT OF CAPACITY FOR PROCESSING INCREASING AMOUNTS OF VISUAL INFORMATION BY HUMAN OPERATORS Abstract Only**V. V. GORBUNOV, N. V. MAKARENKO, and V. V. DOSYCHEV *In its USSR Rept.: Life Sci. Biomed. and Behavioral Sci.* (JPRS-UBB-84-013) p 37 22 Jun. 1984 Transl. into ENGLISH from *Zh. Vyssh. Nervnoy Deyatel'nosti* (Moscow), v. 33, no. 6, Nov. - Dec. 1983 p 1028-1033 Avail: NTIS HC A07/MF A01

Determinations are made of the psychophysiological correlates involved in the processing of increasing quantities of visual information within a limited period of time. Standard techniques are employed in assessing 147 subjects, 19-25 years old, subjected to an increasing volume of visual input (30-160 signals/min) while engaged in a ternary selection test. On the basis of the probability of error-free performance, the subjects fell into 3 groups in relation to the volume of signal input processed and 0.95 probability of error-free performance: Group I—up to 80 signals/min. Group II—up to 90 signals/min, and Group III—up to 110 signals/min. A further increase in visual signal presentation led to a decrease in information processing. Correlation with a variety of physiological characteristics (heart rate, respiratory rate, EEG parameters, etc.) indicated that the rate of information processing is directly related to individual physiological reserves, and suggested that further

improvements could be anticipated by appropriate job training.

M.A.C.

**N84-27423#** Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Hamburg (West Germany). Abt. Flugpsychologie.

**THE RELATIONSHIP BETWEEN PERSONALITY AND EFFICIENCY [UEBER DEN ZUSAMMENHANG ZWISCHEN PERSOENLICHKEIT UND LEISTUNG]**

K. STEININGER *In its Proc. of Sci. Meeting on the Occasion of the Inauguration of New Buildings for The DFVLR Inst. of Aerospace Med.* p 57-66 Oct. 1983 refs In GERMAN

Avail: NTIS HC A07/MF A01; DFVLR, Cologne DM 43

The relationship between human personality and efficiency application to machine systems under changing environmental conditions was investigated. It is found that there is a relationship between personality factors and their combinations and their relationship to certain efficiency tasks which indicates a multiple dynamic effectiveness between personality and efficiency. The human personality and contribution to success on operating the complex man-machine systems depends also on work protection and accident investigation, safety management, the work conditions and training.

Transl. by E.A.K.

**N84-27424#** Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Abt. Weltraummedizin.

**CARDIOVASCULAR REACTIONS ON ORTHOSTASIS AND WEIGHTLESSNESS [HERZ-KREISLAUFREAKTIONEN BEI ORTHOSTASE UND SCHWERELOSIGKEIT]**

F. BAISCH *In its Proc. of Sci. Meeting on the Occasion of the Inauguration of New Buildings for The DFVLR Inst. of Aerospace Med.* p 67-85 Oct. 1983 refs In GERMAN

Avail: NTIS HC A07/MF A01; DFVLR, Cologne DM 43

The cardiovascular system and its reaction to weightlessness was studied. It was found that under circulatory the hematological parameters changes under weightless conditions. The astronaut is orthostatic tolerant of other return from space. Systolic blood pressure reactions in a space environment are studied. Readjustment to Earth gravity can take up to 6 months.

Transl. by E.A.K.

**N84-27436#** Stanford Univ., Calif. Dept. of Psychology.

**RISK: THE LONG AND THE SHORT**

A. TVERSKY and M. BAR-HILLEL (Hebrew Univ.) Jun. 1983 26 p

(Contract N00014-79-C-0077)

(AD-A140580) Avail: NTIS HC A03/MF A01 CSCL 05J

This paper was stimulated by a recent article of Lola Lopes (1982) Decision Making in the Short Run, that challenges the normative adequacy of expected utility theory. This note addresses some of the issues raised by Lopes and rebuts her main arguments. The authors propose a new normative treatment and a psychological analysis of an interesting gambling problem introduced by Paul Samuelson (1963) in his article Risk and Uncertainty: A Fallacy of Large Numbers. GRA

**N84-27437#** Army Research Inst. of Environmental Medicine, Natick, Mass.

**A BRIEF HISTORY OF THE USE OF SIMULATION TECHNIQUES IN TRAINING AND PERFORMANCE ASSESSMENT**

E. S. STEIN and J. L. KOBRICK 27 Apr. 1984 19 p

(AD-A140763; USARIEM-M-22/84) Avail: NTIS HC A02/MF A01 CSCL 15G

Simulation might be generally viewed as a form of controlled fantasy with a finite and functional purpose. Fantasy and imagination are universal features of human life, and have several constructive aspects, including the release of tension. The potential uses of simulation in research and Army training are many and diverse. The main advantages of using simulation techniques are lower cost, greater control and higher safety conditions. An effective simulation must place human participants in a realistic situation or operational environment where they can perform their actual duties.

This behavior will be a function both of what they bring with them (skills, knowledge, abilities, motivation), and the contingencies established by the situation. By balancing the fidelity required to get the job done against the operating cost to achieve it, researchers and trainers can create settings which motivate participants and allow them to perform their tasks as they would in the real world. GRA

**N84-27438#** Hershey (Milton S.) Medical Center, Hershey, Pa. Dept. of Behavioral Science.

**A PLAYER'S MANUAL FOR A COMPLEX DISASTER DECISION SIMULATION**

R. M. POGASH, S. C. STREUFERT, A. L. DENSON, and S. STREUFERT Jan. 1984 126 p

(Contract N00014-80-C-0581)

(AD-A140776; TR-17-ONR) Avail: NTIS HC A07/MF A01 CSCL 09B

This technical report contains the participant's manuals for a complex micro-computer assisted experimental decision making simulation which may be used to assess decision making characteristics (fifteen or more computer scored measures of performance quantity and quality such as use of strategy and decision coordination) of individuals or teams. The scenario is geared to a disaster event but may be modified to fit any complex decision environment. The system was to provide an experimentally controlled and highly complex (real world like) decision making task that would permit (1) the application of various independent variables, (2) variable manipulation across time segments for within data analyses, (3) the simultaneous application of a variety of stressor variables, where useful, (4) the measurement of physiological (noninvasive) responsiveness to task stress in complex tasks, (5) the measurement of the a host of performance variables, with particular emphasis on structural (information to decision processing) characteristics, and (6) the measurement of social and organizational stressor impacts such as task satisfaction and task enjoyment. GRA

**N84-27439#** National Defense Univ., Washington, D. C.

**COHESION IN THE US MILITARY**

J. H. JOHNS, M. D. BICKEL, A. C. BLADES, J. B. CREEL, and W. S. GATLING 1984 120 p

(AD-A140828) Avail: NTIS HC A06/MF A01 CSCL 05J

In the aftermath of the Vietnam war, a number of military analysts have commented on the apparent deterioration of unit morale and cohesion during the latter stages of that conflict. While other analysts have disputed that conclusion, there is a rather widespread view among military professionals that cohesion was a problem. This study was designed to do several things that are necessary if the cohesion issue is to receive the systematic study it needs. First, to develop a conceptual framework that would identify the principal components of military cohesion. Second, analyze the major systemic, macro variables we believed to be causatively related to the intervening factors of leader behavior and organizational culture. Third, focus a great deal of the effort on the Officers Corps, which is believed to be the key organizational element with respect to cohesion. The conclusion and recommendations in this study are targeted for decisionmakers in the Pentagon, OMB, and Congress. GRA

**N84-27440#** Perceptronics, Inc., Woodland Hills, Calif.

**INTEGRATING RESEARCH ON PERCEIVED AND ACCEPTABLE RISK WITHIN THE PSYCHOMETRIC PARADIGM Final Report**

Oct. 1983 27 p

(Contract N00014-80-C-0780)

(AD-A140833; PFTR-1098-83-10) Avail: NTIS HC A03/MF A01 CSCL 05J

Research on perceived and acceptable risk has two main objectives. One is to develop an understanding of the fundamental laws governing individuals' perceptions and their behaviors in situations of risk. The second is to help individuals and society make better decisions about risks. A major approach to the study of perceived and acceptable risk has employed psychophysical scaling methods and multivariate analysis to produce quantitative

representations of people's attitudes and perceptions. The specific goals of this project were to: develop an integrated perspective on current research within the psychometric paradigm; identify the consistent substantive conclusions emerging from current and past research; enhance the effectiveness of current research programs; set the stage for better communication and increased collaboration among researchers in the future; and identify future research needs and establish priorities for future research. The focal point of the project was a workshop held in Eugene, Oregon on December 11-13, 1980, which brought researchers in this field together for intensive discussions of key methodological and substantive issues in risk perception research. GRA

**N84-27441** Claremont Graduate School, Calif.  
**MOTIVATION AND WORK PERFORMANCE: A COMPARATIVE AND ANALYTICAL STUDY Ph.D. Thesis**

P. GHANOUNI 1984 259 p  
 Avail: Univ. Microfilms Order No. DA8407453

The topic of motivation and work performance in organizations has received increased attention in recent years among practicing managers and organizational researchers. Several major theories of motivation and related organizational factors were analyzed in a comparative fashion, and then integrated with research and practical applications. The implications of managerial practice in dealing with motivation in organizational settings were considered. In the course of four major discussions, motivation was defined and its importance to organizations was stressed. Motivation theories were reviewed, and the managerial applications suggested by these theories were discussed. The relationship of motivation to the broader concerns of organizational behavior was emphasized. Knowledge concerning the role of motivation in an organizational setting was reviewed, analyzed and compared.

Dissert. Abstr.

**N84-28367#** Joint Publications Research Service, Arlington, Va.  
**ELECTROSLEEP IN PROPHYLAXIS OF PSYCHONEURAL STRESS AND RECOVERY OF MENTAL PERFORMANCE IN OPERATORS Abstract Only**

A. M. GONSHARENKO, I. S. KANDROR, I. I. POPOVA, S. R. ROYTENBURD, and V. M. SHAKHNAROVICH *In its* USSR Rept.: Life Sci., Biomed. and Behavioral Sci. (JPRS-UBB-84-011) p 28-29 4 Jun. 1984 Transl. into ENGLISH from Fiz. Cheloveka (Moscow), v. 10, no. 1, Jan. - Feb. 1984 p 47-51  
 Avail: NTIS HC A06/MF A01

In view of the therapeutic effectiveness of electrosleep in the management of various neurological problems, a study was made of the potential usefulness of this modality in the prophylaxis of the adverse effects of stressful and emotion-laden shift work of train dispatchers and machinists, and in the restoration of mental efficiency. The 25 to 35 year old subjects were subjected to 15 to 16 electrosleep procedures, each lasting for 1 h and consisting of 120 Hz current below the threshold for perception. The subjects were administered a variety of standard psychological tests before and after electrosleep for evaluation of mental efficiency, along with rheoencephalographic studies and BP determinations. The results showed that, in both groups, electrosleep improved cerebrovascular circulation and decreased systolic and diastolic blood pressure. The psychological test battery demonstrated that electrosleep improved mental performance in all the subjects tested. The effects of electrosleep were ascribed to improve sleep patterns and psychoemotional stabilization, which in turn was responsible for raising the stress threshold of the subjects.

Author

**N84-28368#** Joint Publications Research Service, Arlington, Va.  
**EEG INFORMATIONAL CONTENT IN PREDICTION OF WORK PERFORMANCE Abstract Only**

N. D. BAGROVA, R. N. KOROBV, and Y. M. GROMOV *In its* USSR Rept.: Life Sci., Biomed. and Behavioral Sci. (JPRS-UBB-84-011) p 29 4 Jun. 1984 Transl. into ENGLISH from Fiz. Chelovka (Moscow) v. 10, no. 1, Jan. - Feb. 1984 p 41-46

Avail: NTIS HC A06/MF A01

An evaluation was made of the utility of various EEG parameters as indicators for the selection of operators in terms of physiological reserves. The study involved 19 subjects, 19 to 24 years old, tested on an exercise cycle and exposed to physical loads of 100 to 250 W, and required to perform mental tasks before, during and after the physical load. Analysis of the EEG data showed that spectral power density within the range of frequencies of 1 to 32 Hz may provide useful information. The employment of psychophysiological tests led to a statistically significant decrease in the density of the alpha rhythm and increased the density of rhythms in the 14 to 30 Hz band; there was a linear relationship between the difficulty of the mental tasks and changes in the EEG tracings. Tests calling for making operational corrections and for making a selection from among eight signals were found to be most informative. The consensus was that an increase or a decrease in the spectral power density of the slow waves (2 to 8 Hz), and of those around 15 Hz and greater, in response to mental tasks after a physical exertion, are most reflective of the performance efficiency of operators. Author

**N84-28369#** Joint Publications Research Service, Arlington, Va.  
**FUNCTIONAL STATUS OF OPERATORS AND ITS SYSTEMIC AND TECHNICAL DETERMINANTS Abstract Only**

V. S. AVERYANOV, O. V. VINOGRADOVA, K. G. KAPUSTIN, V. A. LEONOVA, N. S. MALAKHOV, A. S. ILVES, V. I. CHERNYSHEV, and R. M. YAROVAYA *In its* USSR Rept.: Life Sci., Biomed. and Behavioral Sci. (JPRS-UBB-84-011) p 30 4 Jun. 1984 Transl. into ENGLISH from Fiz. Cheloveka (Moscow), v. 10, no. 1, Jan. - Feb. 1984 p 23-30

Avail: NTIS HC A06/MF A01

An analysis was performed of the activities of operators at petrochemical plants, employing various physiological parameters and psychological tests, in order to derive data for setting psychophysiological standards for the type of work performed. The high stress work of the operators, which requires constant decision making and is compounded by the danger of an explosion or a fire, was shown to alter their physiological balance significantly. In general, such individuals present enhanced functional tone of the parasympathetic branch of the autonomic nervous system. The net effect is a reduction in the stability of a number of psychophysiological parameters and in an increased amplitude of their fluctuations. In conjunction with this observation, occupationally related psychophysiological parameters vary little due to well-entrenched habits and psychological attitudes. Subjective evaluation of the time required to accomplish a given operation showed that the subjects felt this parameter to increase in proportion to job stress, although objective measurements demonstrated that no such increase took place. Author

**N84-28382#** Joint Publications Research Service, Arlington, Va.  
**PSYCHOLOGY AND STUDY OF HUMAN FACTOR IN MANAGEMENT Abstract Only**

A. V. FILIPPOV *In its* USSR Rept.: Life Sci., Biomed. and Behavioral Sci. (JPRS-UBB-84-011) p 75 4 Jun. 1984 Transl. into ENGLISH from Psikhologicheskii Zh. (Moscow), v. 5, no. 1, Jan. - Feb. 1984 p 35-44

Avail: NTIS HC A06/MF A01

The substantive features considered by the various branches of psychology of the 'human factor' in management are discussed. The psychology of management as a branch of psychology is discussed as an applied discipline. Peripheral problems attacked by the various branches of psychology include the personality in organization, the collective (the personnel group) in organization,

and the generation and resolution of management problems. Stress is placed on interdisciplinary research. M.A.C.

**N84-28383#** Joint Publications Research Service, Arlington, Va. **STRUCTURE OF FORMAL-DYNAMIC PROPERTIES OF HUMAN PSYCHE IN SIGNAL SYSTEMS INTERACTION Abstract Only** B. V. KURANOV and V. M. RUSALOV *In its* USSR Rept.: Life Sci., Biomed. and Behavioral Sci. (JPRS-UBB-84-011) p 76 4 Jun. 1984 Transl. into ENGLISH from Psikhologicheskii Zh. (Moscow), v. 5, no. 1, Jan. - Feb. 1984 p 45-54 Avail: NTIS HC A06/MF A01

An analysis of the characteristics of different kinds of activity, not only verbal or non-verbal, but also various conflict relationships in them is examined. An extended review of two signal systems is presented, wherein the second signal system is characteristic of man, with word stimuli as signals of signals. The study employs the Stroop interference test method to examine mental characteristics related to the two systems. Mental characteristics are not united because of relation to the systems but because of three independent factors-verbal-lexical, visual-effective and imaginary. Classification of special human types should be constructed not on the basis of one of the systems but on the basis of the actual composition of signal formal dynamic characteristics of human mental activity. M.A.C.

**N84-28403#** Air Force Academy, Colo. **PROCEEDINGS OF THE 9TH SYMPOSIUM ON PSYCHOLOGY IN THE DEPARTMENT OF DEFENSE** G. E. LEE and T. E. ULRICH Apr. 1984 18748 p Symp. held in Colorado Springs, 18-20 Apr. 1984 (AD-A141043; USAFA-TR-84-2) Avail: NTIS HC A99/MF A01 CSCL 05J

Research in psychology with emphasis on military issues is presented. Topics include command and control; personnel management; psychological effects; physiological effects; terrorism; counseling; leadership; radiation effects on combat performance; effects of medications; operator performance; and mental health and morale.

**N84-28404#** Mitre Corp., Bedford, Mass. **ENVIRONMENTS FOR EVALUATING PERFORMANCE OF C3I (COMMAND, CONTROL, COMMUNICATIONS, AND INTELLIGENCE) SYSTEMS** E. J. KIRK *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 4-8 Apr. 1984 (AD-P003237) Avail: NTIS HC A99/MF A01 CSCL 05J

Some environments and methods which have been used to evaluate C3I (Command, Control, Communications and Intelligence) systems are outlined. A series of specific controlled tests that were conducted during recent (1982-83) developmental tests of Joint Service message standards are also described. This type of test may be seen as a cost-effective method to evaluate certain system capabilities in addition to or in place of large-scale field tests. GRA

**N84-28405#** Department of Defense, Washington, D. C. **A SOCIOTECHNICAL COMMUNICATIONS MODEL FOR COMMAND AND CONTROL** D. K. LEEDOM *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 9-13 Apr. 1984 (AD-P003238) Avail: NTIS HC A99/MF A01 CSCL 05J

Using military command and control systems as the setting, this paper examines the problem of effectively communicating perceptions and mental concepts from one organizational element to another. A model is proposed which identifies and links the important aspects of this process: problem formulation, language development and usage, and transmission media. Using this model, the paper outlines tradeoffs among these various factors and suggests ways in which command and control processes might be improved through both technical and non-technical means.

Author (GRA)

**N84-28406#** Armed Forces Medical Intelligence Center, Fort Detrick, Md.

**MILITARY DECEPTION: A CLINICAL PSYCHOLOGICAL ANALYSIS**

R. W. BLOOM *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 15-19 Apr. 1984 (AD-P003239) Avail: NTIS HC A99/MF A01 CSCL 05J

This paper describes four clinical psychological contributions to the study and practice of military deception. First, inferential techniques yield five generic factors of deception: intention, behavior, perception, teleology, and systems. Second, reliability studies and causal modeling techniques applied to these factors are slowly leading to the development of a prescriptive, deception data base. Third, characteristics of those who deceive well versus those susceptible to deception are being identified through modified task analyses. Fourth, inferences are being made as to the reliability, validity, and deception potential of foreign research in behavioral sciences. The above have relevance for the selection, training, and performance of military deception planners and analysts. Author (GRA)

**N84-28407#** United States International Univ., San Diego, Calif. **THOUGHT CONTROL FROM PARENTING, TO BEHAVIOR MOD, TO CULTS, TO BRAINWASHING**

E. J. HUNTER and R. E. HESTAND *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 20-24 Apr. 1984 (AD-P003240) Avail: NTIS HC A99/MF A01 CSCL 05J

In this paper we have pointed out how coercive psychological techniques are prevalent in our society, not only in malignant situations such as POW and hostage experiences and terroristic kidnappings, but also in relatively benign situations such as religious retreats and childrearing practices. Analogous methods are also applied in advertising, in our educational systems, in therapeutic situations and behavioral modification efforts. It is important to reexamine these techniques emphasizing the ethics and human rights involved, particularly in those areas where we have some control. Certainly, within both civilian and military life, individuals differ in their susceptibility to thought control. Perhaps if all of us were not continually conditioned from birth onward to bend to others' value systems in almost every institution we enter, coercive persuasion might be easier to resist. Research has shown us that individuals are far less susceptible to coercive persuasion where there is group support from comrades, where there exists a well-ingrained sense of values, and where the individual has a strong commitment to a cause, be it self, God, or country. Thus, we are back to a recognition of the critical importance of early childhood training and skillful, effective parenting. GRA

**N84-28408#** Oakland Univ., Rochester, Mich. Dept. of Sociology.

**RELEVANT AND IRRELEVANT LEGAL STRUCTURES: DISTINGUISHING PRIVATE SECTOR FROM DOD CONTRACTING**

E. J. MCCABE *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 25-29 Apr. 1984 (AD-P003241) Avail: NTIS HC A99/MF A01 CSCL 05J

Based on interview and observational data of contract formation and administration dealing with hardware and publications development by the U.S. Army Tank-Automotive Command, the social process of government contract law as an example of law in action is compared with the typical use of contracts between merchants in the private sector. While the formal law of contracts is, for the most part, irrelevant in normal business exchanges, the formal legal structure is found to be routinely relied upon in the case of government contracts. This unusual role of the formal law is explained by the absence of normal reciprocal relationships between contractors and the Government. Author (GRA)

**N84-28409#** Kansas Univ., Lawrence.

**NOTES ON A THEORY OF TERRORISM**

M. SHELLY and F. MOOS *In AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 30-34 Apr. 1984*  
(AD-P003242) Avail: NTIS HC A99/MF A01 CSCL 05J

This paper summarizes some of the developments in this theory. We make no attempt to include references since these are extensive and referred to in some detail in other papers and manuscripts. In this paper we emphasize the motivation for going in the directions we have taken. A theory of terrorism is of interest to the military for two reasons. The first is that of the U.S. Armed Forces, both at home and overseas, are evermore frequently targets of terrorists. In some ways, the American military symbolizes the strength of America and may therefore be attacked to demonstrate that the United States is weaker and more vulnerable than it appears to be. The second is that the military, in the form of the National Guard, may be called upon to secure a domestic area when disruption exceeds tolerable levels. GRA

**N84-28410#** Colorado Univ., Colorado Springs.

**SITUATIONAL INTERACTION: A PEER COUNSELING APPROACH TO AWOL (UNAUTHORIZED ABSENCES FROM DUTY) REDUCTION**

R. L. DURHAM and C. EMILIO *In AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 35-39 Apr. 1984*  
(AD-P003243) Avail: NTIS HC A99/MF A01 CSCL 05J

An AWOL reduction program, which utilized peer counseling, was conducted with two randomly selected companies from a mechanized infantry battalion at Fort Carson, Colorado. Two randomly selected companies from the same brigade served as static control units. Employing the Taylor-Johnson Temperament Analysis (T-JTA), AWOL-prone soldiers were identified and were counseled initially by the unit chaplain and subsequently by platoon leaders. Platoon leaders identified situational aspects of AWOL-prone soldiers and interacted as mediators between environmental situations (e.g., money problems) and personal factors identified by the T-JTA. As a function of the intervention, the treated group showed a significant decline in AWOL rates while the control group did not. Results were discussed in terms of the efficiency of employing the Taylor-Johnson Temperament Analysis in conjunction with peer counseling to reduce AWOL rates. GRA

**N84-28411#** Air Force Academy, Colo.

**EVALUATION OF THE BCT (BASIC CADET TRAINING) PARAPROFESSIONAL COUNSELOR TRAINING AT THE UNITED STATES AIR FORCE ACADEMY**

P. R. BROWN and J. L. RAY *In its Proc. of the 9th Symp. on Psychol. in the DOD p 40-44 Apr. 1984*  
(AD-P003244) Avail: NTIS HC A99/MF A01 CSCL 05J

This study evaluated the competence of USAF Academy paraprofessional counselors in communicating a helpful response to assess the success of counselor training. The purpose of this study was to evaluate, by objectively measuring counseling ability, training for paraprofessional counselors who worked as cadre in Basic Cadet Training (BCT) at the United States Air Force Academy. BCT is a six-week training program for cadets entering the Academy, designed to provide military instruction and experience to transition the basic cadet from civilian to military life and provide a foundation for future military development. To meet the individual-specific needs caused by the strenuous environment, the USAF Academy uses upperclass cadets as paraprofessional counselors to the basic cadets. GRA

**N84-28412#** Air Force Medical Center, Lackland AFB, Tex.

**SUICIDE GESTURES OF USAF BASIC TRAINEES**

W. BLOOM *In AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 45-48 Apr. 1984*  
(AD-P003245) Avail: NTIS HC A99/MF A01 CSCL 05J

The purpose of this paper is to share our experiences and observations of USAF basic trainees who made suicide gestures. Lackland Air Force Base is the sole location for basic training of all USAF recruits, and on June 1, 1975, an experimental Air Force

Medical Evaluation Test (AFMET) Program (Bloom 1977) was started there to facilitate early identification of unsuitable trainees. In AFMET Phase 1, initial screening was by a computer scored test. On the second day of training, all recruits take a 50 item, true-false Historical Orientation Inventory with four additional demographic items. On the basis of twenty-eight (28) items previously correlated with failures to complete enlistments, the 6 1/2% most vulnerable are identified for further evaluations. At Phase 2 (Interviews and Tests) appraisals are noted on Standard Reports of Interview (SRI) (Bloom 1981) and Bloom Sentence Surveys (BSCS) are taken (Bloom 1979, 1980). About two of each 6 1/2 per hundred are referred to AFMET Phase 3 (Clinical Assessment), the others are cleared for return to duty. Usually between the 8th to 12th day of training, officer clinicians conduct diagnostic interviews and use a variety of individually selected psychological tests. About 16% of Phase 2 selectees have been recommended for administrative separations. During the eight years of the AFMET Program, there has not been any death by suicide of a basic trainee. The statistical expectancy was 20 suicides or two and a half each year. GRA

**N84-28413#** Texas A&M Univ., College Station.

**FACTOR STABILITY AND CONSTRUCT VALIDATION OF YUKL'S MBS (MANAGERIAL BEHAVIOR SURVEY) FOR MILITARY LEADERSHIP**

D. D. VANFLEET and G. A. YUKL *In AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 49-52 Apr. 1984*  
(AD-P003246) Avail: NTIS HC A99/MF A01 CSCL 05J

The purpose of this paper is to present some evidence regarding the factor stability and construct validity of the new taxonomy for military leadership. In doing this, a second step will be taken in that a comparative analysis of data from two points in time will be performed rather than merely using cross sectional data as in the past. The data presented here strongly suggest that Yukl's Managerial Behavioral Survey (MBS) possesses both factor stability and construct validity as well as previously demonstrated reliability. This means that the MBS can, indeed, be used with military samples to extend our knowledge about effective leader behavior. Such extensions will be even more meaningful, of course, if the research strategies used go beyond single method, single time strategies. If future research will use this more realistic, complex taxonomy in more useful and more complex research strategies, much can be learned about leadership in general and military leadership in particular which can be particularly useful in selection, evaluation, training, and development of future military officers. GRA

**N84-28414#** Montana State Coll., Bozeman. Engineering Experiment Station.

**EXPLORING THE INTERACTION OF THE VROOM/YETTON MODEL AND LEADERSHIP STYLE (LPC) (LEAST PREFERRED COWORKER) AS IT PREDICTS PERFORMANCE**

R. M. MCDANNELL and S. C. MARCY *In AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 53-57 Apr. 1984*  
(AD-P003247) Avail: NTIS HC A99/MF A01 CSCL 05J

The purpose of this research is to explore the relationship between leaders' decision-making behavior on the Vroom/Yetton problem set and performance in an actual organizational setting. Additionally, leadership style as measured by Fiedler's Least Preferred Coworker (LPC) scale is tested as a personality variable that may moderate the problem set to actual leader performance relationship. A group of 98 third year cadets at the U.S. Military Academy were administered a military version of the Vroom/Yetton thirty problem set and Fiedler's LPC scale. Military development ratings made by their Tactical Officers were used as measures of their performance. Results suggest that information resulting from their performance on the problem set is related to their performance evaluations in an actual setting. Additionally, the magnitude of the relationship is larger for low LPC cadets and disappears for high LPC cadets. GRA

**N84-28415#** Montana State Coll., Bozeman. Engineering Experiment Station.

**SUBORDINATE PERCEPTIONS OF CONTINGENT LEADERS: DO FOLLOWERS ACCEPT OUR THEORIES?**

J. H. CAGE *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 58-62 Apr. 1984  
(AD-P003248) Avail: NTIS HC A99/MF A01 CSCL 05J

Two studies were conducted to investigate assumptions made by contingent leadership theorists about subordinates. Paper and pencil instruments provided situations in which a leader followed or failed to follow the prescription of Vroom's contingency theory. Subjects were asked to take the role of subordinate, evaluate the decision making process, offer prognosis about the outcomes, and assess the leader. Three groups of subjects were identified by their responses. Only one of the three groups accepted the leader when s/he acted according to the prescription of contingency theory. The groups were differentiated by characteristics such as income, occupational prestige, and number of subordinates. The findings suggest that individuals, while acting as subordinates, may fail to accept the prescription of contingency theory. GRA

**N84-28416#** Yale Univ., New Haven, Conn.  
**TO THE WILDERNESS AND BEYOND: THE APPLICATION OF A MODEL FOR TRANSFORMAL CHANGE**

R. C. GINNETT *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 63-67 Apr. 1984  
(AD-P003249) Avail: NTIS HC A99/MF A01 CSCL 05J

Much of the ongoing management and development in modern organizations could be considered transactional in nature, and as long as the organization is operating reasonably effectively and efficiently, this style may be most appropriate. However, there may also be organizations in which transformal leadership or development is needed. A model for transformal change was applied in such an organization with qualitatively successful outcomes. The model and its application are described as well as a discussion of the dilemma of evaluation for efforts of this nature. Author (GRA)

**N84-28417#** Armed Forces Radiobiology Research Inst., Bethesda, Md.  
**COMPARATIVE EFFECTS OF BREMSSTRAHLUNG, GAMMA, AND ELECTRON RADIATION ON RAT MOTOR PERFORMANCE**

V. BOGO *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 68-72 Apr. 1984  
(AD-P003250) Avail: NTIS HC A99/MF A01 CSCL 05J

The effects of rapidly delivered supralethal doses of bremsstrahlung, electron, and gamma radiation were investigated on the performance of male Sprague Dawley rats exposed at a midline tissue dose (MTD) rate of 2000 rad/min. Relative radiation effects were determined by establishing median effective doses (ED50) for rats trained on the accelerod, a shock-avoidance test of motor performance. ED50's were based on 10-min post-exposure. No significant difference was found between the bremsstrahlung and gamma radiations even though the physical characteristics used to achieve the two fields were less uniform in the bremsstrahlung exposures. However, the other ED50's translate into significantly different relative effectiveness of 1.35 between the bremsstrahlung and electron fields, and 1.45 between the electron and gamma radiations. The data imply that different radiation fields are not equally effective on behavior. GRA

**N84-28418#** Armed Forces Radiobiology Research Inst., Bethesda, Md.  
**THE INTERACTIVE EFFECTS OF MORPHINE AND IONIZING RADIATION ON THE LATENCY OF TAIL-WITHDRAWAL FROM WARM WATER IN THE RAT**

W. F. BURGHARDT and W. A. HUNT *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 73-76 Apr. 1984  
(AD-P003251) Avail: NTIS HC A99/MF A01 CSCL 05J

The analgesic effect of morphine was enhanced in rats exposed to ionizing radiation (250-5000) in a dose dependent manner. This was indicated by an increase in the latency of tail withdrawal

from warm water, compared with animals receiving morphine alone. Radiation alone had no effect on latencies or on gross behavior. The enhancing effect of radiation was strongest at 24 hours after irradiation and was partially reversible with naloxone, an opiate antagonist, at a dose of two milligrams per kilogram intramuscular. No changes in survival time after irradiation were noted between animals receiving morphine and those receiving saline injections. The results of this study suggest that the effect of narcotic analgesics to relieve pain in casualties on a nuclear battlefield may be enhanced depending on the postirradiation interval. GRA

**N84-28419#** Armed Forces Radiobiology Research Inst., Bethesda, Md.  
**QUATERNARY NALTREXONE REVERSES RADIOGENIC AND MORPHINE-INDUCED LOCOMOTOR HYPERACTIVITY**

G. A. MICKLEY, K. E. STEVENS, J. A. GALBRAITH, G. A. WHITE, and G. L. GIBBS *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 77-81 Apr. 1984  
(AD-P003252) Avail: NTIS HC A99/MF A01 CSCL 05J

The present study attempted to determine the relative role of the peripheral and central nervous system in the production of morphine induced or radiation induced locomotor hyperactivity of the mouse. Toward this end, we used a quaternary derivative of an opiate antagonist (naltrexone methobromide), which presumably does not cross the blood brain barrier. Quaternary naltrexone was used to challenge the stereotypic locomotor response observed in these mice after either an intra-peritoneal injection of morphine or exposure to 1500 rads 60Co. The quaternary derivative of naltrexone reversed the locomotor hyperactivity normally observed in the C57BL/6J mouse after an injection of morphine. It also significantly attenuated radiation-induced locomotion. The data reported here support the hypothesis of endorphin involvement in radiation-induced and radiogenic behaviors. However, these conclusions are contingent upon further research which more fully evaluates naltrexone methobromide's capacity to cross the blood brain barrier. GRA

**N84-28420#** Defense Nuclear Agency, Washington, D.C.  
**THE DEFENSE NUCLEAR AGENCY INTERMEDIATE DOSE PROGRAM: AN OVERVIEW (EFFECTS OF TOTAL-BODY IRRADIATION ON THE PERFORMANCE OF PERSONNEL IN ARMY COMBAT CREWS)**

R. W. YOUNG and D. L. AUTON *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 85-89 Apr. 1984  
(AD-P003253) Avail: NTIS HC A99/MF A01 CSCL 05J

The objective of this research was to provide the quantitative basis for predicting performance decrement in Army crewmen irradiated with less than 4500 rads (cGy). The data were obtained using a questionnaire derived from detailed information on radiation sickness and analysis of 15 combat crew tasks. The questionnaire, which asked for quantitative information on the impact of radiation sickness symptoms on the performance of sub tasks, was administered to experts in the performance of the combat tasks. The results obtained in this effort clearly demonstrate that this methodology can be used to obtain meaningful estimates of the impact of very hazardous environments on performance. Comparison of the results from this study with those from studies which have directly assessed the effects of sickness on performance suggests that this questionnaire approach could successfully be applied to the evaluation of other hazardous environments in other military systems. GRA

**N84-28421#** Organization Research Group of Tidewater, Inc., Norfolk, Va.  
**A QUESTIONNAIRE ASSESSMENT OF ESTIMATED RADIATION EFFECTS UPON MILITARY TASK PERFORMANCE**

A. S. GLICKMAN, P. S. WINNE, B. B. MORGAN, JR., and R. B. MOE *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 90-94 Apr. 1984  
(AD-P003254) Avail: NTIS HC A99/MF A01 CSCL 05J

One hundred twenty five supervisors in four types of U.S. Army combat systems estimated the degree of degradation of military

tasks for 30 descriptive symptom complexes associated with various radiation exposures. Results indicated that: (1) the relative order of symptom effects were highly consistent across positions and the types of systems, (2) performances were expected to be deleteriously affected under most illness conditions, even mild ones, but incapacitation was not anticipated until illness conditions became quite severe, and (3) the most important factors in estimating performances were fluid loss and fatigability/weakness. GRA

**N84-28422#** Pacific-Sierra Research Corp., Los Angeles, Calif.  
**ESTIMATED EFFECTS OF IONIZING RADIATION UPON MILITARY TASK PERFORMANCE: INDIVIDUAL COMBAT CREWMEMBER ASSESSMENT**

G. H. ANNO and D. B. WILSON *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 95-99 Apr. 1984 (AD-P003255) Avail: NTIS HC A99/MF A01 CSCL 05J

Quantitative estimates are developed of the performance levels for selected individual Army combat crewmembers exposed to prompt ionizing radiation from nuclear weapons. The performance levels, expressed in percent of normal (baseline) task performance, provide information for military operations planning, combat training, and computer simulation modeling of combat crew and unit effectiveness. The methodology is described where data from two separate bodies of information (acute radiation sickness symptomatology, and judgment of task performance time from Army combat crew questionnaires) are integrated to compute performance levels as a function of dose (free-in-air) and post-exposure time. GRA

**N84-28423#** Air Force Academy, Colo.  
**A SUMMARY OF THE PSYCHOLOGICAL EFFECTS OF TACTICAL NUCLEAR WARFARE**

G. R. SESSIONS *In its* Proc. of the 9th Symp. on Psychol. in the DOD p 100-104 Apr. 1984 (AD-P003256) Avail: NTIS HC A99/MF A01 CSCL 05J

The psychological component of the response of combat troops to tactical nuclear warfare is a troublesome variable which plagues military planners and commanders responsible for the preparation of the armed forces for the eventuality that nuclear weapons might one day be used in armed conflict. The devastating physical effects of nuclear weapons are extensively documented and the biological response of animals and humans to radiation has also been well studied, but very little is known concerning the probable effects of experiencing a nuclear attack, upon the emotional stability, morale, and motivation of soldiers to perform their assigned duties. The literature addressing this topic is reviewed and evaluated as part of the Defense Nuclear Agency's Intermediate Dose Program. A summary of the report resulting from this effort is presented herein. Author (GRA)

**N84-28424#** Washington Univ., Seattle.  
**PHYSICAL PERFORMANCE TESTS AS PREDICTORS OF TASK PERFORMANCE**

T. L. DOOLITTLE, O. L. SPURLIN, and M. P. SCONTRINO *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 105-109 Apr. 1984 (AD-P003257) Avail: NTIS HC A99/MF A01 CSCL 05J

The more arduous the task, the greater the intensity of force which must be applied per unit of time to overcome resistance or achieve rate. Intensity is commonly called workload with magnitude expressed in appropriate units of power. Two complex factors determine the limits for which an individual can produce energy and generate the requisite power: (1) capacity to utilize oxygen, and (2) ability to generate muscular tension. The former is called aerobic power and the latter strength. From the foregoing discussion it can be seen that it is impossible to replicate the significant components of physically demanding occupations. If a test can be demonstrated to represent important job components it is valid to use the test in applications such as preemployment screening. Nevertheless, because of the legal guidelines and changing professional standards surrounding test validation, there

are some important issues to consider in order to firmly establish the defensibility of a physical performance test. GRA

**N84-28425#** Colorado Univ., Denver.  
**AFFECTIVE DETERMINANTS OF JOB PERCEPTIONS**

K. KRAIGER *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 112-116 Apr. 1984 (AD-P003258) Avail: NTIS HC A99/MF A01 CSCL 05J

The Job Characteristics Model of Hackman and Oldham (1976) has served as a useful guide for designing jobs to be more motivating and satisfying. It is argued, however, that the job perceptions of incumbents may be biased or influenced by internal affective states or moods. This assertion is supported by the results of two studies. The first was a laboratory study in which job perceptions were more favorable when subjects were artificially placed in a good mood. In the second study, the overall job perceptions of a sample of city government workers were found to be predictable from both their job satisfaction and mood states. Author (GRA)

**N84-28426#** Air Force Academy, Colo.  
**EXPECTATIONS, JOB PERCEPTIONS AND DISCONFIRMATION AMONG AIR FORCE ACADEMY GRADUATES**

S. C. CONLEY *In its* Proc. of the 9th Symp. on Psychol. in the DOD p 117-121 Apr. 1984 (AD-P003259) Avail: NTIS HC A99/MF A01 CSCL 05J

This study examined the expectations of Air Force Academy cadets, their later job perceptions as officers, and the discrepancy between these expectations and perceptions (disconfirmation). Using Hackman and Oldham's job characteristics model as a conceptual base, this research examined expectations about five job characteristics (autonomy, feedback, skill variety, task significance, and task identity). Subjects were 110 male and female 1980 graduates of the Air Force Academy (the first class that graduated women). Data on expectations were collected before the subject's graduation from the Academy; two years later, job perceptions were assessed by means of mailed questionnaires. Results showed that job perceptions differed from expectations only with respect to autonomy - which was higher than expected. Since previous research suggests that males and females - and those in flying versus support positions - may differ in their expectations and job perceptions, these sub-groups were also examined. Author (GRA)

**N84-28427#** William Beaumont Army Hospital, El Paso, Tex.  
**THE EFFECTS OF REFORGER (RETURN OF FORCES TO GERMANY) EXERCISE PARTICIPATION ON SOLDIERS' ATTITUDES**

D. J. GRILL *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 122-126 Apr. 1984 (AD-P003260) Avail: NTIS HC A99/MF A01 CSCL 05J

Thousands of DOD personnel annually participate in REFORGER (Return of FORces to GERmany) exercises along with other NATO Allies. Pre and post REFORGER Unit Status Questionnaires, similar to surveys utilized by Israeli Defense Force (IDF) battle psychologists, were administered to two hundred and fifty two soldiers in an armored cavalry squadron which participated in REFORGER '83, Exercise Confident Enterprise. Analysis focused on determining the effects of the unit's participation in REFORGER. A factor analysis of both the pre and post REFORGER Unit Status Questionnaires yielded a set of five factors: View of the Unit; Unit Communication; Self-Evaluation; Evaluation of the Enemy, and Individual Morale. Participation in REFORGER had no significant effect on any of these factors. However, further analysis revealed that there were significant differences between certain groups on a number of dimensions such as previous REFORGER participation; type of MOS; pay grade, and unit. Implications for unit training and for the utilization of mental health personnel in combat are examined. GRA

**N84-28428#** Air Force Academy, Colo.

**CHANGES IN ATTITUDES TOWARD WOMEN AT THE AIR FORCE ACADEMY**

A. C. BRIDGES *In its* Proc. of the 9th Symp. on Psychol. in the DOD p 127-130 Apr. 1984

(AD-P003261) Avail: NTIS HC A99/MF A01 CSCL 05J

Sex-role attitudes were measured at the Air Force Academy by Marshak, DeFleur, and Gillman (1976), using the Attitudes toward Women Scale (Spence & Helmreich, 1972). The attitudes were significantly less egalitarian than those held by male college students at the University of Texas at Austin. Festinger's Cognitive Dissonance Theory (1957) predicts that as perceptions of mandated social change decrease, attitudes held by cadets would become more egalitarian. In cadets sampled in 1983, males are significantly more egalitarian than in 1976, but there's no significant difference between 1983 cadets and 1980 college students. There's a significant trend in male cadets: the longer he's been at the Academy, the more egalitarian he is. As expected, comparison between 1983 male and female cadets showed women were significantly more egalitarian than men. GRA

**N84-28429#** Human Engineering Labs., Aberdeen Proving Ground, Md.

**RISK-TAKING PERFORMANCE OF MILITARY PERSONNEL: SEX DIFFERENCES AND PRACTICE EFFECTS**

G. A. HUDGENS and L. T. FATKIN *In AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 131-135 Apr. 1984*

(AD-P003262) Avail: NTIS HC A99/MF A01 CSCL 05J

An initial search of literature dealing with sex differences and performance variables led to several conclusions about past research in the area: a large number of studies have been reported (Hudgens & Fatkin, 1980, cited about 1500 references); most of those studies were conducted by researchers whose primary interest was the performance variable rather than the sex variable which appeared most often to be included only incidentally; and most of the studies represented one-time efforts both in that repeated measures were not obtained within the investigation and in that the investigations were not followed up to determine the reliability of, generality of or factors responsible for the sex differences observed. The present program was established to perform more intensive investigations of sex differences on performance variables of potential importance to military applications. GRA

**N84-28430#** Walter Reed Army Inst. of Research, Washington, D.C.

**COMPARING WELL-BEING AND STRESS OF SEVERAL HIGH RISK ARMY GROUPS**

T. D. FULLERTON *In AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 143-147 Apr. 1984*

(AD-P003264) Avail: NTIS HC A99/MF A01 CSCL 05J

The investigators of the Department of Military Psychiatry explored the well-being and distress of soldiers in a variety of military groups, some of which are considered high risk populations. Soldiers of several of these groups seem to possess somewhat different work, family, and individual assets and stressors. These groups included drill sergeants, soldiers deployed to the Sinai as part of the multinational peacekeeping force, Special Forces soldiers, and members of a Department of Army (Pentagon) staff. The general psychological well-being of these soldiers was assessed by the General Well-Being Schedule (Dupuy, 1978). The scores on the General Well-Being Schedule of all but two of the groups are in the moderately distressed range. The scores of the Special Forces soldier and members of the DA staff are in the marginally positive range of well-being. There are significant group differences on the overall and subscales of the General Well-Being Schedule. Author (GRA)

**N84-28431#** Anacapa Sciences, Inc., Santa Barbara, Calif.  
**HABITABILITY AND HUMAN PRODUCTIVITY ISSUES CONFRONTING THE AIR FORCE SPACE COMMAND**

J. STUSTER *In AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 153-157 Apr. 1984*

(AD-P003266) Avail: NTIS HC A99/MF A01 CSCL 05J

There are four areas of planned and proposed DoD space activity in which habitability issues play an important role. These are: (1) long-duration space missions, (2) short-duration space missions, (3) extended-duration STS missions, and (4) terrestrial space operations center(s). The purpose of this paper is to identify some of the missions within each of these areas and to explore the associated behavioral, psychological, and sociological issues. These include: sleep, clothing, exercise, medical support, personal hygiene, food preparation, group interaction, habitat aesthetics, outside communications, recreational opportunities, privacy and personal space, and waste disposal and management.

Author (GRA)

**N84-28432#** Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

**MOTION SIMULATION WITH A G-SEAT SYSTEM: SENSORY AND PERFORMANCE MECHANISMS**

G. R. MCMILLAN, W. H. LEVISON, and E. A. MARTIN *In AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 158-162 Apr. 1984*

(AD-P003267) Avail: NTIS HC A99/MF A01 CSCL 05J

Including whole-body motion in a flight simulator improves performance for a variety of tasks requiring a pilot to compensate for the effects of unexpected disturbances. A possible mechanism for this improvement is that whole-body motion provides high derivative vehicle state information which allows the pilot to generate more lead in responding to the external disturbances. In developing new motion simulation algorithms for an advanced g-cuing system we were, therefore, surprised to discover that an algorithm based on aircraft roll acceleration produced little or no performance improvement. On the other hand, algorithms based on roll position or roll velocity produced performance equivalent to whole-body motion. This paper describes the analysis and modeling being conducted at both the sensory system and manual control performance levels to explain the above results.

Author (GRA)

**N84-28433#** Air Force Human Resources Lab., Brooks AFB, Tex.

**THE MEASUREMENT OF C-5A AIRCREW PERFORMANCE**

W. L. WAAG and D. C. HUBBARD *In AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 163-167 Apr. 1984*

(AD-P003268) Avail: NTIS HC A99/MF A01 CSCL 05J

This paper describes efforts to develop and validate a performance measurement system (PMS) for C-5A aircrews. To date, a PMS has been developed and successfully integrated with one of the C-5A flight simulators at Altus AFB, OK. The system is currently being used as a routine part of the simulator training curriculum and is undergoing evaluation. This paper describes the capabilities of the simulator PMS and presents the results of the preliminary data gathered during the validation phase of the project. Author (GRA)

**N84-28434#** Hughes Aircraft Co., El Segundo, Calif.

**AIRCREW PERFORMANCE WITH SIMULATED ADVANCED RADAR AND FLIR (FORWARD LOOKING INFRARED) SENSORS IN SINGLE- AND TWO-PLACE CREW STATIONS**

R. L. HOCKENBERGER *In AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 168-172 Apr. 1984*

(Contract F33615-81-C-0501)

(AD-P003269) Avail: NTIS HC A99/MF A01 CSCL 05J

The present study was directed at the use of synthetic aperture radar (SAR) and forward looking infrared (FLIR) sensor enhancements to quantify mission performance and aircrew workload effects. Both pilots and two-place crews were employed in a simulator based air-to-ground mission context. Results show significant performance and workload effects across the various

system test conditions and between the single- and two-place crews. For example, performance scores revealed an average 15 percent improvement for the two-place crew, with an average 20 percent reduction in subjective workload rating. Author (GRA)

**N84-28435#** Naval Health Research Center, San Diego, Calif.  
**HEALTH RISKS ASSOCIATED WITH AIRCRAFT MODEL TYPE AMONG US NAVY PILOTS**

A. HOIBERG and R. G. BURR *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 173-177 Apr. 1984 (AD-P003270) Avail: NTIS HC A99/MF A01 CSCL 05J

This study identified the ill health effects (hospitalizations) among U.S. Navy male pilots ( $n = 22,245$ ) who primarily flew one of eight aircraft model types. Comparisons of annual hospitalization rates computed for the July 1967 through December 1979 time period determined that trainer and helicopter pilots had the highest total rates while reconnaissance pilots had the lowest. Helicopter pilots had the highest hospitalization rates for ulcers and/hearing problems; rates for calculus of the kidney were the highest among older helicopter pilots. Older track pilots had the highest rates for accidental injuries, musculoskeletal conditions, and infective/parasitic diseases. The highest circulatory disease rate was observed for older fighter pilots. An examination of the hospitalization rates of the other aircraft model types (electronic, patrol, cargo/transport, and reconnaissance) identified relatively few specific illnesses unique to each pilot group. Future research efforts will examine other factors in addition to aircraft model type that might account for the results of this study. Author (GRA)

**N84-28436#** Illinois Univ., Urbana. Dept. of Psychology.  
**INITIAL VALIDATION OF A FUNCTIONAL AGE PROFILE FOR AVIATORS**

R. BRAUNE and C. D. WICKENS *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 178-182 Apr. 1984 (AD-P003271) Avail: NTIS HC A99/MF A01 CSCL 05J

The initial validation of the concept of the Functional Age Profile for aviators is reported. This concept is based on objective performance parameters assessed by a computer-based information processing test battery. Preliminary results suggest that the Functional Age Profile may be an indicator of attentional resource capacity in flight simulator performance. Author (GRA)

**N84-28437#** Pritsker and Associates, Inc., Albuquerque, N. Mex.

**A COMPUTER SIMULATION TO PREDICT TARGET IDENTIFICATION LATENCIES**

V. J. GAWRON, K. R. LAUGHERY, JR., C. C. JORGENSEN, and J. POLITO *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 183-187 Apr. 1984 (AD-P003272) Avail: NTIS HC A99/MF A01 CSCL 05J

As part of an ongoing program to develop computer models of human performance (MOPADS, Model of Operator Performance in Air Defense Systems), a computer model was developed to predict the target identification latencies of human observers. The model predicts these latencies as a function of one or more relevant independent variables. The values of these variables can be defined by the user (e.g., number of observers, observer's time on task) or be provided from an ongoing simulation of an air defense scenario (e.g., distance to target, target speed). Author (GRA)

**N84-28439#** Army Health Care Studies and Clinical Investigation Activity, Fort Sam Houston, Tex.

**WORKSHOPS FOR MANAGEMENT OF COMBAT STRESS**

A. D. MANGELSDORFF, J. M. KING, and D. E. O'BRIEN *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 237-240 Apr. 1984 (AD-P003283) Avail: NTIS HC A99/MF A01 CSCL 05I

Combat produces stresses which may result in psychiatric casualties. Commanders need to be aware of how to assess the psychological readiness of their units and of the means to develop cohesion. The results of three workshops on combat stress and related issues are reviewed. In addition, future directions are discussed. Author (GRA)

**N84-28440#** School of Aerospace Medicine, Brooks AFB, Tex.  
**PSYCHOLOGICAL EVALUATION OF AIRCREW MEMBERS**  
J. C. PATTERSON *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 250-254 Apr. 1984 (AD-P003286) Avail: NTIS HC A99/MF A01 CSCL 05J

Rated USAF Officers requiring psychological evaluation for fitness to fly are referred to the USAF School of Aerospace Medicine (SAM), Clinical Neuropsychology Function (NGN). Other referrals to NGN result from requests for consultation from medical branches within the consultation service. This paper will discuss the approach and psychological methods used in making clinical and aeromedical decisions in the USAF. Further, criticisms of the current procedures will be discussed as well as suggestions for clinical research need to improve psychology's participation in the aeromedical evaluation of aircrew members. GRA

**N84-28446#** Uniformed Services Univ. of the Health Sciences, Bethesda, Md.

**AFTEREFFECTS ASSOCIATED WITH ONE AND TWO STRESSORS ACROSS CONDITIONS OF COMPLETE, PARTIAL, OR NO CONTROL**

D. L. COLLINS, A. BAUM, and J. E. SINGER *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 318-322 Apr. 1984 (AD-P003299) Avail: NTIS HC A99/MF A01 CSCL 05J

This study examined human aftereffects (i.e., psychological, behavioral, and physiological) associated with one or two stressors (i.e., noise, noise and/or a strobe light) over three levels of control (i.e., no, partial, or complete) where control could be repeatedly exerted to terminate the stressor(s). The new concept of partial control, rather than complete or no control, is more analogous to the many daily interactions humans face. Greater psychological, behavioral, and physiological aftereffects were associated with two stressors or the uncontrollable conditions; partial or complete control conditions were analogous to the comparison (no stressor/no control) group. Urinary catecholamines (i.e., epinephrine and norepinephrine) paralleled these findings showing greater arousal when control was absent than when control was available. Men had significantly greater catecholamine levels than did women. Author (GRA)

**N84-28447#** Air Force Hospital, Lackland AFB, Tex.  
**PSYCHOLOGICAL AND BIOCHEMICAL EFFECTS OF A STRESS MANAGEMENT PROGRAM**

T. CAYTON, J. C. PATTERSON, W. PIERSON, and G. TROXLER *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 323-327 Apr. 1984 (AD-P003300) Avail: NTIS HC A99/MF A01 CSCL 05J

The present study is the first of a series of investigations to assess the effects of stress management on selected psychological and biochemical risk factors for cardiovascular disease. We wanted to sample emotional, behavioral, physical and biochemical measures which might be sensitive to the changes of an effective stress management program. GRA

**N84-28448#** Military Academy, West Point, N. Y.  
**THE ROLE OF RELEVANT EXPERIENCE AND INTELLECTUAL ABILITY IN DETERMINING THE PERFORMANCE OF MILITARY LEADERS: A CONTINGENCY MODEL EXPLANATION**

P. J. BETTIN *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 338-342 Apr. 1984 (AD-P003303) Avail: NTIS HC A99/MF A01 CSCL 05J

A field study involving 79 army combat officers in middle echelon leadership positions was conducted to evaluate the role of relevant experience and intellectual ability in predicting leadership performance. Biographical and organizational data were the primary measures used to ascertain the relevance of leader experience. This represents a departure from previously used methodology which considered only the leaders' organizational tenure in determining experience levels. Results shed light on the components of Fiedler's Contingency Model of Leadership Effectiveness supporting the hypothesis that task- and relationship-motivated leaders make effective use of their

experience only in situations which match their leadership personality. The study also suggests a plausible relationship between the leader's cognitive resources and leader behaviors.

Author (GRA)

**N84-28453#** Denver Research Inst., Colo.

**INDIVIDUALIZING WITH COMPUTER-ASSISTED INSTRUCTION (CAI): ENHANCING STUDENT MOTIVATION THROUGH COMPUTER-CONTROLLED AUDIO**

B. L. MCCOMBS *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 406-410 Apr. 1984 (AD-P003314) Avail: NTIS HC A99/MF A01 CSCL 09B

A computer-controlled audio capability for enhancing the effectiveness, of motivational skills training for military trainees was developed for the Army Research Institute as part of its Basic Skills/Learning Strategies research program. This capability interfaces with an Apple IIe microcomputer system and provides for the personalization of computer-assisted introductory and practice segments for seven printed, self-instructional motivational skills training modules. The modules promote the development of self-management, personal responsibility, and positive self-control skills that underlie self-motivation. The implications of this research for providing a cost-effective technology for personalizing CAI training and for reducing the dependence of the motivational skills training on instructor and group process facilitation are discussed.

Author (GRA)

**N84-28454#** Denver Research Inst., Colo.

**TRAINING AND PERFORMANCE SUPPORT SYSTEM: A NEW DIMENSION IN INDIVIDUALIZED INSTRUCTION**

D. A. STEFFEN and J. P. KOTTENSTETTE *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 411-415 Apr. 1984

(AD-P003315) Avail: NTIS HC A99/MF A01 CSCL 09B

The TPSS (Training and Performance Support System) is a computer-based training and job aid system scheduled for delivery in mid-February 1984 to the Electronic Systems Division of the Air Force Systems Command at Hanscom AFB, MA. In addition to hardware and software components instructional materials have been developed to aid Air Force computer specialists responsible for managing the acquisition of computer software for major defense systems. The system was designed to provide a capability for increasing the initial productivity of professional personnel who must assume new job responsibilities. The design concept links job preparation with job performance by: (1) providing instruction for and an explanation of major job task, and (2) providing routine access to task-related information for use during job performance activities. This technique provides workers with performance aids in the work environment that are an extension of the instructional content structures. The combination of use on demand and the integration of instruction and information provides a new dimension in individualized instruction through learner control. GRA

**N84-28458#** Honeywell Systems and Research Center, Minneapolis, Minn.

**TRACKING WITH INTERMITTENT RADAR COVERAGE. 1: INTERRUPTIONS AFTER EACH COLLECTED FRAME OF IMAGERY**

J. R. BLOOMFIELD and R. K. LITTLE *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 445-449 Apr. 1984 (Contract DAAK20-80-C-0254)

(AD-P003322) Avail: NTIS HC A99/MF A01 CSCL 05I

Imagery simulating the output of a moving target indicator (MTI) radar was used in two experiments to determine the effect on the ability of radar operators to track targets moving in one particular area, when the radar was being switched intermittently to provide coverage of a second area as well. In both experiments, we investigated the effects of switching away from the area of interest after each complete scan of that area, varying the length of each interruption that occurred before returning for another scan of the primary area. The frames of simulated MTI radar imagery used for each condition were shown in time compression to twelve operators in both experiments. The results of the two experiments

seem to present a coherent picture. Increasing the length of the interruptions in coverage from 15 to 30 seconds had little effect on tracking performance. With interruptions of 45 to 90 seconds, performance was worse with smaller target units, containing ten vehicles, than it was for larger units. However, with interruptions of 120 seconds, there was a decrement for all target units, large and small, compared to the level of tracking performance achieved with shorter interruptions.

Author (GRA)

**N84-28459#** Honeywell Systems and Research Center, Minneapolis, Minn.

**TRACKING WITH INTERMITTENT RADAR COVERAGE. 2: INTERRUPTIONS AFTER TWO OR MORE CONSECUTIVELY-COLLECTED FRAMES OF IMAGERY**

R. K. LITTLE and J. R. BLOOMFIELD *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 450-454 Apr. 1984 (Contract DAAK20-80-C-0254)

(AD-P003323) Avail: NTIS HC A99/MF A01 CSCL 05I

Simulated moving target indicator (MTI) radar imagery was used in the two experiments performed in this, one of an on-going series of studies in which we are investigating conditions of intermittent radar coverage. In the first of these experiments there were two, and in the second experiment there were two, three, or four consecutively-collected frames of imagery before each interruption in coverage. In both experiments there were twelve operators and the imagery was presented in time compression. The results of the two experiments showed that the use of more than one frame of imagery before the occurrence of the interruptions in radar coverage resulted in improved performance. For the larger, 25- and 50- vehicle units, two consecutively-collected frames, and for the smaller 10-vehicle units, four consecutively collected frames helped to prevent the decrement in tracking performance that otherwise occurred with 120-second interruptions.

Author (GRA)

**N84-28460#** Illinois Univ., Chicago.

**PERCEPTUAL FACTORS IN LOW ALTITUDE FLIGHT**

R. N. HABER *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 489-493 Apr. 1984

(AD-P003329) Avail: NTIS HC A99/MF A01 CSCL 05I

The pilot's number one priority when flying low and fast is avoiding the ground. The ground gives no margin for error. Survival and successful performance requires the pilot's full understanding of the interactions of mission task demands, flight aerodynamics, usefulness of available visual information, and allocation of attention. This paper summarizes what is known about these factors. The following topics are covered: the basic aerodynamic performance characteristics of concern during low altitude flight; what aspects of the terrain and instrumentation provide correct information about ground clearance and terrain avoidance; what flying low and fast requires of perception and attention; and how the interaction of mission task demands with the limitations imposed by the physics of the aerodynamics restrict the conditions of attending and perceiving.

Author (GRA)

**N84-28462#** Air Force Human Resources Lab., Brooks AFB, Tex.

**INDIVIDUAL DIFFERENCES IN LEARNING RATE**

D. L. PAYNE and W. C. TIRRE *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 548-552 Apr. 1984

(AD-P003338) Avail: NTIS HC A99/MF A01 CSCL 05A

As part of the Learning Abilities Measurement Program (Project LAMP) we are investigating the use of direct measures of learning rate as predictors of future learning and task performance. It is proposed that direct measures of learning rate collected under controlled laboratory conditions will help us to identify recruits who may score low on conventional tests, but have the potential to catch up with or surpass current high scorers in learning some new occupational skill. Given the present Air Force policy of assigning individuals to an occupational area on the basis of the area's rated learning difficulty, direct measures of learning rate could have great utility for future selection and classification procedures. There are several unresolved issues concerning the

use of measures of learning rate as predictors. In this paper we focus upon the use of learning rate as a predictor of the following learning outcomes: school achievement, knowledge retention, and ease of relearning. GRA

**N84-28463#** Old Dominion Univ., Norfolk, Va.  
**ASSESSMENT OF LEARNING ABILITIES USING RATE MEASURES**

G. L. ALLEN and B. B. MORGAN, JR. *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 559-563 Apr. 1984 (Contract F41689-83-C-0016)  
(AD-P003340) Avail: NTIS HC A99/MF A01 CSCL 05J

Provided in this presentation is a description of progress in a unique research effort examining the utility of learning rate measures as predictors of learning abilities. Complex Experimental Learning Tasks (CELTs) have been developed in response to the challenge of devising a technology for measuring learning rate. CELTs provide a real-time sample of learning performance on criterion-free, face-valid memory tasks. Microcomputer-based administration affords detailed records of learning activities while facilitating efficient data management. Subjects' performance is described by plotting performance indices (e.g., accuracy, speed of responding) over time. Slope and intercept parameters from these functions hold promise as valid measures of learning rate. Efforts are underway to: (1) determine relationships between traditional aptitude measures and learning rate measures from CELTs, and (2) explore the predictive value of these rate measures for classroom performance. Author (GRA)

**N84-28464#** Walter Reed Army Medical Center, Washington, D.C.

**AGE EFFECTS ON ACTIVE DUTY ARMY MMPI (MINNESOTA MULTIPHASIC PERSONALITY INVENTORY) PROFILES**

F. J. FISHBURNE and S. C. PARKISON *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 575-579 Apr. 1984 (AD-P003343) Avail: NTIS HC A99/MF A01 CSCL 05J

Age effects on response patterns to the Minnesota Multiphasic Personality Inventory have been recognized by the creation of separate norms for adolescent, adults and aged adults. This study examined the effects of age within a normal Army adult male population on MMPI response pattern. Of the validity and clinical scales only scales L, 3 (Hysteria) and 5 (Masculinity-Femininity) showed no significant age effects. Scale means and percentage of respondents scoring above 70T (non-K-corrected Minnesota Adult Norms) across age groups both showed scale age clusters which substantiate the need for age appropriate norms within the adult Army male population. Author (GRA)

**N84-28465#** Army Research Inst. Field Unit, Fort Benning, Ga.  
**USE OF SELF ASSESSMENT IN ESTIMATING LEVELS OF SKILL RETENTION**

J. D. SCHENDEL, J. C. MOREY, M. J. GRANIER, and S. HALL *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 585-589 Apr. 1984

(AD-P003345) Avail: NTIS HC A99/MF A01 CSCL 05I  
The focus of this research was on one approach toward predicting task retention and refresher training requirements--self assessment. Prior to zeroing their weapons for annual M16A1 rifle qualification (record fire), 153 permanent party soldiers completed a questionnaire designed to collect information on their previous marksmanship experiences as well as their beliefs about how they were going to shoot at record fire. Predicted scores accounted for about 10% of the variance associated with record fire scores. However, for those soldiers whose confidence in the accuracy of their predictions exceeded 90%, predicted scores accounted for 25% of the record fire score variance. The best predictors of record fire performance were remembered most recent record fire performance and predicted performance. Subjects, generally, overestimated their actual performance and were biased heavily toward predicting success. The usefulness of the self-assessment approach to skill retention estimation is discussed together with practical suggestions toward refining the precision of questionnaire techniques. GRA

**N84-28466#** Wisconsin Univ., Stevens Point. Cooperative Fishery Research Unit.

**TRAINING DECISION-MAKERS TO BE CREATIVE: A MANAGEMENT PROCESS MODEL**

B. A. MARTIN, K. STROM-GUZOWSKI, and R. L. TAYLOR *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 595-599 Apr. 1984  
(AD-P003347) Avail: NTIS HC A99/MF A01 CSCL 05A

The predictable structure of our military bureaucracies reinforce traditional decision-making processes. At the same time, complex technologies and environments suggest more creative decisions. This research focuses on how experienced decision-makers can be trained to be more creative. Our purpose is twofold. First we examine how decisions are made. Examining models of decision making may help us to better understand the nature of what we do and where creativity fits in. Second our task is to study the research in creativity, developing a model that relates it to decision making. The major focus is integrating the two models--decision-making and creativity--in a theoretical framework. This is a first step; before a training program can be developed, the theoretical roots must be verified. GRA

**N84-28469#** Anacapa Sciences, Inc., Santa Barbara, Calif.  
**A SYSTEMATIC COMPARATIVE ANALYSIS OF CONDITIONS ANALOGOUS TO LONG-DURATION SPACE MISSIONS**

J. STUSTER *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 625-629 Apr. 1984  
(AD-P003353) Avail: NTIS HC A99/MF A01 CSCL 05J

This paper presents interim results of a NASA/Ames Research Center study to systematically analyze conditions of isolation and confinement analogous to a proposed space station. A methodology has been developed to evaluate the relevance of candidate analogues in terms of 14 dimensions or variables. Candidate analogues include research vessels, military outposts, offshore oil platforms, long-distance yacht voyages, and remote scientific stations, to name a few. Using the comparative method and focusing on critical incidents, we explore the behavioral, psychological, and social issues affecting human adaptation and productivity in isolation and confinement. The objective of the research is to develop specific design guidelines to enhance human productivity during long-duration space missions. Author (GRA)

**N84-28471#** Army Soldier Support Center, Fort Benjamin Harrison, Ind.

**RELATIONSHIP BETWEEN CREWMEMBER CHARACTERISTICS AND TANK CREW PERFORMANCE**

B. STERLING *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 635-639 Apr. 1984  
(AD-P003355) Avail: NTIS HC A99/MF A01 CSCL 05J

Numerous prior studies have shown relationships between individual soldier characteristics (such as general and specific mental abilities, education, etc.) and individual performance. However, few studies have demonstrated a valid relationship between individual crewmember characteristics and crew or weapon system performance. This study examined relationships between individual characteristics of tank commanders (N=166) and gunners (N=165) and performance in a crew drill - Table VIII gunnery. Results suggested that for gunners, mechanical ability and experience related to crew performance, while for tank commanders overall mental ability related to crew performance. Results could be used in assignment of soldiers to these crew positions. Author (GRA)

**N84-28472#** Army Research Inst. for the Behavioral and Social Sciences, Alexandria, Va.

**TERRAIN TRAVEL SIMULATION: DATA AND APPLICATION**

N. MITCHELL, R. KRAFT, and A. MARTIN *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 662-666 Apr. 1984  
(AD-P003359) Avail: NTIS HC A99/MF A01 CSCL 05I

Research in visual representation of terrain supported the development of images for simulated travel. Results showed that observers can estimate distances in photographs, both from the

camera station to a target and between targets; this performance is analogous to distance estimation in the real world. Distance estimation performance is affected by the focal length of the camera lens at which the picture is taken. Visual coherence (the appearance of travel) can be maintained when photographs are taken at steps greater than the ten feet used previously.

Author (GRA)

**N84-28473#** Georgia Inst. of Tech., Atlanta. School of Psychology.

**STATIC VERSUS DYNAMIC PRESENTATION OF VISUAL CUES IN SIMULATED LOW LEVEL FLIGHT**

E. J. RINALDUCCI, M. J. PATTERSON, and J. DEMAIO *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 667-671 Apr. 1984

(AD-P003360) Avail: NTIS HC A99/MF A01 CSCL 05I

The present study examined three visual display environments (i.e., a valley floor, a valley floor with walls, and a valley floor with walls and inverted pyramid terrain features) using different display presentation modes (i.e., slides, static video, and dynamic video). Both pilot and non-pilot subjects were employed. Differences between pilot and non-pilot subjects were obtained for the accuracy of altitude estimation with the former being more accurate. Although the results were complex, both pilots and non-pilots, showed in general, an improvement in altitude estimation with the dynamic vs. the static mode of presentation and with increasing complexity of the visual scene. Resolution of the display image was also shown to be an important factor. The results of this study have relevance to the development of CIG and the evaluation of the simulator visual environment.

Author (GRA)

**N84-28475#** Naval Ocean Systems Center, San Diego, Calif.  
**FACTORS AFFECTING VISUAL PERFORMANCE WITH STEREOSCOPIC TELEVISION DISPLAYS**

E. H. SPAIN *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 677-681 Apr. 1984

(AD-P003362) Avail: NTIS HC A99/MF A01 CSCL 05J

A geometrical model describing retinal disparities produced by stereoscopic (stereo) TV systems is experimentally tested for various configurations of camera separation and magnification. Operator visual fatigue is also measured. Although varying configurations affect perceptual performance, they do not affect it in a manner consistent with the simple geometrical model. Observers appear capable of perceptual adaptation, benefitting from enhanced disparities when they are available. No differences in visual fatigue were found for any of the camera configurations tested.

Author (GRA)

**N84-28476#** Air Force Academy, Colo. Dept. of Behavioral Sciences and Leadership.

**INTERACTIONS OF MOTION PERCEPTION WITH PATTERN PERCEPTION**

W. MARSHAK *In its* Proc. of the 9th Symp. on Psychol. in the DOD p 682-686 Apr. 1984

(AD-P003363) Avail: NTIS HC A99/MF A01 CSCL 05J

Perception of motion and spatial pattern are closely intertwined. The reaction time for seeing changes in direction are longer for certain spatial arrangements of moving dot patterns than for others. When a stationary pattern of dots overlaps a moving pattern of dots, the amount of adaptation measured by motion aftereffect is significantly attenuated. This is particularly true when collisions occur between dots. An explanation of these motion - pattern interaction is offered in terms of vector model of motion perception.

Author (GRA)

**N84-28478#** Colorado State Univ., Fort Collins.  
**THE DUAL MEANING OF THE TERM CONTEXT: IMPLICATIONS FOR RESEARCH, THEORY AND APPLICATIONS**

D. D. WICKENS *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 697-701 Apr. 1984

(AD-P003365) Avail: NTIS HC A99/MF A01 CSCL 05J

A literature survey shows context alpha to vary greatly in its effectiveness and reasons for the variation are suggested as well

as a theoretical interpretation of how it operates. Context beta is described and related to its underlying psychological mechanisms. Applications of both to Human Factors work are suggested. In summary, it is proposed that context alpha has its effect by increasing the availability of the class of response (or single response) which have been acquired in that environment or context. By doing so, the context increases the probability that the response will be made when its appropriate cue is presented. This interpretation assumes that the context is not itself discriminating about which one of the multiple responses it has made available will be given at any particular time. That is determined by the cue or stimulus associated with that response. In the transfer design the Stay group is favored by the increased availability produced by the context. But, in the memory situation context makes both classes of response available if they are experienced in the same context. Hence, the Stay group is inferior to the change group.

GRA

**N84-28479#** Army Research Inst. for the Behavioral and Social Sciences, Alexandria, Va.

**RESEARCH INTEGRATION: AN ESSENTIAL FOR DEPARTMENT OF DEFENSE PSYCHOLOGICAL RESEARCH**

L. W. OLIVER *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 702-706 Apr. 1984

(AD-P003366) Avail: NTIS HC A99/MF A01 CSCL 05A

The meta-analysis approach has been used to integrate research findings in dozens of topical areas, primary in the disciplines of psychology and education. It is important that such efforts be continued in order to determine what we can confidently conclude from our research as well as to identify gaps in our knowledge. In fact, it is likely that journal editors eventually will require that a meta-analysis approach be used for all literature reviews. Until now, most research integration has concerned the civilian sector. These findings will have their greatest applicability for DoD civilian research. Little quantitative integration seems to have been accomplished for research relating to military populations and settings. At present, we are not certain to what extent findings based on civilian populations apply to the military. It will be important to use the meta-analysis approach to integrate the military research and then to compare the resulting findings with those of research conducted in the civilian sector.

GRA

**N84-28481#** Retina Foundation, Boston, Mass.

**EYE MOVEMENTS AND SPATIAL PATTERN VISION Annual Report, 1 Feb. 1983 - 31 Jan. 1984**

L. E. AREND 28 Feb. 1984 18023 p

(Contract F49620-83-C-0052; AF PROJ. 2313)

(AD-A140949; AFOSR-84-0399TR) Avail: NTIS HC A02/MF A01 CSCL 06P

Spatial patterns became substantially less visible when held stationary (stabilized) on the retina. Calculations showed that residual visibility of stabilized high contrast patterns can be attributed to slight failure of stabilization. Stabilization showed further that eye movements play an important role in detection of drifting and flickering grating patterns. The substantial differences in sensitivity to low-contrast grating patterns of various spatial and temporal frequencies were not observed when apparent contrasts of high-contrast gratings were determined. Approximately equal physical contrasts produced equal apparent contrasts.

Author (GRA)

**N84-28482#** Pennsylvania Univ., Philadelphia. Clinical Smell and Taste Research Center.

**INVESTIGATION OF MECHANISMS UNDERLYING ODOR RECOGNITION Final Report, 1 Aug. 1981 - 31 Jan. 1984**

R. L. DOTY and D. A. MARSHALL 1 Feb. 1984 33 p

(Contract DAAG29-81-K-0128)

(AD-A140969; ARO-18609.1-LS) Avail: NTIS HC A03/MF A01 CSCL 06P

Using a computer-controlled automated 3-choice test apparatus, a series of rat odor detection experiments were performed to establish the influences of an i.p. injected odorant upon olfactory sensitivity to that odorant. In addition, electrophysiological studies

of surface potentials (electro-olfacto-grams) from septal olfactory tissue and septal tissue from the Organ of Maser were performed. No statistically-significant changes in odor detection performance were found on successive daily tests following injection of the two test odorants (pentyl acetate and dynamic aldehyde). However, significant increases in detection performance were noted across test days in both the experimental (odor injected) and control (saline injected) animals. It was demonstrated for the first time that the septal organ of Maser is differentially responsive to odorants. It was found that: the response boundary perimeters from one animal to another are consistent and in agreement with histologically-defined septal organ regions; responses are largest at recording sites near the center of the organ; and lower concentrations were needed to elicit a response from the organ than from olfactory epithelial tissue located posteriorly on the septum. GRA

**N84-28483#** Institute for Perception RVO-TNO, Soesterberg (Netherlands). Afdeling Psychologie.

**THE EFFECTS OF MARGINAL VITAMIN DEFICIENCY ON MENTAL PERFORMANCE**

A. W. K. GAILLARD, A. H. ROZENDAAL, and C. A. VAREY Jan. 1984 24 p refs In DUTCH; ENGLISH summary (IZF-1983-29; TDCK-78940) Avail: NTIS HC A02/MF A01

The effects of marginal vitamin deficiencies on human performance and heart rate were investigated. Twelve healthy male students participated in the study. Half of them were put on a diet deficient in vitamins B1, B2, B6, and C; the other half received the same diet supplemented by twice the recommended intake of these vitamins. A tendency towards slower reactions or more errors as a function of deficiency is found. Author (ESA)

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**MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT**

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

**A84-36601**

**HYGIENIC ESTIMATION OF THE SORPTION PROPERTIES OF SYNTHETIC MATERIALS USED IN SHIP CONSTRUCTION AND REPAIR [GIGIENICHESKAIA OTSENKA SORBTSIONNYKH SVOISTV SINTETICHESKIKH MATERIALOV, PRIMENIAEMYKH V SUDOSTROENII I SUDOREMONTE]**

M. T. DMITRIEV, L. V. BASALAEVA, and L. M. SHAFRAN (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR; Ministerstvo Zdravookhraneniia SSSR, Nauchno-Issledovatel'skii Institut Gigieny Vodnogo Transporta, Odessa, Ukrainian SSR) Gigiena i Sanitariia (ISSN 0016-9900), Oct. 1983, p. 16-19. In Russian. refs

Results are presented of simulated and on-site testing involving 18 transport vessels in cruise and layover periods, about 100 shipbuilding materials, and 47 low-molecular compounds of an organic and inorganic nature (which are likely sorbates and sources of secondary chemical contamination of the ship environment). The leading role of on-board sources was indicated in the genesis and formation of chemical contamination of the air in living quarters, cargo areas, and work areas. A rated method for assessing the sorptional properties of chemicals was developed to identify and reject harmful substances. A brief list of synthetic and other decorative finishing materials which may not be used on tankers and on gas and chemical transport craft is provided. J.N.

**A84-37190**

**RECORDING THE HEART'S MAGNETIC FIELD [O REGISTRATSII MAGNITNOGO POLIA SERD TSA]**

I. O. FOMIN, S. E. SINELNIKOVA, A. N. KOZLOV, V. N. URANOV, and V. A. GORSHKOV (Moskovskii Meditsinskii Stomatologicheskii Institut; Akademiia Nauk SSSR, Institut Zemnogo Magnetizma, Ionosfery i Rasprostraneniia Radiovoln, Moscow, USSR) Kardiologiia (ISSN 0022-9040), vol. 23, Oct. 1983, p. 66-68. In Russian. refs

A new magnetometer for recording the heart's magnetic field is briefly described. Two components of the magnetocardiographic vector were investigated in 13 normal male subjects and one coronary patient. Despite identical sources of potentials and the same type of wave, magnetocardiograms and electrocardiograms were found to differ significantly in terms of wave correlations. B.J.

**A84-37664**

**MECHANICS OF LOCOMOTION**

T. A. MCMAHON (Harvard University, Cambridge, MA) International Journal of Robotics Research (ISSN 0278-3649), vol. 3, Summer 1984, p. 4-28. refs

Energetic and mechanical principles of walking and running are reviewed, using information available from force-plate studies. A mathematical model of walking is described that conserves the sum of the kinetic and gravitational potential energies of the body. In running, energy is stored transiently in the elastic deformations of stretched muscles and tendons. Theory and experiments are described using these principles and others to find the range of stiffness values for a running track that both lowers the potential for injuries and increases running speed. Author

**A84-37665**

**FOOTPRINTS IN THE ASPHALT**

I. E. SUTHERLAND and M. K. ULLNER (Sutherland, Sproull, and Associates, Inc., Pittsburgh, PA) International Journal of Robotics Research (ISSN 0278-3649), vol. 3, Summer 1984, p. 29-36. Research sponsored by the IBM Corp. refs (Contract MDA903-82-C-0102)

This paper describes the experiences with a man-carrying, 1600 lb, gasoline-powered, hydraulically actuated, six-legged walking machine. An onboard computer uses leg position and loading information to select one of a few possible hydraulic connections of the leg actuators by switching directional control valves. Passive parallel connections of hydraulic actuators distribute loads equally among several legs, creating the effect of a smaller number of 'virtual legs'. Series connections of hydraulic actuators achieve coordinated leg motions during walking. The machine uses no sophisticated servos. Author

**A84-37666**

**CONFIGURATION DESIGN OF THE ADAPTIVE SUSPENSION VEHICLE**

K. J. WALDRON, V. J. VOHNOUT, R. B. MCGHEE (Ohio State University, Columbus, OH), and A. PERY International Journal of Robotics Research (ISSN 0278-3649), vol. 3, Summer 1984, p. 37-48. refs (Contract MDA903-82-K-0058)

The selection of vehicle and leg configuration and of power transmission and actuation system configuration for the adaptive suspension vehicle (ASV) are discussed. The ASV will be a proof-of-concept prototype of a proposed class of transportation vehicles for use in terrain that is not passable for conventional vehicles. It uses a legged locomotion principle. The machine will not be an autonomous 'robot', in the sense that it will carry an operator. It will, however, have a very high level of machine intelligence and environmental sensing capability. Much of the technology involved is unique and has potential for application to future robot systems. In this paper, major aspects of the vehicle and leg geometry, the on-board processing configuration, and the hydrostatic power transmission system are discussed. Author

A84-37667

**THE GAITS OF BIPEDAL AND QUADRUPEDAL ANIMALS**

R. MCN. ALEXANDER (Leeds University, Leeds, England) International Journal of Robotics Research (ISSN 0278-3649), vol. 3, Summer 1984, p. 49-59. refs

The gaits of reptiles, birds, and mammals are reviewed. It is shown that mammals of different sizes tend to move in dynamically similar fashion whenever their Froude numbers  $u^2/g$  are equal: here  $u$  is speed,  $g$  is the acceleration of free fall, and  $h$  is the height of the hip joint from the ground. The gaits of turtles and people are examined in detail. The gaits of turtles appear to reduce unwanted displacements (pitch, roll, etc.) to the minimum possible for animals with such slow muscles. The patterns of force exerted in human walking and running minimize the work required of the muscles at each speed. Much of the energy that would otherwise be needed for running, by people and other large mammals, is saved by tendon elasticity. Author

A84-37670

**STABILITY ANALYSIS AND INPUT DESIGN OF A TWO-LINK PLANAR BIPED**

H. HEMAMI and B.-R. CHEN (Ohio State University, Columbus, OH) International Journal of Robotics Research (ISSN 0278-3649), vol. 3, Summer 1984, p. 93-100. refs  
(Contract NSF ECS-82-01240)

A two-link planar biped system under the influence of holonomic (connection) constraints with constraints not in effect and in effect is investigated in this paper. The use of quadratic Liapunov functions to construct the feedback strategies for maintaining stability in the vicinity of an operating point is presented. The role of the different inputs in opposing gravity, maintaining connection constraints, and moving the system is delineated. Finally, the effectiveness of this methodology and one of its applications are demonstrated via some digital computer simulations. Author

A84-37668

**DYNAMIC WALK OF A BIPED**

H. MIURA and I. SHIMOYAMA (Tokyo, University, Tokyo, Japan) International Journal of Robotics Research (ISSN 0278-3649), vol. 3, Summer 1984, p. 60-74.

The control theory implemented in the BIPER-3 and BIPER-4 biped locomotive robots is described. BIPER-3 has four dc motors at the hip to move the legs about the roll and pitch axis. Potentiometers provide data on the postural state at each joint, and contact sensors detect contiguity between the soles of the feet and the surface. The equations of motion are derived from assumptions of independent motions about the roll, pitch and yaw axes, linearity, no yaw motion and no slip where the foot touches the floor in an inelastic collision. Equations are defined for the dynamic single-leg support and the support-exchange phases of walking. A feedback control law characterizes stability around planned trajectories. Eight motors are used in the BIPER-4 robot, which has legs with the same degrees of freedom as human legs. Experimental data have demonstrated that stride-length control is effective for a free-swinging leg robot. M.S.K.

A84-37671

**CHARACTERISTICS OF LEG MOVEMENTS AND PATTERNS OF COORDINATION IN LOCUSTS WALKING ON ROUGH TERRAIN**

K. G. PEARSON (Alberta, University, Edmonton, Canada) and R. FRANKLIN (Oregon, University, Eugene, OR) International Journal of Robotics Research (ISSN 0278-3649), vol. 3, Summer 1984, p. 101-112. DARPA-supported research. refs

A cinematographic analysis of locusts walking on a variety of terrains was made, in order to determine the tactics used by single legs to find a site for support and the patterns of leg coordination when walking on rough terrain. Locusts were filmed walking on a flat surface, wire mesh, an irregular surface of wooden blocks, a hexagonal array of flathead nails, a flat surface with a ditch, and a vertical rod with projecting side branches. From an analysis of the film, three tactics are discernible: rhythmic searching movements initiated when the leg failed to contact the substrate at the end of the swing phase; a tactile reflex to lift the leg above an object contacted during the swing phase; and local searching movements once the leg contacted a potential support surface. In-phase stepping of the middle legs was observed frequently when animals walked over a ditch or up onto an elevated object. Once the forelegs had found support on either the far side of the ditch or on the elevated object, both middle legs stepped simultaneously and were used together to move the animal over the ditch or up onto the object. I.H.

A84-37669

**EXPERIMENTS IN BALANCE WITH A 3D ONE-LEGGED HOPPING MACHINE**

M. H. RAIBERT, H. B. BROWN, JR., and M. CHEPPONIS (Carnegie-Mellon University, Pittsburgh, PA) International Journal of Robotics Research (ISSN 0278-3649), vol. 3, Summer 1984, p. 75-92. Research supported by the System Development Foundation. refs  
(Contract MDA903-81-C-0130)

In order to explore the balance in legged locomotion, systems that hop and run on one springy leg are studied. Previous work has shown that relatively simple algorithms can achieve balance on one leg for the special case of a system that is constrained mechanically to operate in a plane. Here a three-dimensional (3D) one-legged machine that runs and balances on an open floor without physical support is considered. Control of the machine is decomposed into three separate parts: one part that controls forward running velocity, one part that controls attitude of the body, and a third part that controls hopping height. Experiments with a physical 3D one-legged hopping machine showed that this control scheme, while simple to implement, is powerful enough to permit hopping in place, running at a desired rate, and travel along a simple path. These algorithms that control locomotion in 3D are direct generalizations of those in 2D, with surprisingly little additional complication. Author

A84-37672

**A STUDY OF DESIGN AND CONTROL OF A QUADRUPED WALKING VEHICLE**

S. HIROSE (Tokyo Institute of Technology, Tokyo, Japan) International Journal of Robotics Research (ISSN 0278-3649), vol. 3, Summer 1984, p. 113-133. refs

The paper addresses some of the fundamental problems of energy efficiency, design, and adaptive gait control of quadruped walking vehicles. The design principle of a leg called a gravitationally decoupled actuator (GDA) is shown to be indispensable for realizing energetically efficient walking motion. A novel mechanism, the three-dimensional Cartesian-coordinate pantograph (PANTOMECC), which follows the GDA principle and has a lightweight structure, is introduced. A constructed quadruped walking vehicle model is then described: the walking vehicle has the PANTOMECC leg mechanisms, eight tactile sensors and a posture detector, and is hierarchically controlled by a microcomputer. Comparatively high energy efficiency and a certain degree of terrain adaptability is demonstrated. It is thus shown that a practical walking vehicle can be designed using the proposed method. The adaptive gait control problem is formalized, and an algorithm for terrain-adaptive gait control is presented. By computer simulation, it is shown that the algorithm produces an efficient gait while avoiding 'deadlock' positions in negotiating terrain. The algorithm is shown to be applicable for the control of future quadruped walking vehicles with visual sensors. Author

A84-37673

**AN APPROACH TO THE USE OF TERRAIN-PREVIEW INFORMATION IN ROUGH-TERRAIN LOCOMOTION BY A HEXAPOD WALKING MACHINE**

F. OZGUNER, S. J. TSAI, and R. B. MCGHEE (Ohio State University, Columbus, OH) International Journal of Robotics Research (ISSN 0278-3649), vol. 3, Summer 1984, p. 134-146. refs

(Contract MDA903-82-K-0058)

Until the present time, experiments with computer-controlled walking machines have generally not made use of terrain-preview information. This paper presents the results of experiments with a laboratory-scale hexapod walking machine furnished with a triangulation ranging system making use of two charge-injection-device (CID) television cameras and a hand-held laser. The operator uses the laser to designate candidate footholds, which are accepted or rejected automatically by the machine. Accepted footholds guide the machine over rough terrain with very little disturbance to body attitude. This semiautomatic system represents a step toward the eventual realization of a fully automatic system. The paper includes a description of both hardware and software, and presents experimental results verifying the practicality of the approach. Author

A84-37829

**A PHYSIOLOGICAL RATIONALIZATION OF OPERATORS' WORK AND REST SCHEDULES IN THE PETROLEUM PROCESSING INDUSTRY [FIZIOLOGICHESKOE OBOSNOVANIE REZHIMOV TRUDA I OTDYKHA DLIA OPERATOROV NEFTEPERERABATYVVAIUSHCHEI PROMYSHLENNOSTI]**

I. I. ALEKPEROV, A. N. MELKUMIAN, A. I. ZAMCHALOV, A. I. ALLAKHVERDIEV, and L. M. TSIBULEVSKII (Institut Gigieny Truda i Profzabolevanii, Sumgait, Azerbaidzhan SSR) Gigiena Truda i Professional'nye Zabolevaniia, Nov. 1983, p. 13-16. In Russian. refs

A84-37830

**PSYCHOPHYSIOLOGICAL CHARACTERISTICS OF THE WORK CONDITIONS OF EQUIPMENT OPERATORS ON A LOGGING EXPEDITION [PSIKHOFIZIOLOGICHESKAIA KHARAKTERISTIKA USLOVII TRUDA LESOZAGOTOVITELEI-MEKHANIZATOROV, KH VAKHTOVYM METODOM]**

Z. I. VENDROV, A. M. URZAEV, and M. A. MEDVEDEV (Tomskii Meditsinskii Institut, Tomsk, USSR) Gigiena Truda i Professional'nye Zabolevaniia, Nov. 1983, p. 16-19. In Russian.

A84-37831

**AN EVALUATION OF THE WORK STRESS OF MAIL SORTERS AND TELEGRAPH OPERATORS [OTSENKA TIAZHESTI I NAPRIAZHENNOSTI TRUDA SORTIROVSHCHIKOV POCHTOVYKH OTPRAVLENI I OPERATOROV SVIAZI]**

V. R. KUCHMA (I Moskovskii Meditsinskii Institut, Moscow, USSR) Gigiena Truda i Professional'nye Zabolevaniia, Nov. 1983, p. 20-24. In Russian. refs

A84-37834

**HYGIENIC ESTIMATION OF THE NOISE OF BORING EQUIPMENT [GIGIENICHESKAIA OTSENKA SHUMA RASTOCHNOGO OBORUDOVANIIA]**

K. P. ANTONOVA (Institut Gigieny Truda i Profzabolevanii, Khar'kov, Ukrainian SSR) Gigiena Truda i Professional'nye Zabolevaniia, Nov. 1983, p. 49, 50. In Russian.

A84-39232\* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**EXTENDED MISSION LIFE SUPPORT SYSTEMS**

P. D. QUATTRONE (NASA, Ames Research Center, Moffett Field, CA) IN: The case for Mars; Proceedings of the Conference, Boulder, CO, April 29-May 2, 1981. San Diego, CA, Univelt, Inc., 1984, p. 131-162. refs (AAS PAPER 81-237)

The life support systems employed in manned space missions have generally been based on the use of expendables, such as, for instance, liquid oxygen. For the conducted space missions, such systems have advantages related to volume, weight, and economy of power consumption. However, this situation will change in connection with Shuttle Orbiter missions of extended duration, permanent manned facilities in low-earth orbit, and ultimately manned planetary vehicles. A description is given of suitable regenerative life support systems for such extended manned space missions. Attention is given to advanced life support systems technology, air revitalization, CO<sub>2</sub> reduction, oxygen generation, nitrogen generation, trace contaminant control, air revitalization system integration, control/monitor instrumentation, water reclamation, solid waste management, manned testing and life support integration, an enhanced duration orbiter, a space operations center, manned interplanetary life support systems, and future development requirements. G.R.

A84-39238\* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**THE ATMOSPHERE OF MARS - RESOURCES FOR THE EXPLORATION AND SETTLEMENT OF MARS**

T. R. MEYER (Boulder Center for Science and Policy, Boulder, CO) and C. P. MCKAY (NASA, Ames Research Center, Space Science Div., Moffett Field, CA) IN: The case for Mars; Proceedings of the Conference, Boulder, CO, April 29-May 2, 1981. San Diego, CA, Univelt, Inc., 1984, p. 209-232. refs (AAS PAPER 81-244)

This paper describes methods of processing the Mars atmosphere to supply water, oxygen and buffer gas for a Mars base. Existing life support system technology is combined with innovative methods of water extraction, and buffer gas processing. The design may also be extended to incorporate an integrated greenhouse to supply food, oxygen and water recycling. It is found that the work required to supply one kilogram of an argon/nitrogen buffer gas is 9.4 kW-hr. To extract water from the dry Martian atmosphere can require up to 102.8 kW-hr per kilogram of water depending on the relative humidity of the air. Author

A84-39284\*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**THE PILOT INTERFACE WITH COCKPIT AUTOMATION AND ADVANCED AVIONICS SYSTEMS**

D. A. HINTON and J. D. SHAUGHNESSY (NASA, Langley Research Center, Flight Operations Research Branch, Hampton, VA) IN: General Aviation Technology Conference, Hampton, VA, July 10-12, 1984, Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1984, p. 65-72. refs (AIAA PAPER 84-2241)

A flight test program was conducted with a sophisticated, integrated avionics system to study pilot workload and the pilot interface with high levels of avionics capability. The study indicates that advanced systems can provide improved information to the pilot and additional functional capability. The study also indicates that additional research is needed to develop the knowledge base required to design pilot interfaces with such systems. The combination of the pilot interface and the high level of system capability used in this study led to pilot blunders associated with navigation data management, autopilot management, and maintaining awareness of system status. A functional relationship is suggested between level of avionics system sophistication and the required state-of-the-art in pilot/avionics interface design. Suggested guidelines for the design of the pilot/avionics interface for advanced avionics systems are given. Author

A84-39707

**ERGONOMICS IN GENERAL AVIATION - AN ILLUSTRATED EXAMPLE**

H. DALE (Hull, University, Hull, Yorks., England) International Journal of Aviation Safety (ISSN 0264-6803), vol. 2, June 1984, p. 43-50.

The design of the cockpit instruments in a Cessna 150 general-aviation aircraft is examined critically from an ergonomics perspective. The flight instruments, auxiliary displays, auxiliary controls, and electrical switches are discussed and illustrated with photographs. While many of the faults noted are merely annoying, it is argued that some may contribute to accidents. T.K.

N84-26592# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

**ESTIMATING DETECTION RANGE AND RANGE LOSS LOOKING THROUGH WINDSHIELDS AND HEAD-UP DISPLAYS**

H. C. SELF *In its* Opt. and Human Performance Evaluation of HUD (Head-Up Display) Systems p 31-54 15 Dec. 1983 (AD-P003161) Avail: NTIS HC A05/MF A01 CSCL 06P

It is very important for an aircraft pilot to be able to detect distant objects. His ability to do so is impaired by loss of target contrast due to the atmosphere and to passive optical elements through which he must look. These elements are the aircraft's windshield and head-up display (HUD) and his own helmet visor and spectacles or sun glasses. The problem is to determine loss of target detection range due to loss of contrast. This report examines loss of detection range by combining sighting geometry with the contrast transmission of the atmosphere and other optical elements and with human ability to detect targets. Numerical examples will be presented as tutorial exercises and target detection ranges for selected conditions will be worked out in detail to familiarize the reader with the graphical method derived in this paper. GRA

N84-26593# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

**DIRECT PERFORMANCE ASSESSMENT OF HUD (HEAD-UP DISPLAY) DISPLAY SYSTEMS USING CONTRAST SENSITIVITY**

A. P. GINSBURG *In its* Opt. and Human Performance Evaluation of HUD (Head-Up Display) Systems p 55-66 15 Dec. 1983 (AD-P003162) Avail: NTIS HC A05/MF A01 CSCL 01C

A major problem with creating performance-related metrics has been the lack of analytical throughput, that is, the ability to characterize relevant target information in the same language used to specify system capability, visual processes and performance metrics such as detection range. Unified metrics of display quality are needed that directly relate target information to display capability and operator performance. Although the physics of displays are well understood, there has been a lack of understanding and inability to quantify visual target acquisition. However, increased understanding of visual science now, when coupled with linear systems analysis, promises to create unified performance-based metrics. In particular, contrast sensitivity changes to sine-wave gratings imaged through a display system yield a contrast sensitivity function that can be related to detection range. The spatial frequency bandwidth of relevant target information can be related to changes in the contrast sensitivity function, which, in turn, can be related to changes in target contrast and detection range. This paper discusses an application of this approach for quantifying the detection range impact of several different headup (HUD) displays. GRA

N84-26634# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

**VISUAL EFFECTS OF F-16 CANOPY/HUD (HEAD-UP DISPLAY) INTEGRATION**

L. V. GENCO *In* Dayton Univ. Conf. on Aerospace Transparent Mater. and Enclosures p 793-807 Dec. 1983 (AD-P003221) Avail: NTIS HC A08/MF A01 CSCL 01C

Future fighter aircraft will be fitted with Wide Field of View Head Up Displays (WFOV HUDs), and probably, curved

windscreens. Initial flight tests with a WFOV LANTIRN HUD in an F-16 fighter resulted in test pilots complaining of several visually related problems. One of the complaints was of double vision. Either two aiming symbols or two targets were seen when the pilot kept both eyes open. Other complaints included those of blurred images and a change in depth perception when looking through the HUD-canopy combination. This paper is a report of some of the work done by the Air Force Aerospace Medical Research Laboratory in an attempt to determine both the source of the problem and possible solutions. GRA

N84-26941# Joint Publications Research Service, Arlington, Va. **EVALUATION OF ENERGY CHARACTERISTICS OF BIPEDAL WALKING AND RUNNING BY MODEL ANALYSIS Abstract Only**

V. V. VELETSKIY and Y. V. BOLOTIN *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) p 41 13 Apr. 1984 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Tverdogo Tela (Moscow), no. 4, Apr. 1983 p 89-94 Avail: NTIS HC A04/MF A01

The energy characteristics of bipedal motion on a horizontal ground are evaluated with the aid of the mathematical apparatus for analyzing the dynamics of a free material point, in this case the center of mass. The equations of its motion are formulated differently for running and for walking. In the case of running the duration of contact between foot and ground is assumed to be so short as to make the flight duration almost identical to the step duration. In the case of walking, with the object assumed to be resting on one leg at every instant of time, two modes are considered. The first mode of walking is with the center of mass moving as a pendulum. The second mode of walking is with the center of mass remaining at a constant given altitude above ground. The relations for energy consumption per unit distance or per unit time, respectively, indicate ways to optimize the motion for maximum economy in each case, the variable parameter being the length of step. After first disregarding the dynamics of leg transfer in the first approximation, the analysis continues with the dynamics taken into account and then with impact effects also corrected for. Numerical data are given and their accuracy is estimated. B.W.

N84-26942# Joint Publications Research Service, Arlington, Va. **TREATMENT OF WALKING AS CONTROLLABLE SELF-EXCITED OSCILLATIONS Abstract Only**

Y. I. NEYMARK *In its* USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-003) p 41-42 13 Apr. 1984 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Mekhan. Tverdogo Tela (Moscow), no. 4, Apr. 1983 p 81-88 Avail: NTIS HC A04/MF A01

Walking is treated as controllable oscillatory motion of a bipedal mechanism. Each cycle is subdivided into two phases, first one leg swinging over with other leg as pivot and then switching of legs, each leg being simulated by a two-bar kinematic linkage. This motion is analyzed in the Lagrangian formalism, with the jerk of the pivot leg prior to switching regarded as both self-excitation and means of speed control. The objects of control are angular displacement and velocity of the swinging leg, running being excluded from consideration on account of its being a different process with three phases per cycle, also pace stabilization and smoothness. The ground is assumed to be hard, a soft ground constituting an extreme case without jerking. Author

N84-27399# Joint Publications Research Service, Arlington, Va. **BIOFEEDBACK METHODS AND QUALITY OF OPERATOR'S PERFORMANCE Abstract Only**

M. V. FROLOV, V. A. GLAZKOVA, and L. S. KHACHATURYANTS *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-013) p 38 22 Jun. 1984 Transl. into ENGLISH from Psikhologicheskii Zh. (Moscow), v. 5, no. 2, Mar. - Apr. 1984 p 85-91

Avail: NTIS HC A07/MF A01

The quality of an operator's performance depends substantially on the functional state of the individual and on his emotional

stress. An instruction method is proposed in the system of biofeedback to a random direction by the functional state based on the laws of adaptive selfregulation. A model is developed with a work schedule leading to a stress of the operator. Four stage experiments are performed; (1) training of the test subjects to solve the operator's tasks (OT), (2) modelling of OT under stress conditions, (3) education of subjects on controlling their emotional conditions by the biofeedback methods, and (4) modelling of OT under stress. After BioFeedback Selfregulation BFS, the test subjects performed better, they were more relaxed and their work was more accurate. After training in the BFS system, errors in solving OT dropped considerably, and the physiological exertion in solving various problems dropped also. M.A.C.

**N84-27414#** Joint Publications Research Service, Arlington, Va. **POSSIBILITIES OF CREATING INVARIANT MAN-MACHINE SYSTEMS Abstract Only**

V. G. ZAZYKIN *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-U88-84-013) p 91-92 22 Jun. 1984 Transl. into ENGLISH from *Psikhologicheskii Zh.* (Moscow), v. 5, no. 2, Mar. - Apr. 1984 p 76-84  
Avail: NTIS HC A07/MF A01

An important task of engineering psychology is the design of systems which, while performing their functions, could compensate for various disturbances, i.e., design of invariant systems. Invariant systems are systems with complete or almost complete functional independence of the disturbance acting on them. Three main research directions were identified for the invariant systems: the problem of disturbance compensation, development of methods for transferring of the controlling effects without changes and delays and development of analytical methods and syntheses of control with flexible structures. Theoretical analysis and experimental work performed on a system of observation and stabilization showed it was possible to construct invariant man-machine systems (MMS).

Author

**N84-27422#** Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Abt. Flugphysiologie.

**MODELS FOR THE EVALUATION OF WORK LOADS OF CREWS DURING LONG DISTANCE FLIGHT [MODELLE ZUR BEURTEILUNG DER BELASTUNG VON FLUGBESATZUNGEN AUF LANGSTRECKENFLUEGEN]**

H. M. WEGMENN *In its* Proc. of Sci. Meeting on the Occasion of the Inauguration of New Buildings for The DFVLR Inst. of Aerospace Med. p 45-56 Oct. 1983 refs In GERMAN  
Avail: NTIS HC A07/MF A01; DFVLR, Cologne DM 43

Pilot fatigue, operational stresses, and demands were measured. A model which measures human fatigue and tolerance was designed. Different investigations were compared and are discussed. The models determine quantitatively and the following operational stresses: length of effort; afterflight, different crossed time zones, departure and arrival time, length of transit stops, number of flight days, and accumulated flight services during tour of duty. The compilation of the factors provide numerical values which predict the stresses of a final cycle or a single segment.

Transl. by E.A.K.

**N84-27442#** Toronto Univ., Downsview (Ontario). Inst. for Aerospace Studies.

**DESIGN AND ANALYSIS OF A LONGITUDINAL RIDE COMFORT CONTROL SYSTEM FOR A SHORT TAKE-OFF AND LANDING (STOL) AIRCRAFT**

A. LANOUILLE Apr. 1984 69 p refs  
(UTIAS-TN-254; ISSN-0082-5263) Avail: NTIS HC A04/MF A01

The application of Active Controls Technology to Short Take Off and Landing aircraft is investigated. The investigation is restricted to a longitudinal ride comfort control system. A typical STOL aircraft is modelled as well as an altitude hold autopilot to provide a comparison for the study. Etkin's four point model for response to turbulence with a Von Karman spectrum is used as turbulence model in the performance analysis. Optimal control theory is used to design an optimal altitude hold autopilot for the

aircraft. Using this control system a 98 percent reduction in load factor is achieved. As a consequence of this improvement, the wing root bending moment due to turbulence is reduced to 20 percent of its original value. M.A.C.

**N84-27443#** Army Aeromedical Research Lab., Fort Rucker, Ala.

**IN-FLIGHT EVALUATION OF 2 MOLECULAR SIEVE OXYGEN CONCENTRATION SYSTEMS IN US ARMY AIRCRAFT (JU-1H AND JU-21G) Final Report**

W. CHAFFIN, JR., B. F. HIOTT, and F. S. KNOX, III Mar. 1984 43 p

(Contract DA PROJ. 3E1-62777-A-878)

(AD-A140634; USAARL-84-6) Avail: NTIS HC A03/MF A01 CSDL 06K

The logistical problems associated with using high pressure gaseous oxygen systems have encouraged the development of molecular sieve oxygen concentration systems for use on board aircraft. This report summarizes the in-flight static performance characteristics of two such oxygen concentrators installed in a JU-21G fixed-wing, twin-engine turbopropeller aircraft and a JUH-1H turbine-powered helicopter. Flight profiles consisting of five separate flights at altitudes of 1,524, 3,048, 4,572, 6,096, and 7,620 meters (5,000, 10,000, 15,000, 20,000, and 25,000 feet) were flown in the JU-21G and five separate flights at altitudes of 1,524, 3,048 and 4,572 meters were flown in the JUH-1H. Oxygen concentration at flows of 15, 25, 35, and 70 liters per minute were recorded at each altitude. These flows were chosen to represent normal breathing requirements for one- and two-man crews. In all cases, the concentrators met or exceeded the requirements of MIL-R-83178. The use of engine bleed air to drive the oxygen concentrators produced no noticeable effect on aircraft performance. Author (GRA)

**N84-27444#** Bolt, Beranek, and Newman, Inc., Cambridge, Mass.

**DISPLAY-CONTROL COMPATIBILITY IN 3-D DISPLAYS Final Report, 1 Jul. 1980 - 31 Dec. 1983**

A. W. F. HUGGINS and D. J. GETTY 29 Feb. 1984 29 p

(Contract N00014-80-C-0750; RR0-4209)

(AD-A140640; BBN-5584) Avail: NTIS HC A03/MF A01 CSDL 06P

This research program explored human perceptual performance as influenced by display-control compatibility with a volumetric 3-D display technique. The work was organized into three phases. In the first, we studied how the speed and accuracy of the operator's decisions about the orientation of a displayed object (a cube) was affected as this orientation was varied relative to that of a fixed control (a cubical response box). In the second, we studied how accurately the observer can perceive and project a trajectory presented within the display, as a function of the trajectory's orientation. In the third phase, we used a real-time control task to measure directly the relative utility of the three dimensions of the display. Author (GRA)

**N84-27445#** Carnegie-Mellon Univ., Pittsburgh, Pa. Robotics Inst.

**TESTING AND CONTROL OF A COMPLIANT WRIST**

M. R. CUTKOSKY, J. M. JOURDAIN, and P. K. WRIGHT 9 Mar. 1984 29 p

(AD-A140842; CMU-RI-TR-84-4) Avail: NTIS HC A03/MF A01 CSDL 13I

This report summarizes the evaluation of a controllable, instrumented compliant wrist. The design of the wrist and the concept of a remote center of compliance (RCC) have been described in an earlier report. The wrist is mounted on a large industrial robot used to load precisely machined parts into jigs and fixtures on computer controlled machine tools. The robot and the machine tools form part of an automated cell in which machined parts can be produced with a minimum of human intervention. Loading parts into machine tools is essentially an assembly operation in which the parts are slid into clamps or fixtures and

for this reason the RCC techniques that have been developed for assembly robots can also be applied to a machining cell. GRA

**N84-27446#** Georgia Inst. of Tech., Atlanta. School of Industrial and Systems Engineering.

**A MODEL OF HUMAN PROBLEM SOLVING IN DYNAMIC ENVIRONMENTS M.S. Thesis**

A. E. KNAEUPER Aug. 1983 73 p  
(AD-A140862; REPT-83-3) Avail: NTIS HC A04/MF A01  
CSCL 05H

The increased use of automation in aircraft, ships, process plants, transportation networks, and other large-scale systems is changing the human's role in such systems. The manual activities of the human operator are increasingly supplanted by monitoring of automation and occasional problem solving activities. This thesis focuses on these problem solving activities. Models of human problem solving are reviewed, with emphasis on those applicable to situations involving human-machine interaction in detecting, diagnosing, and compensation for system failures. From this review it emerges that most models developed thus far focus on a single aspect of problem solving. An overall model is presented, which considers the full breadth and robustness of human problem solving behavior in dynamic environments. A realization of the general structure of this model within a particular rule-based computer program is discussed. Results are presented from applying this program to modeling human problem solving in a process control task. Author (GRA)

**N84-27447#** Los Alamos Scientific Lab., N. Mex. Industrial Hygiene Group.

**EVALUATION OF PROPOSED HUMAN SUBJECT CERTIFICATION TESTS FOR SELF-CONTAINED BREATHING APPARATUS Progress Report, 1 Aug. 1980 - 30 Oct. 1982**

J. F. STAMPER, A. L. HACK, and A. TRUJILLO Mar. 1983  
57 p refs  
(Contract DI-BM-J0100068; W-7405-ENG-36)  
(PB84-172212; BM-OFR-48-84) Avail: NTIS HC A04/MF A01  
CSCL 06J

A series of human subject certification tests for self-contained breathing apparatus (SCBA) are proposed. The major conclusions derived during this study are: (1) The proposed tests are not too physically demanding. (2) There should be a minimum test subject weight. (3) The important apparatus variables to be measured are breathing resistance, temperature, and CO<sub>2</sub> and O<sub>2</sub> concentrations of the inhaled gas. (4) Continuous monitoring should be employed. (5) New pass-fail criteria based on realistic estimates of the physiological requirements of the user, tempered by present and future engineering limitations, are needed. (6) Breathing machines should be used for the majority of certification testing. (7) A more realistic ergonomics test is needed. (8) System gas leak and facepiece leakage tests are also needed. GRA

**N84-27950#** Joint Publications Research Service, Arlington, Va. **INSTITUTE ACHIEVEMENTS IN MAN-MACHINE RELATIONS Abstract Only**

J. DENES *In its* East Europe Rept.: Sci. Affairs (JPRS-ESA-84-004) p 26 1 Feb. 1984 Transl. into ENGLISH from Inform. Elektron. (Budapest), no. 5, 1983 p 257-261  
Avail: NTIS HC A03/MF A01

The status of computer technology is assessed briefly. A Color Display Processor (CDP), which is part of a microcomputer, is described. The application of the CDP to meteorological programs, image processing, medical science, computer aided design, and nondestructive materials testing is discussed. R.S.F.

**N84-28438#** Wisconsin Univ., Madison.

**THE DESIGN OF MANUALLY OPERATED CONTROLS FOR A SIX-DEGREE-OF-FREEDOM GROUND-BORNE WALKING VEHICLE: CONTROL STRATEGIES AND STEREOTYPES**

D. B. BERINGER *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 188-192 Apr. 1984  
(AD-P003273) Avail: NTIS HC A99/MF A01 CSCL 05H

The problems posed by control of walking six-degree-of-freedom vehicles vary with specific task requirements. Different strategies are required for cruising supervisory control and precision foot placement. These, along with anthropometric and stereotypic considerations, directly affect the design of the manually operated controls and the degree to which multiple-axis/multiple-task integration can be achieved within a single controller.

Author (GRA)

**N84-28441#** Virginia Polytechnic Inst. and State Univ., Blacksburg.

**VISUAL DISPLAY TECHNOLOGY: A DEVELOPING CHALLENGE FOR THE BEHAVIORAL SCIENTIST**

H. L. SNYDER *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 271-275 Apr. 1984  
(AD-P003290) Avail: NTIS HC A99/MF A01 CSCL 05J

Visual display technology is developing at a pace far exceeding that of the required behavioral data for representative task requirements. Relations between current and projected display capabilities are compared with pertinent human visual performance data and limitations. GRA

**N84-28449#** Norwich Univ., Northfield, Vt.

**WINDOWS ON A FUTURE WORLD: HUMAN DIMENSIONS OF AIR FORCE DOCTRINE IN THE 21ST CENTURY**

M. C. DEVILBISS *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 357-361 Apr. 1984  
(AD-P003307) Avail: NTIS HC A99/MF A01 CSCL 05A

In 1983 the Air Force accepted the new Army combat doctrine Airland Battle as a basis for joint tactical planning. This paper reviews this doctrine, examining the role of the Air Force and argues that in order for this new concept to be successful, a new kind of Air Force member with certain identifiable abilities and attitudes will be required in a battlefield of the future. The paper goes on to examine some of the implications of this hypothesis from the perspective of both the individual warrior and the combat team, and concludes by identifying some of the potential consequences to the Air Force at the organizational level in areas of accession and training of new personnel. Author (GRA)

**N84-28457#** Illinois Univ., Urbana.

**THE LIMITS OF MULTIPLE RESOURCE THEORY IN DISPLAY FORMATTING: EFFECTS OF TASK INTEGRATION**

C. D. WICKENS, D. BOLES, P. TSANG, and M. CARSWELL *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 440-444 Apr. 1984

(Contract N00014-79-C-0658)  
(AD-P003321) Avail: NTIS HC A99/MF A01 CSCL 05H

Multiple Resource Theory proposes that multi-variable displays will be better processed when information is presented in several different display formats (i.e., verbal, spatial, visual, auditory). This superiority of separate formats does not hold if the displayed elements are correlated or must be integrated into a single mental model. We report two experiments that confirm this hypothesis: In experiment 1, subjects monitor two numerical displays. If the task calls for separate independent decisions concerning the value of each display, performance is best when one is spatial (analog) and the other verbal. If the task calls for integration of both displays into a common decision rule, performance is best when homogeneous display formats are used. In experiment 2, subjects monitor the display of several dynamic elements that compose a dynamic system. Performance is found to be better if these correlated elements are integrated into a configural object display, than if they are displayed as separate bargraphs. Author (GRA)

**N84-28461#** Illinois Univ., Champaign. Cognitive Psychophysiology lab.  
**PSYCHOPHYSIOLOGICAL TOOLS IN ENGINEERING PSYCHOLOGY**

E. DONCHIN, A. KRAMER, A. MANE, D. KARIS, and E. HEFFLEY *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 542-546 Apr. 1984  
 (AD-P003337) Avail: NTIS HC A99/MF A01 CSCL 05I

Selective attention is a crucial component of task performance in virtually every man-machine system. Thus, theoretical and practical considerations relating to attention should be a primary focus in several domains within the human engineering of such systems. In the realm of design, a general psychological understanding of attentional capacities and mechanisms should guide the development complex systems. In systems evaluation, limitations in the ability to attend to multiple information sources should be a primary consideration in judging the merits of various prototypes. In the selection of operations personnel for complex systems, individual differences in the ability to selectively attend to relevant information channels can be an important factor in the prediction of future performance. Research on the relation of human event-related brain potentials to selective attention has made contributions to our theoretical understanding of attentional capacities and has yielded several methods for the practical application of ERPs to human engineering problems. GRA

**N84-28470#** Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

**CRITERIA FOR SELECTING SUBJECTS FOR THE ASSESSMENT OF ADVANCED CREW SYSTEM CONCEPTS**

G. G. KUPERMAN *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 630-634 Apr. 1984  
 (AD-P003354) Avail: NTIS HC A99/MF A01 CSCL 05I

A five-Laboratory working group was tasked with the assessment of crew system concepts being considered for the dual role fighter. The methodology employed was based on exposing rated TAC personnel to these concepts through the role playing of a highly structured mission scenario. Because many of the avionics subsystems of interest are developmental, the issue of subject experience was considered to be critical to the validity of judgements elicited in subject de-briefing. Author (GRA)

**N84-28474#** Naval Ocean Systems Center, San Diego, Calif.  
**NOSC (NAVAL OCEAN SYSTEMS CENTER)-HAWAII PERCEPTUAL SCIENCES RESEARCH PROGRAM**

R. L. PEPPER *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 672-676 Apr. 1984  
 (AD-P003361) Avail: NTIS HC A99/MF A01 CSCL 05J

The broad objective of our group is to develop an understanding of the dynamic interaction which occurs between the human operator and the sensors, controls, and displays of remotely manned systems (teleoperators). The emphasis is placed on establishing a fundamental understanding of man's perception of information received from sensors and displays and his performance using control systems and their associated manipulator devices, in order to produce increasingly intelligent, skilled performance across a variety of specified tasks. In order to accomplish this objective, we have begun to develop a general model of remote operator performance that will ultimately have broad predictive ability. A fundamental prerequisite for the development of this model is a data base of performance derived both from empirical tests as well as from predictions based on existing models of perception and motor-skill performance. GRA

**N84-28480#** Army Research Inst. for the Behavioral and Social Sciences, Alexandria, Va.

**VIDEO GAMES: A HUMAN FACTORS GUIDE TO VISUAL DISPLAY DESIGN AND INSTRUCTIONAL SYSTEM DESIGN**

D. J. BOBKO *In* AF Academy Proc. of the 9th Symp. on Psychol. in the DOD p 712-716 Apr. 1984  
 (AD-P003368) Avail: NTIS HC A99/MF A01 CSCL 05I

Electronic video games have many of the same technological and psychological characteristics that are found in military

computer-based systems. For this reason, the video game is both a fascinating object of study and a valuable experimental apparatus. The results of two on-going research programs, both of which employ video games as experimental stimuli, are presented here. The first research program seeks to identify and exploit the characteristics of video games in the design of game-based training devices. The second program is designed to explore the effects of electronic video display characteristics on perceptual judgments. The empirical results of these two programs are shown to have practical application in training device design and visual display design. Author (GRA)

**N84-28484\*** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

**HEAT RESISTANT PROTECTIVE HAND COVERING Patent**

R. P. TSCHIRCH (Little (Arthur D.), Inc., Cambridge, Mass.), K. R. SIDMAN (Little (Arthur D.), Inc., Cambridge, Mass.), and I. J. ARONS, inventors (to NASA) (Little (Arthur D.), Inc., Cambridge, Mass.) 19 Jun. 1984 6 p Filed 30 Jun. 1982 Supersedes N82-32985 (20 - 23, p 3331) Sponsored by NASA (NASA-CASE-MS-C-20261-1; US-PATENT-4,454,611; US-PATENT-APPL-SN-393586; US-PATENT-CLASS-2-161R; US-PATENT-CLASS-2-164; US-PATENT-CLASS-2-167) Avail: US Patent and Trademark Office CSCL 06Q

A heat-resistant aromatic polyamide fiber is described. The outer surface of the shell is coated with a fire-resistant elastomer and liner. Generally conforming and secured to the shell and disposed inwardly of the shell, the liner is made of a felt fabric of temperature-resistant aromatic polyimide fiber.

Official Gazette of the U.S. Patent and Trademark Office

**N84-28485\*#** Jet Propulsion Lab., California Inst. of Tech., Pasadena.

**EVALUATION OF THE HARDMAN COMPARABILITY METHODOLOGY FOR MANPOWER, PERSONNEL AND TRAINING**

W. ZIMMERMAN, R. BUTLER, V. GRAY, and L. ROSENBERG 29 Feb. 1984 182 p refs  
 (Contract NAS7-918)  
 (NASA-CR-173733; JPL-PUBL-84-10; NAS 1.26:173733; ARI-13AR119; ARI-13AR183-35) Avail: NTIS HC A09/MF A01 CSCL 05H

The methodology evaluation and recommendation are part of an effort to improve Hardware versus Manpower (HARDMAN) methodology for projecting manpower, personnel, and training (MPT) to support new acquisition. Several different validity tests are employed to evaluate the methodology. The methodology conforms fairly well with both the MPT user needs and other accepted manpower modeling techniques. Audits of three completed HARDMAN applications reveal only a small number of potential problem areas compared to the total number of issues investigated. The reliability study results conform well with the problem areas uncovered through the audits. The results of the accuracy studies suggest that the manpower life-cycle cost component is only marginally sensitive to changes in other related cost variables. Even with some minor problems, the methodology seem sound and has good near term utility to the Army. Recommendations are provided to firm up the problem areas revealed through the evaluation. M.A.C.

**N84-28486#** California Univ., San Diego. Jolla Inst. for Cognitive Science.

**USER CENTERED SYSTEM DESIGN. PART 2: COLLECTED PAPERS FROM THE UCSD HMI PROJECT Technical Report**

Mar. 1984 102 p  
 (Contract N00014-79-C-0323)  
 (AD-A141023; ICS-8402) Avail: NTIS HC A06/MF A01 CSCL 05H

This report is a collection of recent papers by the Human-Machine Interaction group at the University of California, San Diego. Contents includes: Stages and Levels in Human-Machine Interaction; The Nature of Expertise in UNIX; Users in the Real World; Constructive Interaction: A Method for Studying

User-Computer-User Interaction; Formalizing Task Descriptions for Command Specification and Documentation; Problems in Evaluation of Human-Computer Interfaces: A Case Study; Planning Nets: A Framework for Analyzing User-Computer Interactions; Activity Scripts; Describe: Environments for Specifying Commands and Retrieving Information by Elaboration; Caveats on the Use of Expert Systems; and Software Engineering for User Interfaces.

GRA

mental stress; performance checking before and after training in a simulator; epinephrine, and nonadrenaline secretions; pretraining and posttraining peak heart rate; heat stress; pilots in survival situations in the air, on the ground, and in the sea; escape, survival, and rescue; use of a parachute; and clothing were discussed.

Author (ESA)

**N84-28487#** Institute for Perception RVO-TNO, Soesterberg (Netherlands). Afdeling Verkeersgedrag.  
**ERGONOMIC ASPECTS OF ROAD VEHICLES. PART 1: A LITERATURE SURVEY OF SOME ASPECTS**  
 B. DEWAAL and J. MORAAL Sep. 1983 82 p refs In DUTCH; ENGLISH summary  
 (Contract A81/KL/040)  
 (IZF-1983-15; TDCK-78756) Avail: NTIS HC A05/MF A01

The literature on ergonomic aspects of motor cars and trucks was reviewed, especially on the driver's task. Ergonomic factors are differentiated with regard to their relative importance for an optimal ergonomic design. Basic data to be used for the development of an instrument for ergonomic evaluation of road vehicles are collected. Ergonomic standards are formulated.

Author (ESA)

**N84-28488#** Battelle Inst., Frankfurt am Main (West Germany).  
**FREQUENCY SELECTED AND AMPLITUDE LIMITED PERSONAL NOISE PROTECTORS Final Report, Sep. 1980**  
 W. BURGTORF and R. WEISS Bonn Bundesministerium fuer Forschung und Technologie Mar. 1984 92 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie  
 (BMFT-FB-HA-84-016; ISSN-0171-7618) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 19,50

An electroacoustic transmission system for ear protectors is described. A frequency selected and amplitude limited system was developed and integrated into ear muffs. A ventilating system was integrated to improve comfort. Hearing test results in laboratory show a speech intelligibility increase of 20% for otoplastic devices and 12% for ear muffs, and the ventilating system reduces humidity formed under the ear muffs.

Author (ESA)

**N84-28489#** Battelle Inst., Frankfurt am Main (West Germany).  
 Hauptabteilung Physik.  
**FEASIBILITY STUDY ON A NEW TYPE OF PERSONAL NOISE PROTECTION Final Report, Dec. 1979**  
 K. J. BEUTER, H. SUDHOF, A. SAHM, and R. WEISS Bonn Bundesministerium fuer Forschung und Technologie Mar. 1984 87 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie  
 (BMFT-FB-HA-84-017; ISSN-0171-7618) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 18,50

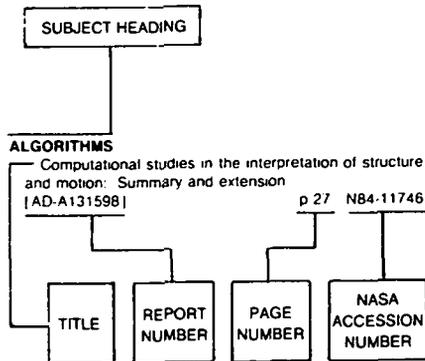
Active sound control by interference for personal noise protection was studied. Arrangements of microphones, loudspeakers and electronic circuits were compared in a systems theoretical analysis and in acoustic measurements and a control system was built. A noise level reduction 10 dB over a wide frequency range is obtained.

Author (ESA)

**N84-28490#** Research Inst. of National Defence, Stockholm (Sweden). Dept. 5.  
**THE MILITARY AIRCREW WORK ENVIRONMENT**  
 M. A. THANDERZ, L. E. LARSSON, P. O. RUTBERG, C. SPANGBERG, and E. SVENSSON Mar. 1984 99 p In SWEDISH; ENGLISH summary Presented at Informationsdag 1983, Stockholm, 12 Jul. 1983  
 (FOA-A-59005-H1-H2; ISSN-0281-0239) Avail: NTIS HC A05/MF A01

Flight crew working environment factors on the ground, in an aircraft, and in emergency situations; anthropometry; biodynamics and dynamic response index for rescue systems applications;

## Typical Subject Index Listing



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

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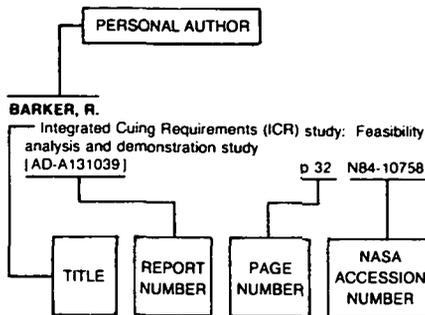
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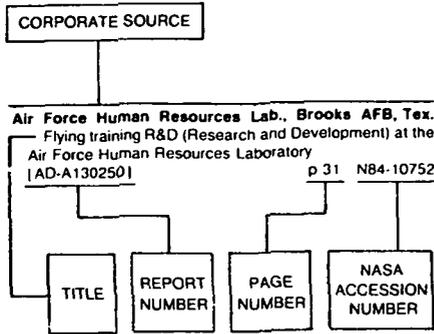
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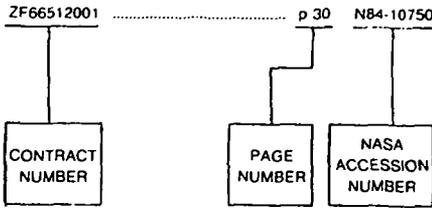
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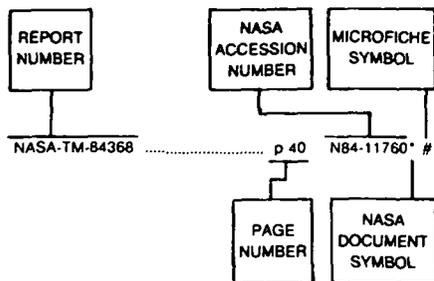
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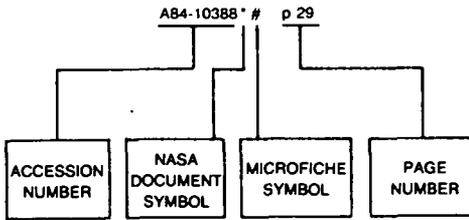
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1. Report No. NASA SP-7011 (263)	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle Space Medicine and Biology Continuing Bibliography (Supplement 263)		5. Report Date October 1984	6. Performing Organization Code
		8. Performing Organization Report No.	
7. Author(s)		10. Work Unit No.	
9. Performing Organization Name and Address National Aeronautics and Space Administration Washington, D.C. 20546		11. Contract or Grant No.	
		13. Type of Report and Period Covered	
12. Sponsoring Agency Name and Address		14. Sponsoring Agency Code	
		15. Supplementary Notes	
16. Abstract  This bibliography lists 403 reports, articles and other documents introduced into the NASA scientific and technical information system in September 1984.			
17. Key Words (Suggested by Author(s)) Aerospace Medicine Bibliographies Biological Effects		18. Distribution Statement  Unclassified - Unlimited	
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages 116	22. Price* \$7.00 HC

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