Aerospace Medicine and Biology A Continuing Bibliography with Indexes

NASA SP-7011(255) February 1984



AEROSPACE MEDICINE AND (NASA-SP-7011 (255)) A CONTINUING BIBLIOGRAPHY WITH INDEXES (SUPPLEMENT 255) (National Aeronautics and Space Administration) 86 P CSCL 06E 00/52 12482

N84-20134

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AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES

(Supplement 255)

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in January 1984 in

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

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

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INTRODUCTION

This Supplement to Aerospace Medicine and Biology lists 278 reports, articles and other documents announced during January 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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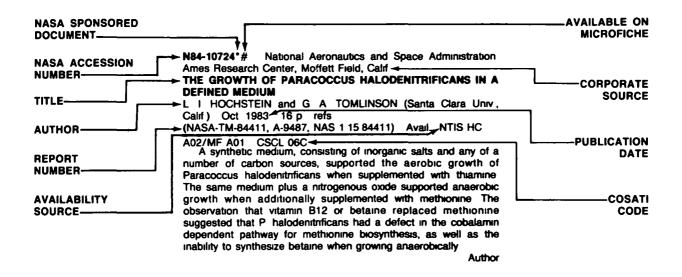
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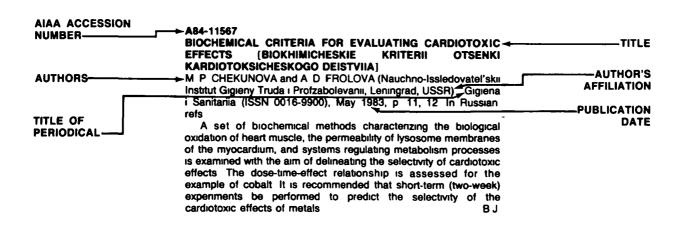
TABLE OF CONTENTS

P	age			
Category 51 Life Sciences (General) Includes genetics	1			
Category 52 Aerospace Medicine Includes physiological factors, biological effects of radiation; and weightlessness.	14			
Category 53 Behavioral Sciences Includes psychological factors; individual and group behavior, crew training and evaluation; and psychiatric research.				
Category 54 Man/System Technology and Life Support Includes human engineering; biotechnology; and space suits and protective clothing				
Category 55 Planetary Biology Includes exobiology; and extraterrestrial life	41			
Subject Index	A-1			
Personal Author Index				
Report Number Index				
Accession Number Index	F-1			

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AEROSPACE MEDICINE AND BIOLOGY

(A Continuing Bibliography (Suppl. 255)

FEBRUARY 1984

51

LIFE SCIENCES (GENERAL)

Includes genetics

A84-10276

IN VIVO COMPARISON OF CYTOCHROME AA3 REDOX STATE AND TISSUE PO2 IN TRANSIENT ANOXIA

K KARIMAN, F G HEMPEL, and F. F JOBSIS (Duke University Medical Center, Durham, NC) Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol 55, Oct 1983, p 1057-1063 Research supported by the American Lung Association refs

(Contract NIH-GM-29531)

The relationship in vivo of the dynamics of tissue oxygen partial pressure with the oxidation-reduction state of cytochrome c oxidase (cyt aa3), the direct reductant of O2 in the electron transport system, is investigated. Artificially ventilated, anesthetized cats were treated with 100 percent N2 ventilation, and measurements of pyrenebutyric acid-generated fluorescence and dual wavelength reflectance spectrophotometry at 605 and 590 nm through limited bilateral craniotomies were used to monitor cerebral cortical tissue oxygen pressures and cyt aa3 redox changes, respectively Following a 15 min N2 exposure, the decrease in tissue oxygen pressure is found to lag behind cyt aa3 reduction, which may serve to prolong O2 availability for other metabolic processes Upon restoration of room air, rapid reoxidation and hyperoxidation to above baseline levels of cyt aa3 occurred followed by the recovery of tissue oxygen pressure, indicative of an increased affinity of cyt aa3 for O2 that was induced by anoxia

A84-10277

VENTILATORY RESPONSE OF INTACT CATS TO CARBON MONOXIDE HYPOXIA

H GAUTIER and M BONORA (Paris VI, Universite, Paris, France) Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol 55, Oct 1983, p 1064-1071. Research supported by the Institut National de la Sante et de la Recherche Medicale refs

The respiratory effects of hypoxemia resulting either from the inhalation of hypoxic air or of small concentrations of CO in conscious and anesthetized cats are compared, together with effects of hypercapnia in a study of cerebral mechanisms in the control of ventilation. In anesthetized animals, CO inhalation is found to produce a progressive decrease in arterial O2 concentration, accompanied by mild increases in ventilation Hypoxic hypoxia is noted to result in a decrease in arterial O2 pressure and concentration and an increase in ventilation. Exposure to hypercapnia caused increases in minute ventilation accompanied by lower tidal volumes and consequently higher breathing frequencies for a given ventilation under conditions of hypoxic and CO hypoxia compared to normoxia. In conscious animals, low concentrations of CO caused a slight decrease in ventilation, while higher concentrations cause first a slight decrease then a characteristic tachypnea sımılar to that described carotid-denervated cats Hypercapnia resulted in changes in ventilatory pattern that were different under CO hypoxic compared

to hypoxic and normoxic conditions. Results suggest the role of some suprapontine structures which trigger a central hypoxemic tachypnea

A84-10278

INFLUENCE OF TRAINING ON BLOOD FLOW TO DIFFERENT SKELETAL MUSCLE FIBER TYPES

B G MACKIE and R L TERJUNG (New York, State University, Upstate Medical Center, Syracuse, NY) Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol 55, Oct 1983, p 1072-1078 refs (Contract NIH-AM-21617)

The influence of an exercise training program on the blood flow capacity of the working skeletal muscles is studied with regard to the different responses of the various muscle fiber types. Adult male rats were trained to run at 60 m/min up a 15 percent grade, and then blood flow in the fast twitch white, fast twitch red and slow twitch red muscle fibers of the gastrocnemius-soleus-plantaris muscle group was determined by the radiolabeled microsphere technique during the first and tenth minutes of in situ contractions at frequencies from 75 to 90 tetani/min Compared to control, untrained rats, treadmill training resulted in a lesser loss of tension at frequencies of 15 tetani/min and above and increased initial blood flows to fast twitch white fibers. A time-dependent relative hyperemia is noted in the red fiber types only, while trained fast twitch white fibers showed a constant 40-50 percent increase in maximal blood flow Although this increase would only have a modest effect on total muscle blood flow and maximal oxygen consumption, it may be important during intense but submaximal exercise

A84-10282

POLYCYTHEMIA AND THE ACUTE HYPOXIC RESPONSE IN **AWAKE RATS FOLLOWING CHRONIC HYPOXIA**

R FRIED, B MEYRICK, M RABINOVITCH, and L REID (Children's Hospital Medical Center, Harvard University, Boston, MA) Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol 55, Oct 1983, p 1167-1172

(Contract NIH-F-32-HL-06304, NIH-HL-23232)

The effects of the structural remodeling of the pulmonary circulation induced by chronic hypoxia on the pressor response to acute hypoxia is investigated while accounting for the contribution of the polycythemia also induced by hypoxia exposure. Twenty-two adult male rats were randomly allocated to one of four groups a hypobaric undergoing hypoxia for 10 (hypoxic-polycythemic), a group undergoing hypoxia but with hematocrit reduced to normocytic through red cell pheresis, a group undergoing hypoxia followed by sham red cell pheresis through a pulmonary arterial catheter, and a normoxic normocytic control group Measurements of pulmonary arterial pressure and pulmonary vascular resistance after 24 hr in room air show these values to be greatest in hypoxic polycythemic rats and least in controls, with hypoxic-normocytic rats occupying an intermediate position Acute exposure to 10 percent O2 lead to a rise in pulmonary arterial pressure and resistance in all groups, which was, however, greater in hypoxic rats than controls and in polycythemic than normocytic rats ALW

REGIONAL DISTRIBUTION OF BLOOD FLOW DURING MILD DYNAMIC LEG EXERCISE IN THE BABOON

A R HOHIMER, L B ROWELL, O A SMITH (Washington, University, Seattle, WA), and J R HALES Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol. 55, Oct. 1983, p. 1173-1177 refs (Contract NIH-HL-16910, NIH-HL-07090, NIH-RR-00166)

The distribution of blood flow to all major tissues during mild leg exercise is studied in the baboon. Five juvenile male baboons were trained to perform mild dynamic leg exercise under chair restraint, and blood flow was measured by the radiolabeled microsphere technique during periods of rest and exercise. During exercise, significant increases were seen in mean arterial blood pressure, heart rate, cardiac output and whole-body oxygen consumption Major increases in blood flow to leg muscles were also observed, together with increases in coronary blood flow in four out of the five animals Blood flow to the skin was reduced in all regions except the toes, as was flow to adipose tissue and sampled nonworking skeletal muscle. A reduction in blood flow to the kidneys was also observed in all the animals, while less consistent reductions were noted in blood flow to the visceral organs An increase was noted in flow to the spinal cord, whereas average brain blood flow remained constant Results show mild leg exercise in baboons to cause widespread vasoconstriction similar to that observed in humans, and indicate the suitability of the baboon for studying the vascular responses of tissue that cannot be examined in humans

A84-10286

TIME COURSE OF AIRWAY HYPERRESPONSIVENESS INDUCED BY OZONE IN DOGS

M J HOLTZMAN, L M FABBRI, B -E SKOOGH, P M OBYRNE, E H WALTERS, H AIZAWA, and J A NADEL (California, University, San Francisco, CA) Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol 55, Oct 1983, p 1232-1236 Research supported by Fisons Corp, Council for Tobacco Research, American Lung Association, and Swedish National Association against Heart and Chest Diseases refs (Contract NIH-HL-24136)

A84-10287

BEHAVIORAL AND AUTONOMIC THERMOREGULATION IN MICE EXPOSED TO MICROWAVE RADIATION

C J GORDON (US Environmental Protection Agency, Health Effects Research Laboratory, Research Triangle Park, NC) Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol 55, Oct 1983, p 1242-1248 refs

Behavioral and autonomic thermoregulatory responses of mice to microwave radiation are studied with the use of a specially waveguide-exposure system that enables designed simultaneous determination of radiation absorption, breathing rate and ambient temperature preference. Mice were placed in a shuttle box which was in turn located within a 2450-MHz waveguide in which a thermal gradient had been established, and exposed to microwave radiation at incident powers from 0 to 152 W for a period of one hour. In the absence of microwave exposure, mice are seen to prefer an average ambient temperature of 31 1 C Specific absorption rates greater than 7 W/kg cause a downward shift in preferred temperature, while breathing rates remained constant up to absorption rates of 20 5 and 32 3 W/kg In mice maintained at an ambient temperature of 31 C, breathing rate increased when absorption exceeded 7.0 W/kg. Results show a preferential activation of behavioral to autonomic thermoregulatory responses during microwave exposure

A84-10288

EFFECT OF PHYSICAL TRAINING ON MYOCARDIAL ENZYME ACTIVITIES IN AGING RATS

J A CHESKY, S LAFOLLETTE, M TRAVIS, and C FORTADO (Sangamon State University, Springfield, IL) Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol 55, Oct 1983, p 1349-1353 Research supported by the American Heart Association, Glenn Foundation for Medical Research, and Sangamon State University refs

The effects of the initiation of an exercise training program at different ages on the activities of enzymes involved in myocardial energy metabolism is investigated. Physical training, consisting of forced swimming of duration increasing gradually up to 1 hr by the end of 3 months, was initiated at ages of 1, 6, 12 or 17-22 months in male Fischer rats. Physical training begun at any age is found to result in an increase in heart rate relative to body weight, accounted for in the younger age groups primarily by a decrease in body weight Extraction of myocardial actomysin ATPase and creating kinase showed the activities of both enzymes to decrease with advancing age. There was no consistent elevation in animals having undergone 3 months of physical training, although enzyme activities in animals starting exercise at 6 months of age were higher than those of sedentary controls, and the oldest animals showed a negative effect. Results are in accord with the presence of an age threshold after which exercise does not elicit an adaptive response

A84-10483

THE ROLE OF METALS IN FREE RADICAL OXIDATION PROCESSES IN THE TISSUES OF ORGANISMS ACCORDING TO DATA OF SPONTANEOUS AND INITIATED CHEMILUMINESCENCE [O ROLI METALLOV V PROTSESSAKH SVOBODNORADIKAL'NOGO OKISLENIIA V TKANIAKH ORGANIZMA PO DANNYM SPONTANNOI I INITSIIROVANNOI KHEMILIUMINESTSENTSII]

G A BABENKO, IA I GONSKII, I M ANTONIK, V I IURKIV, V V VAGILEVICH, IU M MATIIASH, T P MAKSIMCHUK, IU M ZAVIISKII, M A MITSKAN, V A SMOLINSKAIA et al IN Biochemiluminescence (Biokhemiluminestsentsiia) Moscow, Izdatel'stvo Nauka (Moskovskoe Obshchestvo Ispytatelei Prirody, Trudy Volume 58), 1983, p 164-179 In Russian refs

The role of metals in the free radical oxidation of animal tissues was investigated using model experiments with blood serum and nutrients containing various contents of metals, as well as experiments on animals which were fed diets deficient in varius metals. The method employed in this investigation was the determination of the spontaneous chemiluminescence and the chemiluminescence initiated by hydrogen peroxide and ferrous sulfate (catalyst of the peroxide oxidation of lipids) of homogenates of tumor tissues of rats fed on normal diets and diets containing abnormally low amounts of zinc or other minerals. Among other results, it was determined from experiments using cancerous tumors of rats fed on a diet deficient in zinc that zinc plays an antioxidating role in the free radical oxidation processes in the tissues of rats

NI D

A84-10484

SPONTANEOUS BIOCHEMILUMINESCENCE OF MITOCHONDRIA OF SEVERAL TISSUES IN NORMAL CONDITIONS AND DURING THE ACTION OF PHYSICAL FACTORS [SPONTANNAIA BIOKHEMILIUMINESTSENTSIIA MITOKHONDRII NEKOTORYKH TKANEI V NORME I PRI DEISTVII FIZICHESKIKH FAKTOROV]

S M ZUBKOVA IN Biochemiluminescence (Biokhemiluminestsentsiia) Moscow, Izdatel'stvo Nauka (Moskovskoe Obshchestvo Ispytatelei Prirody, Trudy Volume 58), 1983, p. 180-196. In Russian refs

The kinetics of the biochemiluminescence of the mitochondria of several different tissues of rats, such as the liver, cardiac muscles and cerebral cortex, were investigated. A helium-neon laser was employed to change the functional condition of the mitochondria Results show that the intensity of the biochemiluminescence of mitochondria depends on the velocity of electron transport in the

respiratory chain, the level of the coupling of respiration with phosphorylation, and the level of peroxidase activity. In addition, experiments using isolated mitochondria showed that S-containing compounds are important in determining the dependence of the biochemiluminescence on the laser action, which is indicated by the cooperative conformational transitions in the mitochondrial membranes during the action of these physical factors. The role of peroxide compounds in the functioning of mitochondria and the pathways for the utilization of these compounds were studied

A84-10487

PRINCIPLES OF THE PHYSIOLOGY OF FUNCTIONAL SYSTEMS [OSNOVY FIZIOLOGII FUNKTSIONAL'NYKH SISTEM]

K V SUDAKOV, ED Moscow, Izdateľstvo Meditsina, 1983, 272

p In Russian

The theory of functional systems is examined in relation to general and specific physiological processes which determine the activity of the organism as a whole. The physiology of integrated self-regulating systems which produce various results optimal for metabolism is examined The systemic organization of various physiological functions and the patterns of their construction are considered for an understanding of the processes of the organism as a whole Topics studied include the functional systems which determine the optimal level of the volume of the circulating blood, the pH level, the blood pressure, nutrients, temperature, and the osmotic pressure. No individual items are abstracted in this volume

A84-10489

THE PHYSIOLOGY OF THE VEGETATIVE NERVOUS SYSTEM [FIZIOLOGIIA VEGETATIVNOI NERVNOI SISTEMY]

A D NOZDRACHEV Leningrad, Izdatel'stvo Meditsina, 1983,

296 p In Russian refs

The neurophysiological mechanisms of the transmission of the autonomous reflex excited in the arch are examined. The main characteristics of the autonomous structures of the three sections or parts of the autonomous nervous system (sympathetic, parasympathetic, and metasympathetic) are discussed The cytotopical, ultrastructural, and histochemical characteristics of the neurons of the autonomous nerve ganglia and the interneuronal connections are considered. The sensitive, associative, and efferent links of the autonomous reflex arch are studied. The primary mediators and biologically active compounds which inhibit or activate the processes in the synaptic structures are examined The structural and functional organizations of the metasympathetic section of the autonomous nervous system and particular aspects of nerve-muscle transmissions (adrenergic, cholinergic, and purinergic mechanisms) are investigated

A84-10492

THE FRACTIONATION OF PLASMA PROTEINS IN LARGE SCALE PREPARATIONS OF BLOOD [FRAKTSIONIROVANIE BELKOV PLAZMY V PROIZVODSTVE PREPARATOV KROVII

M RUSANOV and L. I SKOBELEV Moscow, Izdateľstvo

Meditsina, 1983, 224 p. In Russian refs

Laboratory and large scale methods for the fractionation of blood plasma proteins are examined, focusing on fractionation methods used in large scale preparations of medicinal compounds The primary technological instruments and equipment employed in the fractionation of blood plasma proteins are discussed, including sterilizing filtration and the automatic regulation and control of the production processes Aspects discussed include the engineering problems of the production of blood plasma proteins, the automatization of the processes, and the equipping of the technical personnel

A84-10842

THE CARDIOSTIMULATING ACTION OF NOREPINEPHRINE CONTAINED IN THE LIPOSOMES IN CONDITIONS OF **ADRENORECEPTOR BLOCKADE** [KARDIOSTIMULIRUIUSHCHEE DEISTVIE ZAKLIUCHENNOGO V LIPOSOMY NORADRENALINA V USLOVIIAKH BLOKADY ADRENERGICHESKIKH RETSEPTOROV]

A. V DMITRIEVA, A V STEFANOV, V I BOIKO, M I GUREVICH. V K LISHKO, and L IA SAZONOVA (Akademiia Nauk Ukrainskoi SSR, Institut Fiziologii, Kiev, Ukrainian SSR) Zhurnal SSSR (ISSN 0015-329X), vol 69, Aug 1983, p 1023-1030 In Russian

A84-10843

THE EFFECT OF AN INCREASED MECHANICAL LOAD ON THE DEPENDENCE OF THE CONTRACTION OF ISOLATED HEART MUSCLE ON THE CONCENTRATION OF CA(2+) IN THE PERFUSATE [VLIIANIE POVYSHENNOI MEKHANICHESKOI **SOKRASHCHENIIA NAGRUZKI** NA ZAVISIMOST' **IZOLIROVANNOI SERDECHNOI MYSHTSY** KONTSENTRATSII CA(2+) V PERFUZATE)

V I KAPELKO, M S GORINA, N A NOVIKOVA, and K I MALINOVSKAIA (Akademiia Meditsinskikh Nauk SSSR, Moscow, Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol

69, Aug 1983, p 1053-1057 In Russian refs

A84-10844

THE PATTERN OF LOCAL VASCULAR RESPONSES IN CONDITIONS OF AN INCREASED ACTIVITY OF THE CEREBRAL CORTEX (DINAMIKA MESTNYKH SOSUDISTYKH REAKTSII V USLOVIIAKH POVYSHENIIA AKTIVNOSTI **GOLOVNOGO MOZGA**

D G BRARAMIDZE, IU I LEVKOVICH, and G I MCHEDLISHVILI (Akademiia Nauk Gruzinskoi SSR, Institut Fiziologii, Tbilisi, Georgian SSR, Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol 69, Aug

1983, p 1058-1064 In Russian refs

The pattern of the dilatory responses of the small pial artery system on the surface of the cerebral cortex of rabbits was studied in experiments using direct cinemicrography during increased cortical activity due to the direct application of an amount of strychnine above the threshold. The diameters of the segments of the pial microvascular system were measured for every frame of the film, including measurements of the relatively large pial arteries (LPA), the sphincters at the offshoots of small artery branches (SO), minor pial arteries (MPA), and precortical arteries (PCA) The relative order of the dilatory responses for the different segments was found to be (in descending order) PCA, SO, MPA, LPA, whereas this pattern was found to be reversed for the latencies It is concluded that this behavior of the pial microvascular system maintains the adequacy of the local blood supply as well as the elimination of the 'steal phenomenon' in the neighboring cortical areas NΒ

A84-10845

AN ANALYSIS OF THE MECHANISM OF THE HYPOTHERMIC NEUROTROPIC ACTION OF COMPOUNDS [ANALIZ **GIPOTERMICHESKOGO MEKHANIZMA** NEIROTROPNYKH SREDSTV

IU V LUPANDIN (Petrozavodskii Gosudarstvennyi Universitet, Petrozavodsv, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol 69, Aug 1983, p 1074-1078 in Russian refs

The mechanism of the suppression of shivering thermogenesis by the action of several compounds (oxotremorine, nicotine, isoprenaline, and seduxene) was investigated in experiments using anesthetized cats. It is determined that these compounds suppress shivering after both intravenous and intraventricular injections, as well as inhibits shivering evoked by the stimulation of the posterior hypothalamous Intravenous injection of antagonists of these compounds are found not to change the amount of stimulation of the medial preoptic region, which is necessary for the threshold inhibition of shivering. It is concluded that the hyperthermic action of these compounds is mainly connected with the suppression of shivering due to their influence at the brain stem level of postural muscular tonus regulation, and not due to the selective action of these compounds on the hypothalamic thermoregulatory center

NI D

A84-10846

THE SEASONAL CHARACTERISTICS OF THE EFFECT OF LOW TEMPERATURE ON THE ACTIVITY OF BRAIN MONAMINE OXIDASE AND THE SENSITIVITY OF RATS TO HYPEROXIA [SEZONNYE OSOBENNOSTI VLIIANIIA NIZKOI TEMPERATURY NA AKTIVNOST' MONOAMINOKSIDAZY MOZGA I CHUVSTVITEL'NOST' KRYS K GIPEROKSSII]

I A GOROSHINSKAIA and A ANANIAN (Rostovskii Gosudarstvennyi Universitet, Rostov-on-Don, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol 69, Aug 1983, p 1079-1084 In Russian refs

A84-10847

THE SPATIAL ORGANIZATION OF NEURONS OF THE BRAIN VISUAL CORTEX DURING THE STIMULATION BY LIGHT SPOTS [O PROSTRANSTVENNOI ORGANIZATSII NEIRONOV ZRITEL'NOI KORY MOZGA PRI STIMULIATSII SVETOVYMI PIATNAMI]

S A CHEBKASOV (Nauchno-Issledovateľskii Institut Neirokibernetiki, Rostov-on-Don, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol 69, Aug 1983, p 1099-1101 In Russian refs

A84-10848

AN ANALYSIS OF THE MECHANISMS OF THE ACCELERATING EFFECT OF THE VAGUS NERVE ON THE WORK OF THE HEART [K ANALIZU MEKHANIZMOV USKORITEL'NOGO VLIIANIIA BLUZHDAIUSHCHEGO NERVA NA RABOTU SERDTSA]

V M SMIRNOV (II Moskovskii Gosudarstvennyi Meditsinskii Institut, Moscow, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol. 69, Aug. 1983, p. 1101-1104. In Russian refs.

A84-10849

THE ROLE OF TEMPORAL PARAMETERS OF THE INTERSPIKE INTERVAL IN THE CODING OF TEMPERATURE (O ROLI VREMENNYKH PARAMETROV MEZHSPAIKOVOGO INTERVALA V KODIROVANII TEMPERATURY)

A M POLIAKOV and V V USHAKOV (Akademiia Nauk SSSR, Institut Khimicheskoi Fiziki, Moscow, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol 69, Aug 1983, p 1108-1112 In Russian refs

The characteristics of the tonic activity of neurons are studied using a model of the neuron-receptor tension in the river crayfish. The mechanisms which determine the intensity of the firing as a function of temperature are analyzed. The investigation employs the model of these processes in the zone of neuron generation during repeated firings developed by Poliakov and Ushakov (1982). The findings of this study demonstrate that the electrogenic sodium pump is the mechanism responsible for the temperature sensitivity of both specific temperature receptors and mechanoreceptors. However, the high temperature dependence of the working of this mechanism exerts an influence on the tonic activity by means of action on the dynamic component of the interspike intervals rather than on the static component of the membrane polarization.

NΒ

A84-11115

PSEUDO-CRITICAL HEAT CAPACITY OF SINGLE LIPID BILAYERS

I HATTA, K SUZUKI (Nagoya University, Nagoya, Japan), and S IMAIZUMI (Suzuka College of Technology, Suzuka, Japan) Physical Society of Japan, Journal (ISSN 0031-9015), vol 52, Aug 1983, p 2790-2797 refs

The results of ac calonmetry measurements of the heat capacity of single lipid bilayers of dipalmitoylphosphatidylcholine in aqueous suspension are presented A different result from that found using differential scanning calonimetry is obtained, especially for the anomaly at the first-order main transition. The pseudocritical heat

capacity is tentatively analyzed in terms of critical-exponent expressions. Pippard's relation is used to compare the pseudocritical amplitude of the heat capacity with the results for the thermal expansion and the ultrasound velocity.

A84-11253

PROTEIN PHOSPHORYLATION IN THE BRAIN

E J NESTLER and P GREENGARD (Yale University, New Haven, CT) Nature (ISSN 0028-0836), voi 305, Oct 13, 1983, p 583-588 refs

Recent evidence for the critical role of protein phosphorylation in neuronal function is summarized. The activation of one of the two types of brain kinases, either cyclic AMP or cyclic GMP, results in the phosphorylation of specific substrate proteins which eventually cause specific biological responses. The phosphorylated proteins may have regulatory and/or biochemical effects that involve short-term and long-term memory or gene expression A causal relationship has been established between cyclic AMP-dependent protein phosphorylation and the physiological response of excitable cells. Two methods have been developed for identifying phosphorylated bands appearing in excited cell proteins, and methods are being explored for characterizing the substrate proteins that can be phosphorylated, thereby raising the possibility that the molecular basis of neurophysiological phenomena can be understood in terms of the protein kınase/protein phosphatase system that controls the phosphorylation process MSK

A84-11261

ENDOTHELIUM-DEPENDENT RELAXATION OF CORONARY ARTERIS BY NORADRENALINE AND SCROTONIN

T M COCKS and J A ANGUS (Baker Medical Research Institute, Prahan, Victoria, Australia) Nature (ISSN 0028-0836), vol 305, Oct 13, 1983, p 627-630 Research supported by the National Health and Medical Research Council of Australia refs

The constrictor amines noradrenaline (NA) and serotonin are reported to release a vasodilator substance from endothelial cells that can act as a physiological antagonist of the smooth muscle contractile responses. The study was performed on the circumflex coronary artery of pig and dog hearts cut into ring segments. The endothelium was removed from some of the samples and all specimens were exposed to NA or adrenaline. The contractile responses were monitored. The data obtained indicated that stimulation of alpha2-andrenoceptors and 5-HT receptors located on the endothelial cells lining the large arteries produced relaxation in the vessels. Attenuation or loss of the vasodilator causing the relaxation is suggested to be responsible for pathological conditions such as variant angina.

A84-11268

ADRENERGIC ACTIVATION OF TRIODOTHYRONINE PRODUCTION IN BROWN ADIPOSE TISSUE

J E SILVA (Brigham and Women's Hospital, Boston, MA) and P. R LARSEN (Harvard University, Boston, MA) Nature (ISSN 0028-0836), vol 305, Oct 20, 1983, p 712, 713 refs (Contract PHS-AM-18616)

The results of a study of the effects of noradrenaline and acute cold exposure on brown adipose tissue (BAT) in rats are reported. The rats were injected with catecholamine agonists or antagonists, exposed to 5 C for 4 hr, then decapitated. BAT was extracted and homogenized and assayed for 5(prime)deiodinase (5'D-II) Noradrenaline was determined to produce an order of magnitude increase in the BAT 5'D-II activity 2 hr after injection, but did not stimulate 5'D-II production in cerebrocortical or pituitary tissue. The cold stress also increased 5'D-II activity, but not in consistent amounts in cerebrocortical tissue. It was concluded that both noradrenaline and cold stress produce a rapid increase in 5'D-II activity due to alpha(1)-adrenergic receptors. The effect of cold stress could be blocked by catecholamine injection, which did not inhibit stimulation by noradrenaline.

RHEOENCEPHALOGRAPHY - BIOPHYSICAL FOUNDATIONS, INFORMATION CONTENT, AND LIMITS OF APPLICATION [REOENTSEFALOGRAFIIA - BIOFIZICHESKIE OSNOVY, INFORMATIVNOST', GRANITSY PRIMENENIIA]

IU E MOSKALENKO and G B VAINSHTEIN (Akademiia Nauk SSSR, Institut Evoliutsionnoi Fiziologii, Leningrad, USSR) Fiziologiia Cheloveka (ISSN 0131-1646), vol 9, Sept -Oct 1983, p 707-722 In Russian refs

It is noted that the theory underlying rheoencephalography (REG) includes certain unexamined and questionable propositions, the clarification of which is becoming more important with the widespread use of this method in clinical practice. A satisfactory interpretation of individual REG indicators in terms of intracranial hemodynamics and the clear delineation of the informational limits of this method are possible only when REG indicators are correlated with the most significant indicators of brain circulation. It is also noted that, as the practice of the implantation of intracerebral electrodes becomes more widespread, the necessity for deep (local) REG becomes greater Of especial importance in this are is the unification of measurement conditions and techniques, procedures for the processing and interpretation of REG waves, and the application of graded directed functional loads.

A84-11349

REGULATORY FUNCTIONS OF ACTIN IN THE CELL [REGULIATORNYE FUNKTSII AKTINA V KLETKE]

B F POGLAZOV (Akademiia Nauk SSSR, Institut Biokhimii, Moscow, USSR) Akademiia Nauk SSSR, Izvestiia, Seriia Biologicheskaia (ISSN 0002-3329), Sept-Oct 1983, p 667-677 In Russian refs

Existing data pertaining to the concentration of actin in muscle and nonmuscle cells are analyzed, noting that actin is present in all living cells in considerable amounts (10-15 percent). The interaction of actin with various proteins is examined, and an analysis is made of data concerning the activating effect of G-actin on the kinase of phosphorylase and glyceraldehyde-e-phosphate-dehydrogenase. These data suggest that actin is a protein coordinator of processes in the cell.

A84-11366

GENERATION OF **ELECTRIC POTENTIALS** ON MITOCHONDRIAL MEMBRANES DURING THE HYDROLYSIS OF [GENERATSIIA **INORGANIC PYROPHOSPHATE ELEKTRICHESKIKH POTENTSIALOV** NΔ MEMBRANE MITOKHONDRII PRI GIDROLIZE NEORGANICHESKOGO **PIROFOSFATA**1

V F DUKHOVICH, I S KULAEV, S E MANSUROVA, V P SKULACHEV, and IU A SHAKHOV (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR) Akademiia Nauk SSSR, Doklady (ISSN 0002-3264), vol 272, no 2, 1983, p 496-499 In Russian refs

A84-11556

THE EFFECT OF ISCHEMIA AND POSTISCHEMIC RESTORATION OF BLOOD CIRCULATION ON THE ULTRASTRUCTURE OF THE NEURONS [VLIIANIE ISHEMII I POSTISHEMICHESKOGO VOSSTANOVLENIIA KROVOOBRASHCHENIIA NA ULTRASTRUKTURU NEIRONOVI

N N BOGOLEPOV, I I MARSHALA, N I PAVLOVSKAIA, A FERCHAKOVA, and IU ORENDACHOVA (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR, Slovak Academy of Sciences, Neurobiology Institute, Kosice, Czechoslovakia) Arkhiv Anatomii, Gistologii i Embriologii (ISSN 0004-1947), vol 84, May 1983, p 5-12 In Russian refs

A84-11557

A COMPARATIVE STUDY OF DENDRITIC SPINES IN THE PRINCIPAL CORTICAL REGIONS OF THE TURTLE FOREBRAIN [SRAVNITEL'NOE ISSLEDOVANIE DENDRITNYKH SHIPIKOV V OSNOVNYKH KORKOVYKH ZONAKH PEREDNEGO MOZGA CHEREPAKH]

T. V DAVYDOVA and N. V GONCHAROVA (Akademiia Nauk SSSR, Institut Evoliutsionnoi Morfologii i Ekologii Zhivotnykh, Moscow, USSR) Arkhiv Anatomii, Gistologii i Embriologii (ISSN 0004-1947), vcl 84, May 1983, p. 17-23 In Russian refs

A84-11558

A QUANTITATIVE EVALUATION OF VARIOUS CARDIAC REGIONS IN YOUNG AND OLD WHITE RATS [KOLICHESTVENNAIA OTSENKA RAZNYKH OTDELOV SERDTSA MOLODYKH I STARYKH BELYKH KRYS]

M S GNATIUK (Ternopol'skii Meditsinskii Institut, Ternopol, Ukrainian SSR) Arkhiv Anatomii, Gistologii i Embriologii (ISSN 0004-1947), vol. 84, May 1983, p. 33-36. In Russian refs

The age-related changes in the macrometric and micrometric parameters of the heart were studied in 35 young white rats (6-8 months) and 40 old white rats (24-28 months). Results show that all of the cardiac regions of the old rats underwent hypertrophy with a predominant increase in the size of the left ventricle. The stromal elements were also found to increase in size, as did the diversity of the metric characteristics of the myocytes. The blood supply deteriorated, which significantly decreased the compensatory-adaptive potential of the myocardial regions.

A84-11559

THE DEVELOPMENT AND STRUCTURE OF THE LYMPHOEPITHELIAL PHARYNGEAL RING OF THE MACACUS RHESUS [RAZVITIE | STROENIE LIMFOEPITELIAL'NOGO GLOTOCHNOGO KOL'TSA MACACUS RHESUS]

O L ZHARIKOVA (Minskii Meditsinskii Institut, Minsk, Belorussian SSR) Arkhiv Anatomii, Gistologii i Embriologii (ISSN 0004-1947), vol. 84, April 1983, p. 44-52. In Russian refs

A84-11560

THE MICROCIRCULATORY BED OF THE LIVER ACCORDING TO DATA OF SCANNING ELECTRON MICROSCOPY [MIKROTSIRKULIATORNOE RUSLO PECHENI PO DANNYM RASTROVOI ELEKTRONNOI MIKROSKOPII]

IU E VYREMKOV and S I KATAEV (Tsentral'nyı Institut Usovershenstvovanıla Vrachei, Moscow, USSR) Arkhiv Anatomii, Gistologii I Embriologii (ISSN 0004-1947), vol 84, April 1983, p 61-70 in Russian refs

A84-11567

BIOCHEMICAL CRITERIA FOR EVALUATING CARDIOTOXIC EFFECTS [BIOKHIMICHESKIE KRITERII OTSENKI KARDIOTOKSICHESKOGO DEISTVIIA]

M P. CHEKUNOVA and A D FROLOVA (Nauchno-Issledovatel'skii Institut Gigieny Truda i Profzabolevanii, Leningrad, USSR) Gigiena i Sanitariia (ISSN 0016-9900), May 1983, p 11, 12 In Russian refs

A set of biochemical methods characterizing the biological oxidation of heart muscle, the permeability of lysosome membranes of the myocardium, and systems regulating metabolism processes is examined with the aim of delineating the selectivity of cardiotoxic effects. The dose-time-effect relationship is assessed for the example of cobalt. It is recommended that short-term (two-week) experiments be performed to predict the selectivity of the cardiotoxic effects of metals.

AN EVALUATION OF THE BACTERIAL ENVIRONMENT ON MOTOR BUSES [KHARAKTERISTIKA MIKROBNOGO FAKTORA USLOVIIAKH **PASSAZHIRSKIKH AVTOBUSNYKH PEREVOZOK**1

B A PLASTUNOV, I I DATSENKO, V S PETRUS, and V A PLASTUNOV (L'vovskii Meditsinskii Institut, Nauchno-Issledovateľskii Institut Epidemiologii i Mikrobiologii, Lvov, Ukrainian SSR) Gigiena i Sanitariia (ISSN 0016-9900), May 1983, p 84-86 In Russian refs

A84-11753#

UTILISATION OF THE EUROPEAN RETRIEVAL CARRIER **EURECA FOR LIFE SCIENCE RESEARCH**

G SEIBERT (ESA, Paris, France) International Astronautical Federation, International Astronautical Congress, 34th, Budapest, Hungary, Oct 10-15, 1983, IAF Paper 83-169 9 p

The design features, mission profiles, and functions of the EURECA free flying platform, to be launched from the Orbiter into a 500 km orbit, then return for retrieval at a later date, are described The 22 m spacecraft will weigh about 35 tons, feature a 400 N thruster and propellant sufficient for a 400 m/sec velocity change, and interface with the Orbiter RMS arm. The missions will support biology, exobiology, and materials processing experiments. The first mission will carry a protein crystallization experiment to provide protein crystals for X ray diffraction studies, botany experiments to determine the effect of gravity on plant growth, an experiment to determine the long-term effect of space radiation on biological materials, and the protection afforded biological materials by shielding equipment. The EURECA platform will maintain orbit for six months before lowering orbit for a passive capture by the

A84-11758#

THE FROG-STATOLITH-EXPERIMENT (STATEX) OF THE GERMAN SPACELAB MISSION D1 - SCIENTIFIC BACKGROUND AND TECHNICAL DESCRIPTION

J NEUBERT, W BRIEGLEB, and A SCHATZ (Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Institut fuer Flugmedizin, Cologne, West Germany) International Astronautical Federation, International Astronautical Congress, 34th, Budapest, Hungary, Oct 10-15, 1983 6 p refs (IAF PAPER 83-184)

The Spacelab D1 mission incorporates the frog statolith experiment, designated 'STATEX' Frog embryos and tadpoles at developmental stages will develop near-weightlessness during 140 hrs of the mission STATEX constitutes one of a number of experiments aimed at establishing the development and function of gravity-sensitive structures in different organisms, and the results obtained may be helpful in understanding the space motion sickness to which half of all astronauts appear susceptible

A84-11759#

RESPECTIVE ROLE OF MICROGRAVITY AND COSMIC RAYS ON PARAMECIUM TETRAURELIA CULTURED ABOARD **SALYUT 6**

H PLANEL, R TIXADOR, G RICHOILLEY, G GASSET, and J TEMPLIER (Toulouse III, Universite, Toulouse. France) International Astronautical Federation, International Astronautical Congress, 34th, Budapest, Hungary, Oct 10-15, 1983 5 p (IAF PAPER 83-186)

Paramecium tetraurelia cultured aboard Salvut 6 have shown an increase in cell growth rate, cell volume, water content and changes in electrolyte content. Additional experiments, carried out in balloon flight and on earth, showed that the stimulating effect observed on cell proliferation is related to exposure to cosmic rays Other changes seem to be due to a direct effect of microgravity on cell Mechanism of gravity action on cell is discussed Author

A84-12060

CARDIOVASCULAR INJURY FROM BLUNT THORACIC IMPACT OF EPINEPHRINE AND ISOPROTERENOL INJECTED RABBITS D C VIANO (GM Research Laboratories, Warren, MI) Aviation, Space, and Environmental Medicine (ISSN 0095-0562), vol 54, Nov 1983, p 988-993 refs

Nonpenetrating thoracic impact of 10 anesthetized rabbits injected with epinephrine and experiencing transient hypertension resulted in four incidents of traumatic rupture of the left ventricle Impact of similar severity did not produce ventricular injury in either 11 control or 10 animals injected with isoproterenol and experiencing transient hypotension. Immediate death and aortic rupture were most frequent in epinephrine injected animals. Impact during cardiac systole produced more frequent cardiovascular lesions in the epinephrine-injected animals than during diastolic loading, whereas the cardiac phase was not a significant factor in the thoracic injuries of the control or isoproterenol injected animals The experiments indicate that the precondition of the myocardium is an important factor in the incidence of ventricular and major vascular rupture in nonpenetrating thoracic impact

A84-12063

PHARMACOKINETICS OF **PENTOBARBITAL** UNDER HYPERBARIC AND HYPERBARIC HYPEROXIC CONDITIONS IN

W G KRAMER (Houston, University, Texas Medical Center, Houston, TX), D W WELCH, W P FIFE, B N CHAIKIN, C MEDLOCK, and D R GROSS (Texas A & M University, College Station, TX) Aviation, Space, and Environmental Medicine (ISSN 0095-0562), vol 54, Nov 1983, p 1005-1008 refs (Contract PHS-210-81-6103, NOAA-NA-81AAD00092)

High hydrostatic pressure has been shown to reverse the anesthetic effects of barbiturates. However, attempts to distinguish between two possible causes of this reversal, changes in drug dispositon or changes in drug-receptor interaction, have not been reported This study examined the possible effects of hyperbaria and hyperbaric hyperoxia on the distribution and clearance of pentobarbital in the dog. The drug was administered to six mixed-breed dogs as a 30 mg/kg i v bolus at 1 ATA breathing air, 6 ATA breathing air, and 2 8 ATA breathing 100 percent oxygen, with serial blood sampling for 12 h Pharmacokinetic and statistical analyses showed no significant effects of hyperbaria or hyperbaric hyperoxia on the total plasma clearance, volume of distribution or elimination half-life If pressure reversal of barbiturate anesthesia occurs at these pressures, changes in the disposition of the drug are not the causative factors

A84-12065* Louisville Univ , Ky RAT HINDLIMB MUSCLE RESPONSES TO SUSPENSION HYPOKINESIA/HYPODYNAMIA

X J MUSACCHIA, J M STEFFEN, and D R DEAVERS (Louisville, University, Louisville, KY) Aviation, Space, and Environmental Medicine (ISSN 0095-0562), vol 54, Nov 1983, p 1015-1020

(Contract NSG-2191, NSG-2325)

Hypokinetic/hyupodynamic (H/H) whole body suspension of rats eliminates hindlimb load bearing functions while permitting continued use of the forelimbs. Responses of hindlimb muscles were assessed in terms of absolute and relative weights during 1 and 2 weeks of H/H suspension Muscle mass loss was in the order soleus greater than gastrocnemius equal to plantaris greater than extensor digitorum longus (EDL) The soleus, a postural antigravity muscle composed mainly of slow twitch fibers, was most sensitive, losing 35 and 45 percent of its weight during the first and second weeks, respectively. The gastrocnemius and plantaris showed losses during the first week but no significant loss during the second wee. The EDL showed little or no weight loss During post suspension recovery all muscles showed a weight gain H/H suspended rats failed to grow, following removal from suspension they gained weight linearly, comparable to controls Products of muscle metabolism including urea, ammonia, and 3-methylhistidine increased in the urine during H/H suspension and were significantly reduced approaching control levels during recovery This suspension model offers considerable promise for comparison with H/H responses during weightlessness Author

A84-12066

NEUROPHYSIOLOGICAL EFFECTS OF -X **IMPACT ACCELERATION**

M S WEISS and M D BERGER (US Navy, Naval Biodynamics Laboratory, New Orleans, LA) (Joint Committee on Aviation Pathology, Scientific Session, 13th, Toronto, Canada, Oct 1982) Aviation, Space, and Environmental Medicine (ISSN 0095-0562), vol 54, Nov 1983, p 1023-1027 refs

In 19 experiments, eight unanesthetized Rhesus monkeys, with torsos restrained in a seated position, and with head and neck free to move were subjected to peak sled accelerations in the -X direction ranging from 42 m/sq sec to 963 m/sq sec Recordings of cortical somatosensory evoked potentials were made using recording electrodes chronically implanted over the somatosensory cortex Electrical pulse stimuli were delivered at a rate of 5 Hz through spinal electrodes located at L1-L2 Evoked potentials were recorded prior to impact, through the impact event, and subsequent to impact, then subjected to quantitative analysis procedures which included normalized cross-correlation and exponential regression The results of this analysis suggest a neurophysiological effect which holds promise as an indicator of a pre-injurious central nervous system condition. This effect is an immediate increase of 2 percent to 5 percent in the latency at peak sled accelerations in the region of 600 m/sq sec. This is consistent with previous findings and provides the basis for applying these techniques to human volunteer experiments Previously announced in STAR as N83-19433 Author

A84-12070

FETAL DEVELOPMENT - EFFECTS OF DECOMPRESSION SICKNESS AND TREATMENT

S C GILMAN, M E BRADLEY (US Navy, Naval Medical Research Institute, Bethesda, MD), K M GREENE (US Navy, Naval Medical Research and Development Command, Bethesda. MD), and G J FISCHER (Washington State University, Pullman, Aviation, Space, and Environmental Medicine (ISSN 0095-0562), vol 54, Nov 1983, p 1040-1042 Navy-supported research refs

Pregnant hamsters were exposed to 71 ATA (200 fsw) of compressed air breathing for 40 min Comparisons were made between three groups of pregnant hamsters (1) those that developed decompression sickness (DCS), (2) those that did not, and (3) a control (non-divided) group As reported previously maternal DCS if untreated resulted in frequent and severe teratogenic effects. Furthermore, fetuses from those females who apparently did not develop DCS were significantly smaller at term than fetuses from the control animals. However, fetuses from females that were treated for DCS did not differ from controls This suggests that 40-min, 200-fsw dives per se are detrimental to fetal development in hamsters

A84-12151

MATHEMATICAL MODELING OF ECOLOGICAL PROCESSES [MATEMATICHESKOE MODELIROVANIE EKOLOGICHESKIKH PROTSESSOV]

N SEMEVSKII and S M SEMENOV Leningrad, Gidrometeoizdat, 1982, 280 p In Russian refs

Mathematical models designed expressly for biocenoses are discussed The underlying mathematics is presented, and it is shown how the models can be used in analyzing various types of ecological problems. A biocenosis in equilibrium is regarded as a system made up of species in coadaptation, with the individuals of each species maximally adapted to the habitat Particular attention is given to a mathematical analysis of this system, which is based on the principle of optimality. With a change in the values of the independent variables describing the habitat, in particular the level of anthropogenic action on the biocenosis, the natural state of equilibrium is upset. Exogenetic succession, a transitional process leading to a new state of equilibrium, then begins. The biocenosis responds in two ways to an increase in anthropogenic effects by a change in the populations and by changes in the types of individuals making up the several species. The mathematical modeling of exogenetic succession is discussed in detail

A84-12156

BIOCHEMICAL MECHANISMS OF STRESS (BIOKHIMICHESKIE MEKHANIZMY STRESSAT

L E PANIN Novosibirsk, Izdateľstvo Nauka, 1983, 234 p In Russian refs

The work examines mechanisms of the nonspecific resistance of the body in different stress phases according to Selye (1936) An analysis is made of the restructuring of the endocrine regulation, providing for transition to a new level of homeostasis. Homeostasis is considered as a functional system of the body in accordance with Anokhin's ideas Particular consideration is given to the role of cyclic nucleotides in metabolism regulation, lipoproteins and the regulation of intracellular metabolism, and the participation of lysosomes in adaptation and recovery processes

A84-12274* San Francisco Univ , Calif

THE GOLGI-HORTEGA-LAVILLA TECHNIQUE, WITH A USEFUL ADDITIONAL STEP FOR APPLICATION TO BRAIN TISSUE AFTER PROLONGED FIXATION

E DAMELIO (San Francisco, University, San Francisco, CA) Stain Technology (ISSN 0038-9153), vol 58, no 2, 1983, p (Contract NCC2-47)

A84-12425* District of Columbia Univ , Washington, D. C. VACUUM UV LASER INDUCED SCISSION OF SIMIAN VIRUS

M JOHNSON-THOMPSON (District of Columbia, University, Washington, DC), J B HALPERN, W M JACKSON (Howard University, Washington, DC), and J GEORGE (Georgetown University, Washington, DC) (U.S. Navy, Conference on Lasers as Reactants and Probes in Chemistry, Washington, DC, May 12-14, 1982) Photochemistry and Photobiology (ISSN 0031-8655), vol 38, 1983, p 1-8 refs (Contract NIH-RR-08005-10, NSF CHE-78-05375-A01, NAG5-17)

A84-12568

THE DESTRUCTION OF A BILAYER LIPID MEMBRANE AS A RESULT OF ELECTRICAL BREAKDOWN (RAZRUSHENIE BLM V REZUL'TATE ELEKTRICHESKOGO PROBOIA]

S I SUKHAREV, V B ARAKELIAN, I G ABIDOR, L V CHERNOMORDIK, and V F PASTUSHENKO (Akademia Nauk SSSR, Institut Elektrokhimii, Moscow, USSR, Akademiia Nauk Armianskoi SSR, Fizicheskii Institut, Yerevan, Armenian SSR) Biofizika (ISSN 0006-3029), vol 28, Sept -Oct 1983, p 756-760 In Russian refs

It is shown that, at the initial stage of the destruction of a bilayer lipid membrane (BLM) due to electrical breakdown, the change of the current I during time t has an exponential character and only slightly depends on the voltage on the BLM. This finding agrees with the ideas about the evolution of sufficiently large (supercritical) pores by the energetic profile of the system, which corresponds to zero voltage in the region of the pores The coefficients of pore diffusion in the space of the radius and lateral viscosity of the BLM, calculated from the slope of the dependence lg I (t) are found to be close to the coefficient of lipid self-diffusion and lateral viscosity of lipid bilayers obtained by different NΒ methods

AN INVESTIGATION OF THE INTERACTION OF POLY A WITH PHOSPHOLIPID MEMBRANES USING AN IR SPECTROSCOPIC METHOD [IZUCHENIE VZAIMODEISTVIIA POLIA S FOSFOLIPIDNYMI MEMBRANAMI METODOM IK-SPEKTROSKOPII]

T V MALTSEVA, E E BICHENKOV, I K KOROBEINICHEVA, and V G BUDKER (Akademia Nauk SSSR, Institut Organicheskoi Khimii, Novosibirsk, USSR) Biofizika (ISSN 0006-3029), vol 28, Sept-Oct 1983, p 766-770 In Russian refs

A84-12570

THE EFFECT OF A CONSTANT MAGNETIC FIELD ON THE PROCESSES OF PEROXIDE OXIDATION OF LIPIDS IN PHOSPHOLIPID MEMBRANES [VLIIANIE POSTOIANNOGO MAGNITNOGO POLIA NA PROTSESSY PEREKISNOGO OKISLENIIA LIPIDOV V FOSFOLIPIDNYKH MEMBRANAKH]

V M ARISTARKHOV, L L KLIMENKO, A I DEEV, and E V IVANEKHA (Akademila Nauk SSSR, Institut Khimicheskoi Fiziki, II Moskovskii Gosudarstvenyi Meditsinskii Institut, Moscow, USSR) Biofizika (ISSN 0006-3029), vol 28, Sept-Oct 1983, p 800-806 In Russian refs

A84-12571

THE HORMONAL REGULATION OF CALCIUM CHANNELS OF CARDIAC MEMBRANES [GORMONAL'NAIA REGULIATSIIA KAL'TSIEVYKH KANALOV MEMBRANY V SERDTSE]

A K FILIPPOV and V I POROTIKOV (Nauchno-Issledovatel'skii Institut po Biologicheskim Ispytaniiam Khimicheskikh Soedinenii, Kupavna, USSR) Biofizika (ISSN 0006-3029), vol 28, Sept -Oct 1983, p 821-825 In Russian refs

Results of experiments on the trabeculae of the auricle of frogs using a method of potential recording show that prostaglandin E1 (PGE1) increases the quantity of working calcium channels in the membrane PGE1, PGF2-alpha, acetylcholine, indometacin (an inhibitor of PG synthesis) and aminazine (an inhibitor of calmodulin) do not decrease the novodrin-induced strengthening of the Ca current These findings indicate that a change in the level of cAMP within the cell modulates the quantity of working Ca channels PG and calmodulin are not needed for the stimulation of adenylate cyclase (AC) by novodrin, and the effect of acetylcholine is not connected with the inhibition of AC

A84-12572

THE EFFECT OF MECHANICAL CONDITIONS ON CHRONOINOTROPY OF THE MYOCARDIUM (VLIIANIE MEKHANICHESKIKH USLOVII NA KHRONOINOTROPIIU MIOKARDA)

V IA IZAKOV and S V ZHELAMSKII (Nauchno-Issledovatel'skii Institut Gigieny Truda i Profesional'nykh Zabolevanii, Sverdlovsk, USSR) Biofizika (ISSN 0006-3029), vol 28, Sept -Oct 1983, p 853-857 In Russian refs

The dependence of mechanical activity on the rhythm in isometric, isotonic, and auxotonic regimes is studied in papillary muscles of rabbits by using the input sequence of the interstimulus intervals of the random process. It is shown that these regimes differed in their coefficients of amplitude variation of mechanical activity at the same input dispersion, the dependence of the mechanical activity in a given cycle on the amplitude of the previous contraction, and the dependence of the force interval calculated from regression equations. The reasons for these differences are examined and the use of chronoinotropic indicators as a measure of contractility is discussed.

A84-12652

EXERCISE TRAINING AND GLUCOSE UPTAKE BY SKELETAL MUSCLE IN RATS

J L IVY, J C YOUNG, J A MCLANE, R D FELL, and J O HOLLOSZY (Washington, University, St Louis, MO) Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol 55, Nov 1983, p 1393-1396 refs

(Contract NIH-AM-18986)

Glucose uptake rates at various insulin concentrations were compared in perfused hindlimbs of sedentary and endurance exercise-trained (treadmill-running) rats. Rates of glucose uptake by hindlimb muscles were about 50 percent higher in the trained than in the untrained animals on the day after the trained rats' last training session. However, by the 2nd day after the trained rats' last training session (40-46 h without exercise), there were no significant differences in glucose uptake rates between the trained and the sedentary rats' hindlimb muscles either in the absence of insulin, at physiological insulin levels, or at a maximally effective insulin concentration A bout of exercise, consisting of swimming to fatigue on the day before study, and muscle contraction induced by electrical stimulation, both resulted in significant increases in glucose uptake by the rats' perfused hindlimbs, the magnitude of these increases were similar in the trained and untrained rats. It is concluded that differences in muscle glucose uptake between trained and untrained rats are due to residual effects of the last exercise session and that training does not result in a long-term adaptive increase in sensitivity of muscle to insulin Author

A84-12654

AGE-RELATED RESPONSES TO MILD RESTRAINT IN THE RAT

B A RATTNER, S D MICHAEL, and P D ALTLAND (National Institute of Arthritis, Diabetes and Digestive and Kidney Diseases, Bethesda, MD, New York, State University, Binghampton, NY) Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol 55, Nov 1983, p 1408-1412 refs

Immature, postpubertal, young adult, and middle-aged rats were lightly restrained for 4 h Relative to untreated controls, restraint uniformly reduced body weight and plasma luteinizing hormone concentration and elevated plasma corticosterone concentration in all age groups. However, restraint increased activities of plasma alanine and aspartate aminotransferase, cratine phosphokinase, and fructose-diphosphate aldolase in only immature and middle-aged animals. This age-related release of tissue enzymes is hypothesized to reflect enhanced responsiveness to catecholamines in immature rats, and possible ischemia related to diminished vasodilatory activity in middle-aged rats. On the basis of these changes, tolerance to restraint in postpubertal and young adults appears to be slightly greater than that of immature and middle-aged rats.

A84-12658

INHIBITION OF GLYCOLYSIS POTENTIATES HYPOXIC VASOCONSTRICTION IN RAT LUNGS

H S STANBROOK and I F MCMURTRY (Colorado, University, Denver, CO) Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol 55, Nov 1983, p 1467-1473 refs (Contract NIH-HL-14985)

METABOLIC ACIDS AND H(+) REGULATION IN BRAIN TISSUE **DURING ACCLIMATIZATION TO CHRONIC HYPOXIA**

T I MUSCH, J A DEMPSEY, C A SMITH, G S MITCHELL, and N T BATEMAN (Wisconsin, University, Madison, WI) Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol 55, Nov 1983, p 1486-1495 refs

(Contract NIH-HL-15469, NIH-HL-24429, DAMD17-77-C-7006)

The regulation of brain-cortex and brain-stem metabolic-acid (MA) and intracellular-H(+) concentrations during acute (A) and chronic (C), moderate (M) and severe (S) hypoxia (H) is investigated in groups of male rats. Brain lactates increase in AMH and ASH, remain high in CMH, decrease in CSH, and remain high after normoxia is restored after CH Brain pH is unaffected by MH but becomes acid in SH, normalizing after 72 h. The role of CO2 in these effects is studied by increasing the fraction of CO2 inspired to prevent hypocapnia in AH or to restore normocapnia during normoxia Hypocapnia accounts brain-lactate-concentration changes in MH and 40-60 percent of the changes in SH. It is suggested that the changes observed in plasma and brain MA and plasma HCO3(-) concentration during CH can account for acidification of cerebral interstitial fluid. Since the time course of this process is different for MH and SH, the correlation between pH and ventilatory acclimatization found by Fencl et al (1979) is not confirmed

PLATELETS AND LEUKOCYTES IN THE LUNGS AFTER ACUTE HYPOBARIC HYPOXIA

G COATES, C NAHMIAS, and A THIND (McMaster University, Journal of Applied Physiology Hamilton, Ontario, Canada) Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol 55, Nov 1983, p 1536-1541 Sponsorship Medical Research Council refs (Contract MRC-MA-6242)

The effects of decompression to 440 or 350 torr for 18 or 40 h on the aggregation and embolization of platelets and leukocytes in the lungs was studied in rabbits. Fe-59-labeled RBC and either Cr-51-labeled platelets or In-111-labeled WBC were injected 2 h prior to decompression in a hypobaric chamber, gamma counts were determined in venous blood and homogenized aliquots of lung and liver after rapid recompression. Platelet function and the sensitivity of the method were confirmed in separate ADP-injection Decompression did not affect either the lung/liver platelet-count ratio, or the (lung-platelet/lung RBC)/(blood platelet/blood RBC) count ratio but effected a significant (P less than 0 005) decrease in both lung-WBC count ratios. Circulating granulocytes in another group of rabbits increased from 3.3 + or 16 x 10 to the 9th/I before decompression (326 torr for 18 h) to 53 + or - 21 x 10 to the 9th/l afterward. The possible role of this peripheral granulocytosis in the development of high-altitude pulmonary edema is discussed

A84-12663* Indiana Univ , Bloomington

THERMOREGULATION IN ERYTHROCEBUS PATAS - A THERMAL BALANCE STUDY

M A KOLKA and R S ELIZONDO (Indiana, University, Journal of Applied Physiology Respiratory, Bloomington, IN) Environmental and Exercise Physiology (ISSN 0161-7567), vol 55, Nov 1983, p 1603-1608 refs

(Contract NIH-AM-16703, NCA2-OR-335-001)

The ability of nonacclimated patas monkeys (Erythrocebus patas) to maintain a constant core temperature at six ambient temperatures from 15 to 40 C is investigated experimentally in 3 male and 3 female animals weighing 3 9-60 kg. The monkeys were permitted to reach equilibrium at the test Ta for at least 2 h before O2-uptake, CO2 output, weighted skin temperature (Tsk), rectal temperature (Tre), respiratory evaporative water loss (Eresp) and total evaporative water loss (Etot) were measured for 30 min The results are presented in tables and graphs. Tsk is found to vary (from about 30 7 to about 37 2 C) with Ta, while Tre increases only from 37 6 to 38 4 C, Etot increases from about 9 to about

76 W/sq m, mainly due to eccrine sweating Total body conductance, Tsk, and Tre are shown to be lower (the conductance significantly) at 40 C than those of rhesus monkeys. It is suggested that the enhanced heat tolerance of E patas makes this species an appropriate subject for further studies of primate temperature regulation

N84-10723# Polish Academy of Sciences, Warsaw CONFERENCE ON ULTRASONICS IN BIOLOGY AND MEDICINE, **UBIOMED 6: REPORT SUMMARIES**

1983 58 p refs Conf held in Warsaw, 19-23 Sep 1983 (ISSN-0208-5658) Avail Issuing Activity

Bovine kidney cell cultures were used as an experimental model for a complex study of the biophysical mechanism of ultrasonic action The cell cultures were grown in Minimum Essential Medium supplemented with 5-10% calf serum in Roux bottles. Suspensions of 1,000,000 cells in ml using trypsin were prepared. The sonication of cells at low and very low ultrasound intensity in 37 C water bath was carried out. In the first series of experiments the morphological and functional changes of cells immediately after sonication were evaluated in the second series of experiments the sonicated cells were seeded in Roux bottles and grown in optimal conditions. In both series of experiments the changes in morphology and viability of cells influenced by ultrasound of low and very low intensity levels were observed. The possible mechanisms of ultrasonic action on cell cultures are discussed

NW

N84-10724*# National Aeronautics and Space Administration Ames Research Center, Moffett Field, Calif

THE GROWTH OF PARACOCCUS HALODENITRIFICANS IN A **DEFINED MEDIUM**

L I HOCHSTEIN and G A TOMLINSON (Santa Clara Univ, Calif) Oct 1983 16 p refs (NASA-TM-84411, A-9487, NAS 1 15 84411) Avail NTIS HC

A02/MF A01 CSCL 06C

A synthetic medium, consisting of inorganic salts and any of a number of carbon sources, supported the aerobic growth of Paracoccus halodenitrificans when supplemented with thiamine The same medium plus a nitrogenous oxide supported anaerobic growth when additionally supplemented with methionine. The observation that vitamin B12 or betaine replaced methionine suggested that P halodenitrificans had a defect in the cobalamin dependent pathway for methionine biosynthesis, as well as the inability to synthesize betaine when growing anaerobically

Author

N84-10725# Air Force Academy, Colo STABILITY OF RAT BRAIN GLUTAMINE SYNTHETASE TO OXYGEN TOXICITY (OXYGEN AT HIGH PRESSURE) Final Report

J T WEBB Jul 1983 17 p refs (Contract AF PROJ 2308)

(AD-A131049, USAFA-TR-83-12) Avail NTIS HC A02/MF A01

Enzyme assays using the gamma-glutamyl transferase method provided estimates of glutamine synthetase activity in rat brain homogenates subjected to a pure oxygen environment for over three hours No loss of activity was detected versus controls subjected to air or pure nitrogen. This finding supports the lack of any connection between convulsions caused by in vivo inhibition of glutamine synthetase and convulsions caused by oxygen toxicity (oxygen at high pressure) Author (GRA)

N84-10726# Montana State Univ, Bozeman Dept of Civil Engineering and Engineering Mechanics

MICROBIAL FOULING AND ITS EFFECT ON POWER

GENERATION Final Report, 15 May 1980 - 14 May 1983 W G CHARACKLIS, F L ROE, M H TURAKHIA, and N ZELVER Jul 1983 181 p refs (Contract N00014-80-C-0475)

(AD-A131084) Avail NTIS HC A09/MF A01 CSCL 13J

This report describes results of laboratory experiments conducted to determine the influence of fouling biofilm formation on heat transfer resistance and fluid frictional resistance. The research is directed at problems of power generation on ship board

N84-10727# Brookhaven National Lab , Upton, N Y THE DESIGN AND OPERATION OF SYSTEMS FOR INHALATION EXPOSURE OF ANIMALS

R T DREW 1982 43 p refs (Contract DE-AC02-76CH-00016)

(DE83-015388, BNL-33103) Avail NTIS HC A03/MF A01

The development, design, and operation of systems for exposure of animals to airborne pollutants are discussed The most significant point is that there are no set ways to perform inhalation studies. Many methods and techniques are acceptable The specific protocol developed depends on the objectives of the study or the questions being asked Many chamber designs and operations are suitable to answer specific questions. The most important point for an investigator to understand is the limitations of the system he has chosen. A wide variety of chamber shapes and sizes are currently in use and are appropriate under certain circumstances In conclusion, those beginning to design facilities or chambers are encouraged to consult with those who are currently operating such systems prior to beginning construction

N84-10728# Oak Ridge National Lab , Tenn NONPARAMETRIC ESTIMATION OF THE DISTRIBUTION OF

TO ONSET FOR SPECIFIC DISEASES SURVIVAL/SACRIFICE EXPERIMENTS

B W TURNBULL and T J MITCHELL Jul 1983 41 p refs (Contract W-7405-ENG-26)

(DE83-013726, ORNL/CSD-111) Avail NTIS HC A03/MF A01

The analysis of an animal survival/sacrifice experiment in which it is desired to investigate the incidence of a particular disease of interest is considered. It is assumed that the disease is irreversible and detectable only at death, e g , via a necropsy $\,$ Each observation is of one of three types, namely, death caused by the disease, death by competing cause (e.g., sacrifice) with the disease present, and death with the disease absent A two dimensional EM algorithms is proposed to obtain the nonparametric maximum likelihood estimates of the distribution G(t) of the time to onset (Y) and the distribution F(t) of the time to death (X) from the disease A slight modification of the algorithm enables the construction of likelihood based confidence intervals of F(t), G(t), the medians of X and Y and other functions of interest. The methods are illustrated using data from an experiment with laboratory mice in which the disease of interest is reticulum cell sarcoma

N84-10729# Oak Ridge National Lab , Tenn Biology Div THE RELEVANCE OF EXPERIMENTAL ANIMAL STUDIES TO THE HUMAN EXPERIENCE

R J M FRY 1982 24 p refs Presented at the Conf on Radiation Carcinogenesis Epidemiology and Biol Significance, Washington, D.C., 24 May 1982 (Contract W-7405-ENG-26)

(DE83-014053, CONF-8205170-2) Avail NTIS HC A02/MF A01

Animal experiments are being used to examine a number of physical and biological factors that influence risk estimations though not usually in coordination with epidemiologists. It is clear that the different mechanisms involved in different types of tumors are reflected in the diversity of dose-response relationships. The forms of the dose-response relationships are influenced by both the initial events and their expression. Evidence is accumulating that many initiated cells do not get expressed as overt cancers and host factors may play a major role in the expression of potential tumor cells There is a need for information about the relationship of the natural incidence and susceptibility to radiation induction for more tumor types Such experiments will help answer the question of which risk estimate models are appropriate for different tumor types and can be carried out on animals. Perhaps because of the importance of host factors risk estimates as a percentage of the natural incidence appear to be similar for human beings and mice for a small number of tumor types

N84-10730# Idaho Univ . Moscow Water and Energy Resources

AQUACULTURE **TECHNIQUES: PRODUCTION** FORECASTING MODEL FOR AQUACULTURE SYSTEMS

P C DOWNEY and G W KLONTZ Mar 1983 82 p refs (Contract DI-14-34-0001-0216)

(PB83-221713, W83-03318, OWRT-A-063-IDA(2)) Avail NTIS HC A05/MF A01 CSCL 06C

Computer implementation of the mathematical models of quantitative relationships in aquaculture systems is a dynamic process which provides a conceptual framework for understanding systems behavior These models can provide useful information on variable significance to systems functioning. This computer implemented mathematical model addresses one of the significant limitations of aquaculture systems management, namely, production forecasting, by providing a method of using technology to predict Allowable Growth Rate (AGR)

Health Effects Research Lab, Research Triangle N84-10731# Park, N C Genetic Bioassay Branch

EVALUATION OF MOTOR VEHICLE AND OTHER COMBUSTION EMISSIONS USING SHORT-TERM GENETIC BIOASSAYS

J LEWTAS Jul 1983 20 p refs (PB83-233270; EPA-600/D-83-078) Avail NTIS HC A02/MF A01 CSCL 06F

Short term genetic bioassays were useful in evaluating unregulated organic combustion emissions from motor vehicles Identification of mutagens and carcinogens in complex exhaust emissions was greatly facilitated by the use of bioassay directed factionation and characterization methods It is also possible to evaluate the effect of fuels, engine types, and control technologies on the rates of mutagenic emissions from motor vehicles. Greater differences in the rate of mutagenic emissions were observed between different engines (e.g., diesel vs. gasoline) and control technologies (e.g., with and without catalyst) than between different fuels A comparative evaluation of various combustion sources indicates that motor vehicle emissions make a major contribution to the mutagenicity observed in ambient air

N84-11693# Joint Publications Research Service, Arlington, Va USSR REPORT: SPACE BIOLOGY AND AEROSPACE MEDICINE, VOLUME 17, NO. 5, SEPTEMBER - OCTOBER 1983 O G GAZENBO, ed 1 Nov 1983 156 p refs Transl into ENGLISH of Kosmich Biol + Aviakosmich Med (Moscow), v 17, no 5, Sep - Oct 1983 96 p (JPRS-84655) Avail NTIS HC A08

The effects of long term space flight are examined Metabolism responses and the cardiovascular system are emphasized Certification of pilots through medical examination is included

N84-11705# Joint Publications Research Service, Arlington, Va. MORPHOMETRIC STUDY OF RAT ADRENAL MEDULLA DURING LONG-TERM HYPOKINESIA

A S PANKOVA and Y A SAVINA *In its* USSR Rept Space Biol and Aerospace Med, V 17, No 5, Sep-Oct 1983 p 74-79 1 Nov 1983 refs Transl into ENGLISH from Kosmich Biol i Aviakosmich Med (Moscow), v 17, no 5, Sep -Oct 1983 p 51-54

Avail NTIS HC A08

Using Wood's differential staining, norepinephrine- and epinephrine-secreting cells of the adrenal medulla of 36 Wistar male rats exposed to 1 to 55-month hypokinesia were measured caryometrically After 2 month hypokinesia the nuclear volume of norepinephrine-secreting cells increased significantly 5 5-month hypokinesia no dystrophic changes were seen in the Author adrenal medulla

N84-11706# Joint Publications Research Service, Arlington, Va EFFECT OF ELEUTEROCOCCUS EXTRACT ON RECOVERY **PROCESSES** RATS **FOLLOWING** IN SEVEN-DAY **HYPOKINESIA**

E. I KHASINA, I V DARDYMOV, and I I BREKHMAN *In its* USSR Rept Space Biol and Aerospace Med, V 17, No 5, Sep-Oct 1983 p 81-84 1 Nov 1983 refs Transl into ENGLISH from Kosmich Biol i Aviakosmich Med (Moscow), v 17, no 5, Sep -Oct 1983 p 55-58 Avail NTIS HC A08

Rats were housed in small cages for 7 days and then were placed into regular cages. The hypokinetic animals lagged behind the controls in their weight gain and reached their normal weight 45 days after the exposure The hypokinetic exposure stimulated the pituitary-adrenal system, the effect being most pronounced during the first 12 h after the experiment. The hypokinetic effect decreased the glycogen content and the hexokinase and glucose-6-phosphate dehydrogenase activity and increased lactate dehydrogenase and phosphoenol pyruvate carboxykinase activity The parameters examined returned to normal 45 days after the experiment The eleuterococcus preparation, the administration of which began immediately after the exposure, expedited the normalization of the parameters almost twofold (by day 20).

Author

N84-11707# Joint Publications Research Service, Arlington, Va EFFECT OF HYPOKINESIA ON AMINO ACID METABOLISM IN RATS ON DIETS DIFFERING IN CALCIUM AND PHOSPHORUS CONTENT

T F VLASOVA and Y B MIROSHNIKOVA In its USSR Rept Space Biol and Aerospace Med , V 17, No 5, Sep -Oct 1983 p 89-95 1 Nov 1983 refs Transl into ENGLISH from Kosmich Biol i Aviakosmich Med (Moscow), v 17, no 5, Sep -Oct 1983 p 58-60

Avail NTIS HC A08

The effect of hypokinesia on amino acid metabolism was studied in rats kept on diets with different ratios of calcium and phosphorus It was shown that excessive phosphorus in the diet led to a significant decrease of the amino acid pool, thus aggravating the hypokinetic effect

N84-11708# Joint Publications Research Service, Arlington, Va **DEMONSTRATION OF GAS BUBBLES IN CANINE PULMONARY** ARTERY AND AORTA BY MEANS OF ULTRASONIC ECHOGRAPHY WITH INTRAVENOUS AIR INFUSION

V P NIKOLAYEV, V P KATUNTSEV, R T KAZAKOVA, R I FINOGENOVA, K. S YUROVA, T D DORONINA, A D MANSFELD, P K CHICHAGOV, and A M REYMAN *In its* USSR Rept Space Biol and Aerospace Med, V 17, No 5, Sep -Oct 1983 p 89-95 1 Nov 1983 refs Transl into ENGLISH from Kosmich Biol i Aviakosmich Med (Moscow), v Transl into 17, no 5, Sep -Oct 1983 p 61-65

Avail NTIS HC A08

The transducer and receiving amplifier of a standard ultrasonic echocardiograph were modified to develop a device for detecting unmasked echocardiographic images of gas bubbles in blood vessels. This device was employed to detect gas bubbles passing from the venous to the arterial bed via lungs in anesthesized and thoracotomized dogs during air intravenous infusion. Gas bubbles entered the aorta when the dose of infused air was 12 to 15 ml It is postulated that gas bubbles formed in the animal and human body during decompression may pass from the venous into the arterial bed not only through shunts but also through lung capillaries

N84-11710# Joint Publications Research Service, Arlington, Va PREDICTION OF VOMITING IN DOGS EXPOSED TO RADIATION WITH SHIELDING OF MIDABDOMEN

T F OSOKINA, B L RAZGOVOROV, and B I DAVYDOV its USSR Rept Space Biol and Aerospace Med, V 17, No 5, Transl into Sep -Oct 1983 p 102-105 1 Nov 1983 refs ENGLISH from Kosmich Biol i Aviakosmich Med (Moscow), v 17, no 5, Sep -Oct 1983 p 70-72 Avail NTIS HC A08

Data on vomiting as a primary dose-dependent reaction of dogs to irradiation are presented. It is shown that vomiting can be predicted with reference to the average absorbed dose in the abdominal area, provided the animal is irradiated in a lethal dose and the area is shielded It is emphasized that calculated and experimental data are in good agreement

N84-11711# Joint Publications Research Service, Arlington, Va CONDITION OF ERYTHROCYTES DURING LONG-TERM **EXPOSURE TO MAGNETIC FIELD**

G V CHERKASOV In its USSR Rept Space Biol and Aerospace Med, V 17, No 5, Sep-Oct 1983 p 106-110 1 Nov 1983 Transl into ENGLISH from Kosmich Biol i Aviakosmich Med (Moscow), v 17, no 5, Sep -Oct 1983 p 72-75 Avail NTIS HC A08

During and after exposure to a constant magnetic field of 1 6 T mice showed variations in the size distribution to red blood cells, with their shape remaining unchanged and enlarged cells being predominant. This shift persisted till exposure day 10 and began to return to normal on days 15, 22 and 30 After irradiation the Price-Jones curve varied in a different manner and recovered by day 6 The changes in the curve were not correlated with variations in the reticulocyte and erythrocyte counts or hemoglobin content It is concluded that an exposure to a constant magnetic field produces insignificant lesions in the red blood cell membrane Mention should be made of a reduction of the reticulocyte count in the peripheral blood after exposure

N84-11720*# Texas Univ , Austin Dept of Botany THE REGULATORY FUNCTIONS OF CALCIUM AND THE ROLE OF CALCIUM **GRAVITATIONAL RESPONSES IN CELLS AND TISSUES**

S J ROUX, ed Nov 1983 295 p refs Workshop held in Bethesda, Md , 16-18 Sep 1982

(Contract NSG-7480)

(NASA-CP-2286, NAS 1 55 2286) Avail NTIS HC A13/MF A01 CSCL 06B

The hypothesis that calcium plays an important part in regulating cellular response to gravity and to other environmental stimuli is explored Topics covered include the role of calmodulin and other proteins, gravitropic responses, bone demineralization during space flight, and intracellular communication

N84-11721*# Texas Univ , Austin Dept of Botany EVIDENCE FOR A REGULATORY ROLE OF CALCIUM IN **GRAVITROPISM**

S J ROUX In its The Regulatory Functions of Calcium and the Potential Role of Calcium in Mediating Gravitational Responses in Nov 1983 refs Cells and Tissues p 2-13 Avail NTIS HC A13/MF A01 CSCL 06B

Experiments conducted to determine the cellular basis of gravitropism, the phenomenon of calcium migration following gravitropic stimulation, and the preferential accumulation of calcium in cells are described. Results of autoradiographic studies of cross sections of oat, and the pryoantimony precipitation of calcium in situ are discussed It was found that the movement of calcium during gravimetric stimulation is a redistribution of calcium from the vacuolar regions into the cells walls. This movement requires precipitation of a calcium ATPase. The control of calcium ATPase by calmodulin and whether chlorpromazine is binding to calmodulin in plants are considered ARH

N84-11722*# Massachusetts Univ , Amherst Dept of Botany CALCIUM AND MITOSIS

P HEPLER In Texas Univ The Regulatory Functions of Calcium and the Potential Role of Calcium in Mediating Gravitational Responses in Cells and Tissues p 14-27 Nov 1983 refs Avail NTIS HC A13/MF A01 CSCL 06B

Although the mechanism of calcium regulation is not understood, there is evidence that calcium plays a role in mitosis Experiments conducted show that (1) the spindle apparatus contains a highly developed membrane system that has many characteristics of sarcoplasmic reticulum of muscle, (2) this membrane system contains calcium, and (3) there are ionic fluxes occurring during mitosis which can be seen by a variety of fluorescence probes. Whether the process of mitosis can be modulated by experimentally modulating calcium is discussed.

ARH

N84-11723*# Agricultural Research Center, Beltsville, Md Plant Stress Lab

CALCIUM MODULATION OF PLANT PLASMA MEMBRANE-BOUND ATPASE ACTIVITIES

C CALDWELL In Texas Univ The Regulatory Functions of Calcium and the Potential Role of Calcium in Mediating Gravitational Responses in Cells and Tissues p 28-43 Nov 1983 refs Avail NTIS HC A13/MF A01 CSCL 06B

The kinetic properties of barley enzyme are discussed and compared with those of other plants. Possibilities for calcium transport in the plasma membrane by proton pump and ATPase-dependent calcium pumps are explored. Topics covered include the ph phase of the enzyme, high affinity of barley for calcium, temperature dependence, activation enthalpy, and the types of ATPase catalytic sites. Attention is given to lipids which are both screened and bound by calcium. Studies show that barley has a calmodulin activated ATPase that is found in the presence of magnesium and calcium.

N84-11724*# Vanderbilt Univ , Nashville, Tenn INTRACELLULAR CALCIUM RECEPTORS: CALMODULIN AND RELATED PROTEINS

D M WATTERSON In Texas Univ The Regulatory Functions of Calcium and the Potential Role of Calcium in Mediating Gravitational Responses in Cells and Tissues p 44-56 Nov 1983

Avail NTIS HC A13/MF A01 CSCL 06B

Studies on intracellular calcium receptors, calmodulin and related proteins were carried out Calcium binding proteins, like calmodulin fall into a class of proteins that are predominantly intracellular and reversibly bind calcium with dissociation constants in the micromolar to nanomolar range Calcium regulation of these proteins appears to be due to localized increases in calcium concentrations in the cytoplasm. The main thrust of the research is concerned with purifying and characterizing the calcium receptors and trying to elucidate mechanistically how they are involved in cellular responses.

N84-11725*# Georgia Univ, Athens Bioluminescence Lab ROLE OF CALCIUM AND CALMODULIN IN PLANT CELL REGULATION

M J CORMIER In Texas Univ The Regulatory Functions of Calcium and the Potential Role of Calcium in Mediating Gravitational Responses in Cells and Tissues p 57-68 Nov 1983 refs Avail NTIS HC A13/MF A01 CSCL 06B

The role of calcium and calmodulin in plant cell regulation is discussed Experiments are done to discover the level of calcium in plants and animals. The effect of intracellular calcium on photosynthesis is discussed.

N84-11726*# Connecticut Univ , Farmington Dept of Physiology

LOCAL CALCIUM ENTRY AND THE GUIDANCE OF GROWTH

K R ROBINSON *In* Texas Univ The Regulatory Functions of Calcium and the Potential Role of Calcium in Mediating Gravitational Responses in Cells and Tissues p 69-82 Nov 1983 refs Avail NTIS HC A13/MF A01 CSCL 06B

The role of calcium in developing cells is illustrated. The Fucus egg, a brown algae is used to describe this phenomenom. Results of local calcium entry and forced calcium entry into the eggs are given.

N84-11727*# State Univ of New York, Stony Brook Dept of Cellular and Comparative Biology

DEVELOPING HIGHER PLANT SYSTEMS IN SPACE

A D KRIKORIAN *In* Texas Univ The Regulatory Functions of Calcium and the Potential Role of Calcium in Mediating Gravitational Responses in Cells and Tissues p 83-96 Nov 1983 refs Avail NTIS HC A13/MF A01 CSCL 06B

The effects of hypogravity and microgravity environments on plant cells are discussed Experiments on embryos of carrots are discussed Simulation and spacecraft environments were used in experiments

N84-11728*# Michigan Univ , Ann Arbor Biological Sciences

GRAVITROPIC RESPONSES IN THE GRASS PULVINUS: MODEL SYSTEM FOR ASYMMETRIC GROWTH

P B KAUFMAN *In* Texas Univ The Regulatory Functions of Calcium and the Potential Role of Calcium in Mediating Gravitational Responses in Cells and Tissues p 97-110 Nov 1983 refs Avail NTIS HC A13/MF A01 CSCL 06B

Gravitropic responses in the grass pulvinus consituting a model system for asymmetric growth are discussed. The geotropic responses of the grass under various hormonal conditions are discussed. R J F

 $\textbf{N84-11729}^*\#$ National Aeronautics and Space Administration, Washington, D $\,$ C

BONE AND CALCIUM ALTERATIONS DURING SPACEFLIGHT

E M HOLTON In Texas Univ The Regulatory Functions of Calcium and the Potential Role of Calcium in Mediating Gravitational Responses in Cells and Tissues p 111-126 Nov 1983 refs Avail NTIS HC A13/MF A01 CSCL 06B

Bone demineralization caused by weightlessness during space flight is discussed. Bones of rats were examined and the results are given RJF

N84-11730*# California Univ , Davis Dept of Physiology GRAVITATIONAL STUDY OF THE CENTRAL NERVOUS

J M HOROWITZ In Texas Univ The Regulatory Functions of Calcium and the Potential Role of Calcium in Mediating Gravitational Responses in Cells and Tissues p 127-132 Nov 1983 refs Avail NTIS HC A13/MF A01 CSCL 06B

A series of experiments conducted at 1G are discussed with reference to the role of calcium ions in information processing by the central nervous system. A technique is described which allows thin sections of a mammalian hippocampus to be isolated while maintaining neural activity. Two experiments carried out in hypergravic fields are also addressed, one investigating altered stimulation in the auditory system, the other determining temperature regulation responses in hypergravic fields.

N84-11731*# Indiana Univ , Bloomington Dept of Biology POLARITY OF THE AMPHIBIAN EGG

G M MALACINSKI In Texas Univ The Regulatory Functions of Calcium and the Potential Role of Calcium in Mediating Gravitational Responses in Cells and Tissues p 133-141 Nov 1983 refs

Avail NTIS HC A13/MF A01 CSCL 06B

Amphibian egg polarity and the mechanism which generates the polarity is addressed. Of particular concern is the question of

whether the activation rotation which responds to gravity is a prerequisite for normal development.

 $\bf N84-11732^*\#$ National Aeronautics and Space Administration, Washington, D $\,$ C

PROGRAMMATIC COMMENTS

G SOFFEN, B BISHOP, and R YOUNG In Texas Univ The Regulatory Functions of Calcium and the Potential Role of Calcium in Mediating Gravitational Responses in Cells and Tissues p 142-146 Nov 1983

Avail NTIS HC A13/MF A01 CSCL 06B

The life science programs of NASA are informally discussed Research areas can be generally categorized as space biology, aerospace medicine, origins of life, biomedical research, and life support systems. The role of the life sciences in the development of the space station and the experimental opportunities afforded by such a facility are addressed.

N84-11733*# Michigan Univ, Ann Arbor Dept of Anatomy CALCIUM IONS, STORES, AND MODULATORS: WHAT IS THE GRAVITY RECEPTOR CONNECTION?

M D ROSS In Texas Univ The Regulatory Functions of Calcium and the Potential Role of Calcium in Mediating Gravitational Responses in Cells and Tissues p 147-164 Nov 1983 refs Avail NTIS HC A13/MF A01 CSCL 06B

The effect of weightlessness on gravireceptors is considered in an effort to shed light on the etiology of space motion sickness. The structures of the gravireceptors (crystals and neuroepithelium) are examined to determine the role piezoelectricity plays. B G

N84-11734*# Yale Univ, New Haven, Conn Dept. of Cell Biology

THE PLASMA MEMBRANE CALCIUM PUMP

H RASMUSSEN In Texas Univ The Regulatory Functions of Calcium and the Potential Role of Calcium in Mediating Gravitational Responses in Cells and Tissues p 165-179 Nov. 1983

Avail NTIS HC A13/MF A01 CSCL 06B

Three aspect of cellular calcium metabolism in animal cells was discussed including the importance of the plasma membrane in calcium homeostasis, experiments dealing with the actual mechanism of the calcium pump, and the function of the pump in relationship to the mitochondria and to the function of calmodulin in the intact cell

N84-11735*# Vanderbilt Univ , Nashville, Tenn Dept of Pharmacology

CARBOXYLIC ACID IONOPHORES AS PROBES OF THE ROLE OF CALCIUM IN BIOLOGICAL SYSTEMS

P W REED In Texas Univ The Regulatory Functions of Calcium and the Potential Role of Calcium in Mediating Gravitational Responses in Cells and Tissues p 180-199 Nov. 1983 refs Avail NTIS HC A13/MF A01 CSCL 06B

The biological effects of calcium ionophores are described, focusing on arachidonic acid oxygenation, and the formation of a number of oxygenated metabolites of arachidonic acid. These metabolites are involved in a number of bodily functions, and their production may be regulated by calcium.

N84-11736*# California Univ , Berkeley MEASUREMENT AND CONTROL OF FREE CALCIUM INSIDE SMALL INTACT CELLS

R Y TSIEN In Texas Univ The Regulatory Functions of Calcium and the Potential Role of Calcium in Mediating Gravitational Responses in Cells and Tissues p 200-217 Nov 1983 refs Avail NTIS HC A13/MF A01 CSCL 06B

The use of dye to measure intracellular free calcium concentration was discussed Difficulty in measuring the calcium is caused by two promblems the small amount of calcium available for testing, and the selectivity to bind calcium at 100 nanomolar excludes substances from entering the cell B G

N84-11737*# Baylor Coll of Medicine, Houston, Tex. Dept of Cell Biology

ROLE OF CALMODULIN IN CELL PROLIFERATION

J CHAFOULEAS *In* Texas Univ The Regulatory Functions of Calcium and the Potential Role of Calcium in Mediating Gravitational Responses in Cells and Tissues p 218-232 Nov 1983 refs Avail NTIS HC A13/MF A01 CSCL 06B

Calmodulin levels were found to increase as cells enter plateau. The data suggest that the cells are exiting the cell cycle late in the G sub 1 phase, or that the calmodulin levels in plateau cells are uncoupled to progression into S phase in plateau cells. Upon release, calmodulin levels rapidly decrease. Following this decrease, there is a increase prior to S phase.

N84-11738*# Albert Einstein Coll of Medicine, New York Cellular Neurobiology Div

CONTROLS OF INTRACELLULAR COMMUNICATION MEDIATED BY GAP JUNCTIONS

M V L BENNETT In Texas Univ The Regulatory Functions of Calcium and the Potential Role of Calcium in Mediating Gravitational Responses in Cells and Tissues p 233-244 Nov 1983 refs Avail NTIS HC A13/MF A01 CSCL 06B

Experiments were done using aequorin and no increase in aequorin luminescence during acidification adequate to uncouple cells was seen. The pH sensitivity of the conductance of the perfused membrane was essentially the same as that observed with intracellular pH microelectrodes.

N84-11739*# Texas Univ , Austin

SUMMARY OF STUDY GROUP SESSION DISCUSSIONS

In its The Regulatory Functions of Calcium and the Potential Role of Calcium in Mediating Gravitational Responses in Cells and Tissues p 245-288 Nov 1983

Avail NTIS HC A13/MF A01 CSCL 06B

The relationship between gravitational physiology and calcium metabolism is examined. The role of gravity on the problems of bone response, low gravity environments, calcium in plants, and the potential in animal systems for alterations in nerve and muscle function as variations in extracellular calcium levels occurred are discussed. Innovative materials for experiments on interactions between calcium and gravity, experiments that could utilize ionospheres or calcium-measuring dyes, and specific gravity calcium experiments are also addressed.

N84-11740# Illinois Univ , Urbana Dept of Physiology and Biophysics

PHOTOSYNTHESIS IN INTACT PLANTS

A R CROFTS 1983 10 p refs (Contract DE-AC02-80ER-10701) (DE83-016045, DOE/ER-10701/T1) Avail NTIS HC A02/MF

A four-stage approach to the study of photosynthesis at the molecular level in intact plants is described. The approaches are (1) development and construction of laboratory apparatus for the study of photosynthesis in suspensions and in detached leaves in a laboratory environment, (2) laboratory experiments to evaluate the apparatus, (3) development and construction of apparatus for use in the field, and (4) experiments in the field to study the effect of environmental factors on photosynthesis in situ. DOE

N84-11741# Oak Ridge National Lab , Tenn Engineering Physics

CALCULATIONS OF RADIATION FIELDS AND MONKEY MID-HEAD AND MID-THORAX RESPONSES IN AFRRI-TRIGA REACTOR FACILITY EXPERIMENTS

J O JOHNSON (Tennessee Univ), M B EMMETT, and J V PACE, III Jul 1983 114 p refs (Contract W-7405-ENG-26)

(DE83-015483, ORNL/TM-8807) Avail NTIS HC A06/MF A01

A computational study was performed to characterize the radiation exposure fields and the mid-head and mid-thorax response functions for monkeys irradiated Discrete ordinates radiation transport calculations were performed in one dimensional herical

geometry to obtain the energy spectra of the neutrons and gamma rays entering the room through various spectrum modifiers and reaching the irradiation position. Adjoint calculations performed in two dimensional cylindrical geometry yielded the mid-head and mid-thorax response functions, which were then folded with flux spectra to obtain the monkey mid-head and mid-thorax doses (kerma rates) received at the irradiation position. The results are presented both as graphs and as tables. The resulting spectral shapes compared favorably with previous works, however, the magnitudes of the fluxes did not. The differences in the magnitudes may be due to the normalization factor used DOE

N84-11742# Hohenheim Univ , Stuttgart (West Germany) Inst fuer Tiermedizin und Tierhygiene

HYGIENIC MICROBIOLOGICAL/VIROLOGICAL EXAMINATION OF AN AIRWASHER CONCERNING THE EMISSION OF AIRBORNE MICROORGANISMS Final Report, Jul. 1982

D STRAUCH and J WEKERLE Bonn Bundesministerium fuer Forschung und Technologie Jun 1983 147 p refs GERMAN, ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-83-130, ISSN-0340-7608) Avail NTIS HC A07/MF A01, Fachinformationszentrum, Karlsruhe, West Germany DM 31

A biological air washer with activated sludge as absorbent is examined The emission of virus aerosols and out-wash efficiency with airborne viruses were tested. The washer reduces airborne viruses in waste air by up to 695%, when activated sludge is used for absorbent and washer parameters are regulated optimally However, this is accompanied by an emission of airborne virus with the purified air. In the absorbent of the washer, an accumulation of test agents used during separation was ascertained Virus accumulation in the absorbent depends upon the test agents, the absorbent turnover and the air throughput Separated virus was emitted out of the absorbent as a function of virus concentration in the absorbent, air throughput and absorbent turnover

Author (ESA)

N84-11743# Health Effects Research Lab, Research Triangle Park, N C

INFLUENCE OF NITROGEN DIOXIDE ON XENOBIOTIC METABOLISM IN ANIMALS

J A GRAHAM, J W ILLING, F J MILLER, and D E GARDNER Jul 1983 12 p refs (PB83-239723, EP1-600/D-83-062) Avail NTIS HC A02/MF

A01 CSCL 06T

Potential extrapulmonary effects of nitrogen dioxide (NO2) on hepatic xenobiotic metabolism were examined. Initial studies were conducted using pentobarbital (PEN) induced sleeping time (ST) in mice as an indicator of integrated mechanisms of xenobiotic clearance A 3 hr exposure to concentrations as low as 0 47 mg NO2/cu m (0.25 ppm) caused a significant increase in PEN-induced ST in female mice. When exposures were repeated for several days, the magnitude of the effect diminished Investigation of sex sensitivity indicated that female mice were affected by acute exposure (3 hr/day, 1 or 2 days), but males were not it was also observed that a 4 day (3 hr /day) exposure to 1 88 mg NO2/cu m (1 0 ppm) induced tolerance to the effects of 9 4 mg NO2/cu m (5 0 ppm) Author (GRA)

52

AEROSPACE MEDICINE

Includes physiological factors, biological effects of radiation, and weightlessness

A84-10279

RENIN, ANGIOTENSIN-CONVERTING ENZYME, AND ALDOSTERONE IN HUMANS ON MOUNT EVEREST

J S MILLEDGE, D M CATLEY, F D BLUME, and J B WEST (Northwick Park Hospital, Harrow, Middx, England, Bakersfield State College, Bakersfield, California, University, La Jolla, CA) Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol 55, Oct 1983, p 1109-1112 Research supported by the American Alpine Club, Servier Laboratories, Explorers Club, U.S. Army, and NSF (Contract NIH-HL-24335, PHS-3-HR-6-2915)

Plasma renin activity (PRA), serum angiotensin-converting enzyme (ACE) activity, and plasma aldosterone concentration (PAC) were measured in 15 subjects at sea level and at high altitude Previous work has shown that on first ascent to altitude PAC and ACE are reduced, whereas PRA may be raised or reduced. After 2-4 wk at 6,300 m all hormones had returned to within + or - 10 percent of sea-level values. In seven subjects PRA and PAC were measured when exercise stopped PRA and PAC were both elevated, PRA more than PAC, i.e., the PAC response to PRA was markedly blunted. Since ACE activity was normal, it is suggested that there may be down regulation, i.e., reduction in density of angiotensin II receptors on the adrenal cortex and/or induction of enzymes which degrade angiotensin II. This mechanism apparently protects the subjects from very high levels of PAC and sodium retention when hypoxia and exercise raise PRA to very high levels

A84-10280

LACTATE ACCUMULATION DURING INCREMENTAL EXERCISE WITH VARIED INSPIRED OXYEN FRACTIONS

M C HOGAN, R H COX, and H G WELCH (Tennessee, University, Knoxville, TN) Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol 55, Oct 1983, p 1134-1140 Research supported by the American Heart Association refs (Contract NIH-7088)

The relationship between lactate accumulation and oxygen uptake under conditions of hypoxia, normoxia and hyperoxia is examined at progressively increasing exercise intensities. Six healthy subjects performed bicycle ergometer exercise at 60 rpm for 3 min at work rates of 60, 90, 105 W and subsequent increments of 15W until exhaustion while breathing gas mixtures of 17, 21 or 60 percent O2 on three separate occasions. The mean oxygen uptakes for the six subjects as a function of work rate are found not to differ among the three treatments. Mean blood lactate, measured at the end of each work rate interval, showed a steady trend, with the hypoxic condition showing the highest lactate concentrations and hyperoxia showing the lowest, although values at exhaustion were not significantly different among the three treatment groups Four of the subjects reached their greatest workload under normoxic conditions, while two were able to sustain the same work rate under hyperoxic and normoxic conditions Results thus demonstrate a dissociation of lactate accumulation from oxygen uptake, and suggest that differences in lactate (or H(+)) concentration may partially account for differences in performance under the three conditions

HYPOHYDRATION AND EXERCISE - EFFECTS OF HEAT ACCLIMATION, GENDER, AND ENVIRONMENT

M N SAWKA, M M TONER, R P FRANCESCONI, and K B. PANDOLF (U S Army, Research Institute of Environmental Medicine, Natick, MA) Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol 55, Oct 1983, p 1147-1153 refs

The effects of heat acclimation on physiological responses to exercise during hypohydration in three different environments are investigated in six male and six female subjects matched for maximal aerobic power Subjects performed treadmill exercise in hot-wet (35 C, relative humidity 79 percent), hot-dry (49 C, 20 percent) and comfortable (20 C, 40 percent) environments once when euhydrated and once when hypohydrated by 5 percent of body weight both before and after a 10-day period of heat acclimation Measurements of rectal temperature, mean skin temperature and heart rate show the physiological responses of men and women not to differ significantly in most of the environments studied Hypohydration is found generally to increase rectal temperature and heart rate and decrease sweat rate, while not altering mean skin temperature. Heat acclimation acted to reduce rectal temperature and heart rate in the comfortable environment, but only heart rates were reduced in the two hot environments Results thus show that under hypohydration, heat acclimation acts to decrease thermoregulatory and cardiovascular strain in a comfortable environment, but only cardiovascular strain in hot environments ALW

A84-10284

'ANAEROBIC THRESHOLD' - PROBLEMS OF DETERMINATION AND VALIDATION

M P YEH, R M GARDNER, T D ADAMS, F G YANOWITZ, and R O CRAPO (Utah, University, LDS Hospital, Salt Lake City, UT) Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol 55, Oct 1983, p 1178-1186 Research supported by the LDS Hospital-Deseret Foundation refs (Contract NIH-GM-23095)

The properties of various invasive and noninvasive measures used to determine an individual's anaerobic threshold, i.e., the oxygen consumption or work rate beyond which lactate accumulates, are investigated in an attempt to develop computerized threshold detection criteria. Arterial and venous blood samples were drawn and breath-by-breath gas responses were measured in eight normal subjects during rest, zero work load, and a work load increasing at the rate of 20 W/min Arterial lactate appeared to rise smoothly throughout the work period in all subjects, while arterial bicarbonate showed gradual increases, followed by the expected decreases in half. Venous lactate levels were observed to lag arterial response by about 1.5 min. When four physiologists were asked to determine independently the times of lactate accumulation and the anaerobic threshold from the invasive and noninvasive data, respectively, interreviewer variability on the order of 16 percent was found Invasive measurements thus demonstrate the lack of a threshold phenomenon, while noninvasive measurements show an unacceptably wide range of values for individual subjects ĂLW.

A84-10285

EFFECT OF A 42.2-KM FOOTRACE AND SUBSEQUENT REST OR EXERCISE ON MUSCLE GLYCOGEN AND ENZYMES

W M SHERMAN, D L COSTILL, W J FINK, F C HAGERMAN, L E ARMSTRONG, and T F MURRAY (Ball State University, Muncie, IN, Ohio University, Athens, OH) Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol 55, Oct 1983, p 1219-1224 Research supported by the National Dairy Council and Sigma Xi refs

A84-10397#

HUMAN PHYSIOLOGY RESEARCH UNDER MICROGRAVITY CONDITIONS AND THE PROPOSED 'ANTHRORACK' FACILITY H OSER (ESA, Microgravity Office, Paris, France) and J IVES (ESA, Payload Technology Dept, Noordwijk, Netherlands) ESA Bulletin (ISSN 0376-4265), no 35, Aug 1983, p 40-50

Areas of biomedical concern and the measurements to be made on the Spacelab are discussed. The physiological responses to microgravity environment will be examined in terms of the adaptation and function of cardiovascular/pulmonary and sensorimoter functions, as well as metabolic processes. Attention will be given to edema due to the absence of hydrostatic forces and to the regulation of circulation, blood pressure, and cardiovascular global and local resistance. Astronauts will be monitored through blood and urine samples, the effects of exercise, the motor responses and the susceptibility to motion sickness, postural activity, and responses to acoustic stimulation. The anthrorack, a computerized, multi-user work station design concept, has been developed to permit data acquisition, storage, and analyses, as well as sample analyses and cinematography

DHK

A84-10488

PHYSICAL METHODS OF TREATMENT IN NEUROLOGY [FIZICHESKIE METODY LECHENIIA V NEVROLOGII]

N I STRELKOVA Moscow, Izdatel'stvo Meditsina, 1983, 272 p In Russian refs

The main natural physical factors which can be employed during the treatment of diseases of the nervous system are discussed. The characteristics and various features of the mechanism of action of these types of treatments are examined. The etiology, pathogenesis, and clinical features of the most commonly encountered disorders of the nervous system are considered, focusing on disorders of the brain and spinal cord, and the peripheral and vegetative nervous systems, as well as neuroses and nerve-muscle disorders. Methods are presented for the physical therapy of these disorders at various stages of the development of the disorders, based on the pathogenesis, severity, and duration of the disorder. A differentiated approach to the use of various methods of physical therapy is suggested, which depends on the syndromes of the disorders, the condition of the compensation, and includes the consideration of neurophysiological data.

A84-10739

INFLIGHT LOSS OF CONSCIOUSNESS

D C JOHANSON (U.S. Navy, Marine Corps Air Station, El Toro, CA) IN SAFE Association, Annual Symposium, 20th, Las Vegas, NV, December 6-10, 1982, Proceedings Van Nuys, CA, SAFE Association, 1983, p. 212-215 refs

The causes of loss of consciousness (LOC) among aircrew who fly high performance military aircraft capable of 10 g sustained acceleration are examined, together with preventive measures. The 10 g acceleration effectively increases the hydrostatic pressure on the blood flow from 28 cm to 28 m, significantly raising the pressure against which the heart must pump. The result is grayout, blackout (loss of vision), and in the worst case LOC. The necessity of anti-g protection was demonstrated when a pilot who had survived a LOC event by ejecting, while the aircraft went on to crash, was exposed to a similar flight profile in a centrifuge and again suffered LOC. The presence of a tilt-back seat and an anti-g suit did not prevent the event. The pilot, if trained in the M-1 maneuver, may have avoided LOC Specific training in the M-1 straining maneuver, centrifugal tests to identify pilots who are most likely to tolerate high-g maneuvers, and the use of biofeedback sensors to alert pilots to the presence of conditions conducive to LOC conditions are recommended MSK

U.S. NAVY EJECTEE ANTHROPOMETRY - 1 JANUARY 1969 THROUGH 31 DECEMBER 1979

F C GUILL (U.S. Naval Air Systems Command, Washington, DC) IN SAFE Association, Annual Symposium, 20th, Las Vegas, NV, December 6-10, 1982, Proceedings Van Nuys, CA, SAFE Association, 1983, p. 241-256

The existing data base on anthropometric values reported in the Medical Officer's Report/Flight Surgeon's Report on aircraft ejectee anthropometry is discussed for accuracy and content. The study was performed to assess the necessary anthropometric measurements that need periodic updating in order to design safer and better-fitting personal survival equipment. The available data covered only aircraft mishaps where ejection was accomplished Divergences between ejectee data and data on the entire Naval aircrew population are noted, demonstrating that the ejectee data represent an entirely different population than the normal aircrew data cover. Further investigation of this factor is indicated.

MSK

A84-11017

HUMAN BODY TEMPERATURE - ITS MEASUREMENT AND REGULATION

Y HOUDAS (Lille, Universite, Lille, France) and E F J RING (Royal National Hospital for Rheumatic Diseases, Bath, England) Research supported by AGA Infrared Systems, Ltd., and Ultrakust GmbH New York, Plenum Press, 1982, 247 p refs

The terminology used in thermal physiology is examined, and principles of heat transfer are discussed, taking into account heat quantity, heat flux, temperature, pressure, quantities used in physiology, a number of common definitions, the equivalence between different forms of energy, the release of potential energy in living tissues, heat transfer without change of state, and heat transfer with change of state Temperature and humidity measurement are considered along with man and his environment, the temperature distribution in the systems and tracts of the human body, physiological changes affecting the temperature distribution, problems of temperature regulation, questions of heat loss and conservation, acclimatization to heat and cold, and disorders of thermoregulation. Attention is given to possible thermal imaging applications, causes of temperature irregularities in the head and neck, common causes of increased temperatures of upper limbs, and thermography in disease

A84-11327

LEVEL OF ARTERIAL PRESSURE AND VEGETATIVE CARDIAC REGULATION DURING THE SIMULATION OF INTENSE OPERATOR ACTIVITY [UROVEN' ARTERIAL'NOGO DAVLENIIA I VEGETATIVNAIA REGULIATSIIA SERDTSA PRI MODELIROVANII NAPRIAZHENNOI OPERATORSKOI DEIATEL'NOSTI]

R M BAEVSKII, ZH V BARSUKOVA, K K IOSELIANI, and T D SEMENOVA Fiziologiia Cheloveka (ISSN 0131-1646), vol 9, Sept-Oct 1983, p 723-728 In Russian refs

A84-11328

DEPENDENCE OF STRUCTURES OF HEART RHYTHM ON THE PHYSICAL WORK CAPACITY OF ATHLETES [ZAVISIMOST' STRUKTURY SERDECHNOGO RITMA OT FIZICHESKOI RABOTOSPOSOBNOSTI SPORTSMENOV]

A K KEPEZHENAS (Vil'niusskii Pedagogicheskii Institut, Vilnius, Lithuanian SSR) and D I ZHEMAITITE (Kavnasskii Meditsinskii Institut, Palanga, Lithuanian SSR) Fiziologiia Cheloveka (ISSN 0131-1646), vol 9, Sept Oct 1983, p 729-739 In Russian refs

An analysis is made of the interrelationship between the physical work capacity of athletes in training and heart-rhythm characteristics under load and at rest. The subjects comprised 92 athletes 19 to 25 years in age engaging in different cyclic forms of sport and 28 healthy students of the same age not engaged in sports. Results of rhythmography indicate that there is no linear relation between the physical work capacity of the athletes and the characteristics of respiratory arrhythmia and heart-rhythm dispersion. It is found that, at rest, the sympathetic influences on the regulation of the

trained heart are reduced due to the relative increase of parasympathetic influences. The higher the level of parasympathetic influence on the heart-rhythm regulation, the greater are the reserve capacities of the heart with respect to the improvement of the heart's functional indicators under maximum sympathetic influences.

A84-11329

RHYTHMOINOTROPIC PHENOMENA IN THE HUMAN HEART [RITMOINOTROPNYE IAVLENIIA V SERDTSE CHELOVEKA]

V IA IZAKOV, V F ANTIUFEV, and IU L PROTSENKO (Nauchno-Issledovatel'skii Institut Gigieny Truda i Profzabolevanii, Sverdlovsk, USSR) Fiziologiia Cheloveka (ISSN 0131-1646), vol 9, Sept -Oct 1983, p 740-747 In Russian refs

Intraventricular pressure was studied as a function of the duration of the R-R intervals in patients with flickering arrhythmia. The cross-correlation and cross-dispersion functions of interpulse interval-pressure were calculated. One random realization made it possible to obtain all the basic characteristics of rhythmoinotropic relationships known for determinate regimes. It is shown that the interval-pressure correlation coefficients depend on the mean heart rate, a finding determined by the nonlinearity of the chronoinotropic characteristics. A comparison of correlation and dispersion functions shows that linear chronoinotropic estimates are reliable at not very high contraction rates.

A84-11330

PARAMETERS OF THE DISTRIBUTION OF EKG R-R INTERVALS IN THE PREDICTION OF THE WORK CAPACITY OF HUMAN OPERATORS [PARAMETRY RASPREDELENIIA R-R-INTERVALOV EKG V PROGNOZIROVANII RABOTOSPOSOBNOSTI CHELOVEKA-OPERATORA]

A V TROSHKIN (Akademiia Nauk Ukrainskoi SSR, Institut Kibernetiki, Kiev, Ukrainian SSR) Fiziologiia Cheloveka (ISSN 0131-1646), vol 9, Sept -Oct 1983, p 748-752 In Russian refs

An investigation is made of the statistical parameters of the distribution of R-R intervals and the probability of the errorless execution of tracking operations under various levels of psychoemotional stress. The test involved the tracking of two luminous points moving toward each other by 32 healthy males 19 to 24 years in age. It is shown that a number of parameters of the R-R interval distribution can be used to predict the quality of perior performance. An analytical formula is obtained for the probability of task execution as a function of the principal statistical parameters of the R-R interval distribution.

A84-11331

HEART-RHYTHM REACTION TO SENSORIMOTOR LOADS OF VARYING COMPLEXITY [REAKTSII SERDECHNOGO RITMA PRI SENSOMOTORNYKH NAGRUZKAKH RAZLICHNOI SLOZHNOSTI]

E I SHULMAN, M IU GELTSEL, and M B SHTARK (Akademiia Meditsinskikh Nauk SSSR, Novosibirsk, USSR) Fiziologiia Cheloveka (ISSN 0131-1646), vol 9, Sept-Oct 1983, p 757-761. In Russian refs

Changes in the duration of heart-rhythm intervals caused by motor reaction and an acoustic signal prior to and during sensorimotor activity were studied in 50 human subjects (university students). The utilization of two types of sensorimotor tasks (a simple task and a selection task) made it possible to analyze these changes in connection with load complexity. It is shown that prior to sensorimotor activity the acoustic signal causes only a slight extension of the first poststimulus interval. The process of decision making in the selection task is found to affect the heart rhythm a statistically reliable extension of the heart-rhythm interval in which the decision is made is observed.

CIRCADIAN FLUCTUATIONS OF CERTAIN INDICATORS OF THE CONDITION OF THE CARDIOVASCULAR SYSTEM AND SKIN ELECTRICAL CHARACTERISTICS IN YOUNG FEMALE ATHLETES ENGAGED IN ACADEMIC ROWING [SUTOCHNYE KOLEBANIIA NEKOTORYKH POKAZATELEI SOSTOIANIIA SERDECHNO-SOSUDISTOI SISTEMY I ELEKTRICHESKIKH KHARAKTERISTIK KOZHI U IUNYKH SPORTSMENOK, ZANIMAIUSHCHIKHSIA AKADEMICHESKOI GREBLEI]

S M CHIBISOV, O A SHEVELEV, and E V TSIVAREVA (Universitet Druzhby Narodov, Moscow, USSR) Fiziologiia Cheloveka (ISSN 0131-1646), vol 9, Sept-Oct 1983, p 762-766 In Russian refs

A84-11333

PREDICTION OF HEMODYNAMIC REACTIONS TO ISOMETRIC EXERCISE [PROGNOZIROVANIE REAKTSII GEMODINAMIKI NA IZOMETRICHESKUIU NAGRUZKU]

B G BERSHADSKII, L P LARIKOVA, and T A EVDOKIMOVA (I Leningradskii Meditsinskii Institut, Leningrad, USSR) Fiziologiia Cheloveka (ISSN 0131-1646), vol 9, Sept-Oct 1983, p 767-772 In Russian refs

Patients with incipient hypertension were tested in order to assess the possibility of predicting hemodynamic reactions under isometric exercise of varying intensity depending on the age and sex of the patients, and the condition of the blood-circulation system in a state of rest. Age is shown to have a significant influence on circulation indicators in a state of rest. In addition, values of hemodynamic indicators under isometric muscular tension were found to diverge from corresponding values in a state of rest. Finally, it is shown that the accuracy of the prediction of the hemodynamic state during and after exercise increases with the number of preceding states included in the regression model. This accuracy is limited by the indicator-measurement error.

A84-11334

SKIN CAPILLARY BED UNDER THE PROLONGED LIMITATION OF HUMAN MUSCULAR ACTIVITY IN THE ANTIORTHOSTATIC POSITION [KAPILLIARNOE RUSLO KOZHI PRI DLITEL'NOM OGRANICHENII MYSHECHNOI DEIATEL'NOSTI CHELOVEKA V ANTIORTOSTATICHESKOM POLOZHENII]

N E PANFEROVA and T M PROSKURINA Fiziologiia Cheloveka (ISSN 0131-1646), vol 9, Sept-Oct 1983, p 773-777 In Russian

A84-11335

NEURON CORRELATES OF THE RECOGNITION OF VISUAL STIMULI. I DYNAMICS OF THE MEANS AND VARIANCES OF THE CURRENT DISCHARGE FREQUENCY OF NEURON POPULATIONS OF THE HUMAN BRAIN IN TESTS INVOLVING VISUAL-STIMULUS RECOGNITION. II - INVESTIGATION OF SPACE-TIME CORRELATIONS BETWEEN CURRENT FREQUENCIES OF THE IMPULSE ACTIVITY OF NEURON POPULATIONS OF THE HUMAN BRAIN DURING THE OF VISUAL STIMULI **[NEIRONNYE** RECOGNITION KORRELIATY OPOZNANIIA ZRITEL'NYKH STIMULOV. I DINAMIKA SREDNIKH ZNACHENII I DISPERSII TEKUSHCHEI RAZRIADA NEIRONNYKH **POPULIATSII** GOLOVNOGO MOZGA CHELOVEKA V PROBAKH PO OPOZNANIIU ZRITEL'NYKH STIMOLOV. II - IZUCHENIE PROSTRANSTVENNO-VREMENNYKH KORRELIATSIONNYKH SVIAZEI MEZHDU TEKUSHCHIMI CHASTOTAMI IMPUL'SNOI AKTIVNOSTI NEIRONNYKH POPULIATSII MOZGA CHELOVEKA PRI OPOZNANII ZRITEL'NYKH STIMULOVI

IU D KROPOTÓV (Akademiia Meditsinskikh Nauk SSSR, Leningrad, USSR) Fiziologiia Cheloveka (ISSN 0131-1646), vol 9, Sept-Oct 1983, p 778-792 In Russian refs

A84-11336

DEPENDENCE OF THE TIME OF RECOGNITION OF SIGNIFICANT OPTICAL STIMULI ON THE FEATURES CHARACTERIZING THE SPACE-TIME ORGANIZATION OF BRAIN BIPOTENTIALS [ZAVISIMOST' VREMENI RASPOZNAVANIIA ZNACHIMYKH SVETOVYKH STIMULOV OT OSOBENNOSTEI PROSTRANSTVENNO-VREMENNOI ORGANIZATSII BIOPOTENTSIALOV MOZGA]

L A POTULOVA and IA A VASILEV (Akademiia Nauk SSSR, Institut Vysshei Nervnoi Deiatel'nosti i Neirofiziologii, Moscow, USSR) Fiziologiia Cheloveka (ISSN 0131-1646), vol 9, Sept -Oct 1983, p 793-798 In Russian refs

A84-11339

THE INFLUENCE OF THE NEUROPEPTIDE ARGININE-VASOPRESSIN ON HUMAN TOLERANCE TO A HOT DRY ENVIRONMENT [VLIIANIE NEIROPEPTIDA ARGININ-VAZOPRESSINA NA PERENOSIMOST' CHELOVEKOM ZHARKOI SUKHOI SREDY]

V D BAKHAREV, A T MARIANOVICH, I B SLIUSAR, L A LEVKIN, O S PAPSUEVICH, and G I CHIPENS (Voenno-Meditsinskaia Akademiia, Leningrad, USSR) Fiziologiia Cheloveka (ISSN 0131-1646), vol 9, Sept-Oct 1983, p 819-827 In Russian refs

Eight healthy males 29 to 35 years of age were tested in a climate chamber for five days, two hours a day, at an air temperature of 49 C, a relative humidity of 20 percent, and an air velocity of 0.5 m/s. It was found that (8-arginine)-vasopressin in a dose of 10 ED (60 micrograms) produces a significant reduction in psychic and physiological stress in the human body subjected to a hot dry environment. This stress reduction can be accompanied by a reduction in psychomotor productivity. These effects are observed not only on the day of drug administration but also on the day after.

B J

A84-11340

THE EFFECT OF THE ADMINISTRATION OF 8-ARGININE-VASOPRESSIN DURING A PERIOD OF ADAPTATION TO HYPERTHERMIA [EFFEKT PRIMENENIIA 8-ARGININ-VAZOPRESSINA V PERIOD ADAPTATSII K GIPERTERMIII

N V ZGODA, V D BAKHAREV, V I IUNKEROV, N E DOMALCHUK, and IU P OSIPOV (Voenno-Meditsinskaia Akademiia, Leningrad, USSR) Fiziologiia Cheloveka (ISSN 0131-1646), vol 9, Sept -Oct 1983, p 828-836 In Russian refs

Ten healthy male subjects were tested in a microclimate chamber for five days, two hours a day, at a temperature of 49 C, a relative humidity of 20 percent, and an air velocity of 0.5 m/s. It was shown that the neuropeptide 8-arginine-vasopressin had a considerable effect on control processes associated with the optimization of the functioning of physiological systems in the transition period. The development of an energetically justified model of adaptation to hyperthermia is considered.

A84-11341

ASSESSMENT OF THE FUNCTIONAL CONDITION OF THE FEMALE ORGANISM IN FACTORIES [K OTSENKE FUNKTSIONAL'NOGO SOSTOIANIIA ZHENSKOGO ORGANIZMA V USLOVIIAKH PROIZVODSTVA]

A. P DORINOVSKAIA and R SH PLIAMOTAIA-ABDRAKHMANOVA (Sverdlovskii Institut Narodnogo Khoziaistva, Sverdlovsk, USSR) Fiziologiia Cheloveka (ISSN 0131-1646), vol 9, Sept -Oct 1983, p 837-843 In Russian refs

A84-11342

MORPHOFUNCTIONAL CORRELATIONS AS EXEMPLIFIED BY THE RELATIONSHIPS BETWEEN THE CARDIOVASCULAR SYSTEM AND THE PHYSIQUE [MORFOFUNKTSIONAL'NYE KORRELIATSII NA PRIMERE VZAIMOSVIAZEI SERDECHNOSOSUDISTOI SISTEMY I TELOSLOZHENIIA]

T N MOLIARENKO (Tambovskii Gosudarstvennyi Pedagogicheskii Institut, Tambov, USSR) Fiziologiia Cheloveka (ISSN 0131-1646), vol 9, Sept -Oct 1983, p 844-848 In Russian refs

DISPLACEMENT OF LIQUID IN A MODEL OF SEMICIRCULAR CANALS UNDER THE EFFECT OF ANGULAR ACCELERATIONS IN WEIGHTLESSNESS [SMESHCHENIE ZHIDKOSTI V MODELI POLUKRUZHNYKH KANALOV PRI VOZDEISTVII UGLOVYKH USKORENII V USLOVIIAKH NEVESOMOSTI]

F A SOLODOVNIK, E V LAPAEV, A A PRUSSKII, A A SIMAKOV, and A V CHAPAEV Akademiia Nauk SSSR, Izvestiia, Seriia Biologicheskaia (ISSN 0002-3329), Sept -Oct 1983, p 759-761 In Russian refs

The inertial displacement of liquid in the closed ring of a polychloride tube under the effect of positive and negative angular accelerations was measured in normal ground conditions and in conditions of short-term weightlessness. It is shown that the magnitude of the inertial displacement is higher in weightlessness than in normal conditions, which is probably due to the reduced friction between liquid particles and between the liquid and the tube walls. The results suggest that, in the semicircular canals of the labyrinth of an astronaut in space flight, the inertial displacement of the endolymph will be greater than in normal ground conditions for the same head movements.

A84-11551

THE USE OF FUNCTIONAL RHEOVASOGRAPHY FOR THE EXAMINATION OF ATHLETES WITH CIRCULATORY DISORDERS IN LOWER EXTREMITIES [PRIMENENIE FUNKTSIONAL'NOI REOVAZOGRAFII PRI ISSLEDOVANII SPORTSMENOV S NARUSHENIIAMI KROVOOBRASHCHENIIA V NIZHNIKH KONECHNOSTIAKH]

V V KOGAN-IASNYI and T V PRASOLOVA Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), May 1983, p 19-21 In Russian refs

A84-11552

ECONOMICAL REGIMES OF RUNNING FOR ATHLETES OF DIFFERENT AGES IN A HOT CLIMATE [EKONOMICHNYE REZHIMY BEGA U SPORTSMENOV RAZNOGO VOZRASTA V USLOVIJAKH ZHARKOGO KLIMATA]

V A ZAIKIN (Gosudarstvennyı Tsentral'nyı Institut Fizicheskoi Kul'tury, Moscow, USSR, Turkmenskii Gosudarstvennyı Institut Fizicheskoi Kul'tury, Ashkhabad, Turkmen SSR) Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), May 1983, p 17-19 In Russian refs

A84-11553

METABOLISM OF CERTAIN TRACE ELEMENTS AND THE PROPHYLAXIS OF THEIR DEFICIT IN ATHLETES [OBMEN NEKOTORYKH MIKROELEMENTOV I PROFILAKTIKA IKH DEFITSITA V ORGANIZME SPORTSMENOV]

V NASOLODIN (laroslavskii Gosudarstvennyi Universitet, Yaroslavl, USSR) Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), May 1983, p 15-17 In Russian refs

Data on the dynamics of concentrations of iron, copper, manganese, and zinc in the blood of athletes under physical exercise of varying intensity are generalized Results of balance studies of these trace elements are analyzed, and ways to prevent sport-related anemia are examined

A84-11554

LONG-TERM RETARDED TRAINING EFFECT OF FORCE LOADS [DOLGOVRREMENNYI OTSTAVLENNYI TRENIROVOCHNYI EFFECT SILOVYKH NAGRUZOK]

IU V VERKHOSHANSKII (Gosudarstvennyi Tsentral'nyi Institut Fizicheskoi Kul'tury, Moscow, USSR) Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), May 1983, p 5-8 In Russian refs

The long-term retarded training effect (LRTE) of concentrated force loads in various forms of athletics is examined. The dynamics of the velocity-force characteristics of athletes in prolonged training stages is indicated. In particular it is shown that there is a tendency to a stable and prolonged reduction in maximum muscle strength under the effect of concentrated force load, followed by an equally stable and prolonged increase, significantly exceeding the original

level Practical recommendations are made regarding the organization of training using the LRTE B J

A84-11555

EXTERIORIZATION OF THE EFFECT OF HYPERTHERMIA BY OBSERVING THE SYMPATHOADRENAL ACTIVITY IN SUBJECTS UNDER PSYCHOEMOTIONAL STRESS [OB'EKTIVIZATSIIA DEISTVIIA GIPERTERMII S POMOSHCH'IU IZUCHENIIA SIMPATO-ADRENALOVOI AKTIVNOSTI U LITS V SOSTOIANII PSIKHOEMOTSIONAL'NOGO NAPRIAZHENIIA]

V N VASILEV, V S CHUGUNOV, and M S EREMÉEV (Klinicheskaia Spetsializirovannaia Bolnitsa Klinika Nevrozov, Moscow, USSR) Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), May 1983, p 22, 23 In Russian refs

A84-11561

THE APPLICATION OF AN ELECTROMAGNETIC FIELD IN PATIENTS FOLLOWING DISORDERS OF BRAIN BLOOD CIRCULATION [PRIMENENIE ELEKTROMAGNITNOGO POLIA U BOLNYKH POSLE NARUSHENII MOZGOKOGO KROVOOBRASHCHENIIA]

N I STRELKOVA, S G MASLOVSKAIA, A G GAVRILKOV, and E N STRELTSOVA (Tsentral'nyı Institut Kurortologii ı Fizioterapii, Moscow, USSR) Sovetskaia Meditsina, no 5, 1983, p 35-38 In Russian refs

A84-11562

HYPERVENTILATION AS A METHOD FOR DETECTING DISORDERS OF ATRIOVENTRICULAR CONDUCTIVITY IN ATHLETES [GIPERVENTILIATSIIA KAK METOD VYIAVLENIIA NARUSHENII ATRIOVENTRIKULIARNOI PROVODIMOSTI U SPORTSMENOV]

S A MELIKHOV, A V LIRMAN, and ZH A FILIPPOV (Tomskii Meditsinskii Institut, Tomskii Vrachebno-Fizkul'turnyi Dispanser, Tomsk, USSR) Kardiologiia (ISSN 0022-9040), vol 23, May 1983, p 26-29 In Russian refs

A hyperventilation test, dosed with respect to the respiration rate and time, was conducted in 140 athletes with EKG monitoring During the test, one athlete exhibited an episode of a sinoauricular block, and four athletes developed a temporary atrioventricular block of the Wenkebach-Samoilov type (stage II) 20-60 hours following the hyperventilation in these three latter athletes, the EKG at rest showed decelerated atrioventricular conductivity in two of these athletes, this feature was combined with indications of myocardial dystrophy, while for the other athlete this feature was combined with periodically recorded cardiac sinus rhythm Two athletes were placed under long-term observation When repeated tests gave negative results, the block developed in response to hyperventilation following preliminary administration of obsidan

A84-11563

THE EFFECT OF DIURETICS ON THE CONCENTRATION OF CALCIUM IN BLOOD SERUM AND ITS EXCRETION WITH THE URINE [VLIIANIE DIURETIKOV NA SODERZHANIE KAL'TSIIA V SYVOROTKE KROVI I EGO EKSKRETSIIU S MOCHOI]

K A MERZON (Donetskii Meditsinskii Institut Donetsk, Ukrainian SSR) Kardiologiia (ISSN 0022-9040), vol 23, May 1983, p 46-49 In Russian refs

A84-11564

PREDICTING VENTRICULAR ARRYTHMIA OF THE HEART IN PATIENTS WITH MYOCARDIAL INFARCTION [K PROGNOZIROVANIIU ZHELUDOCHKOVYKH ARITMII SERDTSA U BOL'NYKH INFARKTOM MIOKARDA]

I M GELFAND, M N STARKOVA, and A L SYRKIN (Akademiia Nauk SSSR, Institut Prikladnoi Matematiki, I Moskovskii Meditsinskii Institut, Moscow, USSR) Kardiologiia (ISSN 0022-9040), vol 23, May 1983, p 9-12 In Russian refs

COMPARATIVE EVALUATION OF CHANGES IN MB CPK ACTIVITY AND INDICATORS OF PRECARDIAL MAPPING [SRAVNITEL'NAIIA OTSENKA IZMENENIIA AKTIVNOSTI MV KFK I POKAZATELEI PREKARDIAL'NOGO KARTIROVANIIA]

A V VINOGRADOV, G P ARUTIUNOV, A. S. GLAZUNOV, I N GELFAND, and O R SULTANBEKOV (II Moskovskii Gosudarstvennyi Meditsinskii Institut, Moskovskii Fiziko-Tekhnicheskii Institut, Moscow, USSR) Kardiologiia (ISSN 0022-9040), vol 23, May 1983, p 34-36 In Russian refs

Twenty patients with acute myocardial infarction were simultaneously subjected to two types of tests peripheral-blood MB CPK (creatine phosphokinase) activity measurement and precardial mapping Extreme values of precardial mapping were compared with those of MB CPK activity peaks, and the duration of increased MB CPK activity was determined it was shown that the extreme mapping values can be detected six-to-nine hours later than the MB CPK activity peaks Necrosis weights estimated on the basis of MB CPK activity and precardial-mapping indicators showed close correlation. It is concluded that MB CPK activity measurement is a more accurate way of assessing necrotic-zone spread, while precardial mapping yields a more accurate estimate of necrosis weight.

A84-11566

A HYGIENIC EVALUATION OF SEVERAL CHARACTERISTICS OF INTERMITTENT NOISE [CIGIENICHESKAIA OTSENKA NEKOTORYKH KHARAKTERISTIK NEPOSTOIANNOGO SHUMA]

A V KOLOGANOV (Donetskii Nauchno-Issledovatel'skii Institut Truda i Profzabolevanii, Donetsk, Ukrainian SSR) Gigiena i Sanitariia (ISSN 0016-9900), May 1983, p 8-10 In Russian refs

The relationship between the functional condition of male metallurgical workers (20-45 years of age) and the physical parameters of intermittent noise was studied. The correlation coefficients between the level of noise emission and several physiological parameter indicators were determined. The dependence of the changes in the auditory analyzer on the rate of sound level changes of the intermittent sound for 1 second was found to have a definite hygienic significance. It is found that the deleterious biological activity of intermittent sound can be increased or decreased in situations when the frequency of the noise pulses coincides with important biological rhythms. N.B.

A84-11568

INDICATORS OF CATECHOLAMINE METABOLISM AND HEMODYNAMICS IN AIR TRAFFIC CONTROLLERS WITH NEUROCIRCULATORY DYSTONIA OF THE HYPERTENSION TYPE [POKAZATELI KATEKHOLAMINOVOGO OBMENA I GEMODINAMIKI U AVIADISPETCHEROV PRI NEIROTSIRKULIATORNOI DISTONII GIPERTENZIVNOGO TIPA]

E L KAN, O O MALINOVSKAIA, and V A KUPRIIANOV (Nauchno-Issledovatel'skii Neirokhirurgicheskii Institut, Leningrad, USSR) Gigiena i Sanitariia (ISSN 0016-9900), May 1983, p 24-26 In Russian refs

Sixty-five air traffic controllers of Sochi airport were examined, 19 of them had neurocirculatory dystonia of the hypertension type, while 46 were apparently healthy. Tests for the diurnal rhythm of catecholamine excretion in the urine showed differences between the test groups with respect to catecholamine excretion level within different periods of 24 hours, in the day/night excretion ratio, and in the mediator and hormonal parameters of the sympathoadrenal system. Subjects with neurocirculatory dystonia had significantly higher levels of systole, heart stroke volume, minute blood volume, and systolic arterial pressure. In addition, their general peripheral resistance was lower than that of the control group.

A84-11569

A HYGIENIC EVALUATION OF ELEVATED DYNAMIC LOADS
ON PASSENGERS IN URBAN TRANSPORT VEHICLES
[GIGIENICHESKAIA OTSENKA POVYSHENNYKH
DINAMICHESKIKH NAGRUZOK NA PASSAZHIROV SALONOV
GORODSKOGO TRANSPORTA]

G V NOVIKOV, L A BUTCHENKO, and L S LANTSOV (Leningradskii Institut Usovershenstvovaniia Vrachei, Leningrad, USSR) Gigiena i Sanitariia (ISSN 0016-9900), May 1983, p 26-28 In Russian.

A84-11571

EXTERNAL RESPIRATION IN ELECTRIC WELDERS
[SOSTOIANIE VNESHNEGO DYKHANIIA
ELEKTROSVARSHCHIKOV]

V I SVIDOVYI, V F KIRILLOVA, and V N FILIMONOV (Leningradskii Sanitarno-Gigienicheskii Meditsinskii Institut, Leningrad, USSR) Gigiena i Sanitariia (ISSN 0016-9900), May 1983, p 57, 58 In Russian refs

A84-11572

HEAT-TRANSFER CHARACTERISTICS OF PORT WORKERS IN THE ARCTIC [OSOBENNOSTI TEPLOOBMENA PORTOVYKH RABOCHIKH ZAPOLIAR'IA]

B V USTIUSHIN, I I DEDENKO, B G LYTKIN, A E SHMONIN, T L IVANOVA, and A S KILEEV (Moskovskii Nauchno-Issledovatel'skii Institut Gigieny, Moscow, USSR) Gigiena i Sanitariia (ISSN 0016-9900), May 1983, p 61, 62 In Russian refs

An analysis was made of heat-transfer data for 200 dock workers engaged in the loading and unloading of ships in periods of winter Arctic navigation. The data reveal increased evaporative heat release from the skin and lungs, and an increase of heat losses due to the heating of inhaled air.

A84-11573

CHANGES IN THE AMINO ACID CONTENTS OF SALIVA AND URINE IN OIL AND GAS DRILLERS [IZMENENIE SODERZHANIIA AMINOKISLOT V SLIUNE I MOCHE U BUROVIKOV NEFTEGAZORAZVEDOCHNOI EKSPEDITSII]

A ! ZHIKHAREVA and G S OBODCHUK (Tiumenskii Meditsinskii Institut, Tyumen, USSR) Gigiena i Sanitariia (ISSN 0016-9900), May 1983, p 63, 64 In Russian refs

A84-11574

A HYGIENIC EVALUATION OF THE WORKING ENVIRONMENT OF OFF-SHORE OIL RIGS [GIGIENICHESKAIA OTSENKA PROIZVODSTVENNOI SREDY NA MORSKIKH NEFTIANYKH PROMYSLAKH]

I I ALEKSPEROV (Azerbaidzhanskii Nauchno-Issledovatel'skii Institut Gigieny Truda i Professional'nykh Zabolevanii, Sumgait, Azerbaizhan SSR) Gigiena i Sanitariia (ISSN 0016-9900), May 1983, p 64-66 In Russian refs

A84-11760#

OXYGEN REGIMEN IN THE HUMAN PERIPHERAL TISSUE DURING SPACE FLIGHTS

H HAASE, B JARSUMBECK (Institute of Aviation Medicine, Koenigsbrueck, East Germany), E A KOVALENKO, M P BOBROVNITSKII, V N SEMENKOV (Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR), A VACEK (Ceskoslovenska Akademie Ved, Biofyziaklni Ustav, Brno, Czechoslovakia), Z SAROL (Wojkowy Instytut Medycijny Lotniczey, Warsaw, Poland), J HIDEG (Institute of Aviation Medicine, Kecskemet, Hungary), and K ZLATAREV International Astronautical Federation, International Astronautical Congress, 34th, Budapest, Hungary, Oct 10-15, 1983 18 p refs

(IAF PAPER 83-197)

The study was carned out with a special board-oxymeter based on the polarographic principle A significant decrease in the intracutaneous oxygen partial pressure was observed in the crew visiting the Salyut-6 station on a seven-day mission. The decrease

was 3 28 kPa (24 7 mm Hg) Local oxygen utilization decreased significantly, by 0 44 kPa (3 3 mm Hg) During hyperventilation testing after return to earth, a statistically significant decrease in the peak value by 1 39 kPa (10 5 mm Hg) was observed Among the regular crew of the station, the greatest decrease in partial pressure was 3 8 kPa (28 5 mm Hg) and the smallest was 3 4 + or - 0 5 kPa (25 6 + or - 4 0 mm Hg) The decrease in local oxygen utilization during the flight was greater than the decrease observed in the visiting crew

A84-11761#

GENERAL RESULTS OF MEDICAL INVESTIGATIONS IN SALYUT-6 MANNED SPACE FLIGHTS

E I VOROBEV, O G GAZENKO, A M GENIN, A D EGOROV, IU G NEFEDOV, and E B SHULZHENKO International Astronautical Federation, International Astronautical Congress, 34th, Budapest, Hungary, Oct 10-15, 1983 9 p refs (IAF PAPER 83-202)

The changes observed after the flight proved to be reversible, and they disappeared completely after a relatively short period of readaptation. It has been found that postflight changes do not correlate with the duration of the flight Medical studies carried out during the Salyut-6 flights indicate that the duration of manned space flights can be increased. It is noted that the cosmonaut Riumin made his 185-day flight six months after completing a 175-day flight. In both missions his health and work capacity were identical, suggesting a complete recovery to his normal physiological state during the six months between flights. It is concluded that if the cosmonauts perform special exercises and adhere to a reasonable work/rest schedule, their physiological changes do not progress with increasing flight duration from one to six months.

A84-11962

FUNCTIONS OF THE FRONTAL LOBES OF THE BRAIN [FUNKTSII LOBNYKH DOLEI MOZGA]

E D KHOMSKAIA and A R LURIIA Moscow, Izdatel'stvo Nauka, 1982, 288 p. In Russian

Papers are presented concerning the role of the frontal lobes in the formation of the higher psychic functions in man. Variants of the 'frontal syndrome' are discussed, and psychophysiological studies of functions of the frontal lobes are described. Particular consideration is given to the role of the frontal lobes in the organization of auditory and speech memory in children and adults, visual-perception disorder in patients with frontal-lobe lesions, vertical rhythmic movements of the eyes in the case of local brain lesions, and self-evaluation disorders in patients with local brain lesions. No individual items are abstracted in this volume

В

A84-12061* National Aeronautics and Space Administration Lyndon B Johnson Space Center, Houston, Tex

TRANSDERMAL SCOPOLAMINE IN THE PREVENTION OF MOTION SICKNESS EVALUATION OF THE TIME COURSE OF EFFICACY

J L HOMICK, M F RESCHKE, J DEGIOANNI, N M CINTRON-TREVINO (NASA, Johnson Space Center, Houston, TX), and R L KOHL (Technology, Inc., Houston, TX) Aviation, Space, and Environmental Medicine (ISSN 0095-0562), vol. 54, Nov. 1983, p. 994-1000 refs

This study evaluated the time course of efficacy of transdermal scopolamine in the prevention of motion sickness induced by exposure to conolis stimulation in a rotating chair. We measured levels of efficacy, quantified side effects and symptoms, and determined inter- and intra-subject variability following use of transdermal scopolamine. The response to transdermal scopolamine was highly variable, although overall we recorded a 40 percent improvement in test scores 16-72 h after application of the transdermal system. This variability could not be explained solely by the levels of scopolamine present in the blood. The improvement was not due to the artifactual repression by scopolamine of selected symptoms of motion sickness. An unexpectedly high incidence of side effects was reported.

concluded that the therapeutic use of transdermal scopolamine be evaluated individually and that individuals be cautioned that subsequent usage may not always be effective

Author

A84-12062* National Aeronautics and Space Administration Lyndon B Johnson Space Center, Houston, Tex

CARDIOVASCULAR EXAMINATIONS AND OBSERVATIONS OF DECONDITIONING DURING THE SPACE SHUTTLE ORBITAL FLIGHT TEST PROGRAM

M W BUNGO and P C JOHNSON, JR (NASA, Johnson Space Center, Medical Research Branch, Houston, TX) Aviation, Space, and Environmental Medicine (ISSN 0095-0562), vol 54, Nov 1983, p 1001-1004 refs

During the first four flights of the Space Shuttle, cardiovascular data were obtained on each crewmember as part of the operational medicine requirements for crew health and safety. From monitoring blood pressure and electrocardiographic data, it was possible to estimate the degree of deconditioning imposed by exposure to the microgravity environment. For this purpose, a quantitative cardiovascular index of deconditioning (CID) was derived to aid the clinician in his assessment. Isotonic saline was then investigated as a countermeasure against orthostatic intolerance and found to be effective in partially reversing the hemodynamic consequences. It was observed that the space flight environment of reentry might potentially be arrhythmogenic in at least one individual.

A84-12068

THE CONFIRMATION OF 9-CARBOXY-THC IN URINE BY GAS CHROMATOGRAPHY/MASS SPECTROMETRY

J D WHITING and W W MANDERS (US Armed Forces Institute of Pathology, Washington, DC) (Joint Committee on Aviation Pathology, Scientific Session, 13th, Toronto, Canada, Oct. 1982) Aviation, Space, and Environmental Medicine (ISSN 0095-0562), vol. 54, Nov. 1983, p. 1031-1033

A84-12069

DIAPHRAGMATIC RUPTURE DURING G-MANEUVERS IN A T33 JET TRAINER

P A MANINGAS, M A DIJULIO, and S C DRONEN (US Army, Madigan Army Medical Center, Tacoma, WA) Aviation, Space, and Environmental Medicine (ISSN 0095-0562), vol. 54, Nov. 1983, p. 1037, 1038 refs

A 26-year-old white male, radar operator, participated in a flight in a U S Air Force T33 jet trainer. The patient exerienced nausea and vomiting followed by several episodes of retching during maneuvers of positive acceleration. Upon landing, he noted severe epigastric pain and shortness of breath. After 3 h of persistent symptoms, he presented to the base hospital's emergency department where he was diagnosed as having diaphragmatic herniation of abdominal viscera into the left hemithorax. At laparotomy, a large traumatic paraesophageal tear was discovered. The abdominal viscera were reduced and the defect repaired. The postoperative course was uncomplicated. The pathophysiology of blunt, nonpenetrating diaphragmatic herniation is discussed. Another mechanism for diaphragmatic rupture resulting from the forces of vomiting and acceleration is proposed.

A84-12131

FUNCTIONAL ASYMMETRY OF THE CEREBRAL HEMISPHERES AND UNCONSCIOUS PERCEPTION [FUNKTSIONAL'NAIA ASIMMETRIIA POLUSHARII MOZGA I NEOSOZNAVAEMOE VOSPRIIATIE]

E A KOSTANDOV Moscow, Izdateľstvo Nauka, 1983, 172 p In Russian refs

The physiological basis of such unconscious psychic processes as psychological defense, displacement, and emotions of indeterminate origin is examined from the vantage point of the theory of the mutually complementary functional 'cooperation' between the cerebral hemispheres Data obtained using electrophysiological and psychophysical conditioned-reflex techniques are examined it is shown that it is possible to carry out semantic analysis on the unconscious level and to form associations with the aid of emotionally significant words on this

level A conclusion of the study is that the unconscious in the human psyche can be effectively investigated from the neurophysiological point of view.

A84-12154

PROBLEMS IN THEORY AND METHODOLOGY FOR THE INVESTIGATION OF HIGHER NERVOUS ACTIVITY IN MAN-SELECTED WORKS [VOPROSY TEORII I METODOLOGII ISSLEDOVANIIA VYSSHEI NERVNOI DEIATEL'NOSTI CHELOVEKA - IZBRANNYE TRUDY]

L G VORONIN Moscow, Izdatel'stvo Pedagogika, 1982, 176 p In Russian refs

The fundamental ideas of Pavlov's theory are elaborated in the light of present-day neurophysiology. Problems in the phylogeny and ontogeny of higher nervous activity in man are discussed along with methodological principles for the investigation of this activity. Also considered are some current problems in the investigation of higher nervous activity, including physiological mechanisms of motor skills, typological features of the orientation reflex, the nature of oscillatory processes in conditioned-reflex activity, and physiological principles of activation in the learning process.

B J

A84-12158

MOTOR UNITS OF HUMAN SKELETAL MUSCLES [DVIGATEL'NYE EDINITSY SKELETNYKH MYSHTS CHELOVEKA]

D KOZAROV and IU T SHAPKOV Leningrad, Izdatel'stvo Nauka, 1983, 256 p. In Russian refs

Published literature is surveyed and original experimental results are presented on the activity of motor units of human skeletal muscles for arbitrary movements, postures, reflex activation, and arbitrary control Particular consideration is given to the phenomenon of postactivation potentiation; the role of proprioceptors in regulating the work of motor units, and mechanisms of recruitment and modulation of discharge frequency

A84-12651

CARDIORESPIRATORY RESPONSE TO EXERCISE IN MEN REPEATEDLY EXPOSED TO EXTREME ALTITUDE

J S MILLEDGE, M P WARD, E S WILLIAMS, and C R A CLARKE (Northwick Park Hospital, Harrow, Middx, St Andrew's Hospital, St. Bartholomew's Hospital, London, England) Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol 55, Nov. 1983, p. 1379-1385 refs

The ventilatory and heart rate responses were studied in four experienced high-altitude climbers at sea level and during a 6-wk period above 4,500 m to discover whether their responses to hypoxia were similar to those of high-altitude natives. Comparison was made with results from four scientists who lacked their frequency exposure to extreme altitude. The climbers had greater maximum O2 consumption at sea level and altitude but similar ventilatory responses to increasing exercise. On acute hypoxia at sea level their ventilatory response was less than that of scientists Their heart rate response did not differ from that of scientists at sea level, but with acclimatization of the reduction in response was significantly greater. It is concluded that these climbers, unlike high-altitude residents, have cardiorespiratory responses to exercise similar to those of other lowlanders except that their ventilatory response was lower and the reduction in their heart rate response was greater Author

A84-12653

TRAINING-DEPENDENT CHANGES OF RED CELL DENSITY AND ERYTHROCYTIC OXYGEN TRANSPORT

H MAIRBAEURL, E HUMPELER, G SCHWABERGER, and H PESSENHOFER (Innsbruck, Universitaet, Innsbruck, Graz Universitaet, Graz, Austria) Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol 55, Nov 1983, p 1403-1407 refs

Prolonged endurance training causes a decreased O2 affinity Hb, which is due to an increase in erythrocyte 2,3-diphosphoglycerate (2,3-DPG) concentration mechanisms were studied in 20 males with varying degrees of fitness The O2 tension at 50 percent O2 saturation of Hb (P50) was higher in the more fit subjects (+13 mmHg) and the 2,3-DPG concentration was higher (+23 micromol/g Hb) in this group The mean density was significantly lower in fit subjects (1 1002 g/ml) as compared with less fit subjects (1 1056 g/ml), indicating a lower mean age. Density distribution curves show that in the fit subjects more young erythrocytes were in blood and that the very old erythrocytes were missing. After correction for the differences in the density distribution, no differences in the P50 value and 2.3-DPC concentration between less fit and fit subjects were found Therefore, the decreased Hb-O2 affinity after training can be explained by the presence of more young erythrocytes in the blood of trained subjects. The magnitude of this effect correlates with Author the training status

A84-12655

EFFECT OF INTRAVENOUS DOPAMINE ON HYPERCAPNIC VENTILATORY RESPONSE IN HUMANS

D S WARD and J W BELLVILLE (California, University, Los Angeles, CA) Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol 55, Nov 1983, p 1418-1425 Research supported by the University of California refs.

A84-12656

PLASMA ADRENOCORTICOTROPIN AND CORTISOL RESPONSES TO SUBMAXIMAL AND EXHAUSTIVE EXERCISE P A FARRELL (Wisconsin, University, Milwaukee, WI), T L GARTHWAITE (Wisconsin, Medical College, Milwaukee, WI), and A B GUSTAFSON (Wood Veterans Administration Medical Center, Milwaukee, WI) Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol 55, Nov 1983, p 1441-1444 Research supported by the U S Veterans Administration refs

A84-12657

CONTROL OF BREATHING AT THE START OF EXERCISE AS INFLUENCED BY POSTURE

D WEILER-RAVELL, D M COOPER, D J WHIPP, and K WASSERMAN (California, University, Medical Center, Torrance, CA) Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol 55, Nov 1983, p 1460-1466 refs

(Contract NIH-11907)

The results of ventilatory-response tests in one female and nine male subjects performing upright (U) and supine (S) cycle ergometry are reported Each subject performed the 6-min square-wave tests at a work rate below the predetermined anaerobic threshold, three times in each position. Breath-by-breath measurements of inspired ventilation (VI), O2 uptake (VO), CO2 output, and end-tidal O2 and CO2 tensions, and beat-by-beat heart rates (HR) are presented in tables and graphs comparing rest and exercise states in U and S positions. The VI response to exercise was decreased significantly, from 81 + or - 8 percent in U to 50 + or - 6 percent in S, and similar patterns are seen in VO2 and in the ratio VO2/HR The reduced ventilatory response in the S position is attributed to a decreased pulmonary blood flow, as predicted by the cardiodynamic-hyperpnea model of Wasserman et al (1974) TΚ

OVERALL 'GAIN' OF THE RESPIRATORY CONTROL SYSTEM IN NORMOXIC HUMANS AWAKE AND ASLEEP

Y HONDA, F HAYASHI, A YOSHIDA, Y OHYABU, Y NISHIBAYASHI, and H KIMURA (Chiba University, Chiba, Japan) Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol 55, Nov 1983, p 1530-1535 refs

A84-12662 OPTIMIZING THE EXERCISE PROTOCOL FOR CARDIOPULMONARY ASSESSMENT

M J BUCHFUHRER, J E HANSEN, T E ROBINSON, D Y SUE, K WASSERMAN, and B J WHIPP (California, University, Torrance, CA) Journal of Applied Physiology Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol 55, Nov 1983, p 1558-1564 refs

A comparative study of cycle and treadmill-ergometer 1-min incremental-exercise tests at different levels of work-rate increment in 12 normal male subjects (age 28-54) is reported. In initial tests to exhaustion in about 10 min, maximum O2 uptake and anaerobic threshold (AT, at about 50 percent of the maximum uptake) were 6 and 13 percent higher, respectively, with the treadmill than with the cycle in the second set of tests (with 5 subjects) treadmill increments of 08, 17, 25, and 42 percent/min at 34 mph and 17 and 42 percent/min at 45 mph were compared to cycle increments of 15, 30 and 60 W/min It is shown that AT is independent of test duration, but maximum O2 intake is significantly higher in tests lasting about 8-17 min than in longer (low-increment) or shorter (high-increment) tests of either type A work-rate increment which brings the subject to exhaustion in 10 + or - 2 min is recommended for reproducible evaluation of cardiopulmonary function

N84-10733# Aerospace Medical Research Labs , Wright-Patterson AFB, Ohio PRELIMINARY INVESTIGATION OF VARIATION IN SOME DARK

PRELIMINARY INVESTIGATION OF VARIATION IN SOME DARK ADAPTATION ASPECTS FOR POSSIBLE RELEVANCE TO MILITARY HELICOPTER AIRCREW

E DONALDSON Jun 1983 91 p refs (Contract AF PROJ 7184)

(AD-A130231, AFAMRL-TR-83-053) Avail NTIS HC A05/MF A01 CSCL 05J

The variability in night visual capacity of military aircrew may be relevant to task selection especially for low level night operation of the light observation helicopter. The experimental objective was to assess the extent of variation threshold for spatial frequencies and in the time to recovery of dark adaptation after a standard light exposure simulating a flare illumination. The subjects were 11 volunteers, five of whom were dark adapted for a period of 30 The level of adaptation was measured with an adaptometer which had the capability of presenting the stimulus at several spatial frenquencies. A brief exposure to the simulated flare illumination was immediately followed by assessment of the effect on dark adaptation and time for recovery Considerable variation was demonstrated in the rate and threshold levels of dark adaptation for light and for resolution of several spatial frequencies Following the simulated flare exposure of 0.8 mL for 90 seconds, most subjects attained a threshold level for light within 30 seconds and there was no evidence of a recovery effect in the curves of the threshold luminance for resolution of a 6.25 cycles per degree grating Marked differences in the threshold levels and in the spread of the subjects' estimations were clearly evident

N84-10732*# National Aeronautics and Space Administration Ames Research Center, Moffett Field, Calif

THE PHYSIOLOGICAL EFFECTS OF SIMULTANEOUS EXPOSURES TO HEAT AND VIBRATION Ph.D. Thesis - California Univ., Berkeley

W A SPAUL Sep 1983 181 p refs

(NASA-TM-84400, A-9458, NAS 1 15 84400) Avail NTIS HC A09/MF A01 CSCL 06S

Determination of the effects of exposure to vibration on the body's ability to handle heat stress, and, if so, identification of the specific vibration parameters (frequency and intensity) for both whole-body (wbv) and segmental-body vibration (sbv) that would have the most detrimental effect on the body's ability to maintain thermal homeostasis were studied Rectal and skin temperatures, heart rates, localized sweat rates, arm-segment blood perfusion rates, respiration rates, oxygen uptakes, and respiratory exchange ratios were measured in six men (22 to 33 yr) during simultaneous exposures to heat and vibration - either wbv or sbv, and during a heated 50 min recovery period. The heat conditions were T (sub db) = 435 + or - 05C (mean + or SEM), and RH = 20 +or - 4% All vibration exposures were divided into two exposure conditions - identical frequencies but at a high intensity (HI) and a low intensity (LI) level The HI wbv exposure was for 25 min/day at 5 Hz, 0 37 g-rms, 10 Hz, 0 46 g-rms, 16 Hz, 0 72 g-rms, 30 Hz, 1 40 g-rms, 80 Hz, 3 70 g-rms. The LI wbv exposure was for 2.5 hr/day at the same frequencies but at the following accelerations 0 14 g-rms, 0 18 g-rms, 0 28 g-rms, 0 55 g-rms, 1 44 g-rms During the sbv the subject stood and grasped a vibrating, in the Z-axis, hand grip with both hands Author N84-10734# Naval Biodynamics Lab , New Orleans, La Bureau of Medicine and Surgery

EFFECTS OF IMPACT ACCELERATION ON SOMATOSENSORY EVOKED POTENTIALS

M D BERGER and M S WEISS Apr 1983 65 p refs (AD-A130280, NBDL-83R002) Avail NTIS HC A04/MF A01 CSCL 06S

In order to test and evaluate impact protection devices, an impact-injury model for restrained humans in a crash environment must be developed Disruption of the functioning of the central nervous system (CNS) is an important consequence of impact injury involving the head and neck, and is an important consideration in the development of a useful impact-injury model Ultimately, neurophysiological criteria for functional injury of the CNS are desired The main purpose of the experiments reported here is to identify some of the measures of CNS function which may provide the basis for establishing such criteria. In these experiments, eight unanesthatized Rhesus monkeys, with torsos restrained in a seated position, and with head and neck free to move, were subjected to peak sled accelerations in the -X direction ranging from 42 m/s sq second to 963 sq second The results of these analyses indicate that neurophysiological indices of injury may include increases in latencies of the cervical Somatosensory evoked potentials (SEP) peaks exceeding 25%, large changes in the amplitude of the cervical SEP, changes in ripples on the cortical primary SEP, and substantial and persistent changes in the surface-positive cortical primary SEP. In particular, analysis of shifts in latency of the cervical SEP suggests the possibility of an injury threshold in the vicinity of 700 - 800 sq second Smaller shifts in latency occurring near 600 sq second may indicate a pre-injury condition GRA

N84-10735# Army Research Inst of Environmental Medicine, Natick, Mass Exercise Physiology Div

THE ENERGY COST AND HEART RATE RESPONSE OF TRAINED AND UNTRAINED SUBJECTS WALKING AND **RUNNING IN SHOES AND BOOTS**

B H JONES, M M TONER, W L DANIELS, and J J KNAPIK

1983 21 p refs (AD-A131420, USARIEM-M-37/83) Avail NTIS HC A02/MF A01 CSCL 06S

To determine the difference in the energy cost of walking and running in a lightweight athletic shoe and a heavier boot, fourteen male subjects (6 trained and 8 untrained) had their oxygen uptake (VO2) measured while walking and running on a treadmill They wore each type of footwear, athletic shoes of the subjects' choice (average weight per pair = 616g), and leather military boots (average weight per pair = 1776g) at 3 walking speeds (4 0, 5 6 and 73 km/h) and 3 running speeds (89 105 and 121 km/h) The trials for running were repeated at the same three speeds with the subjects wearing shoes and these shoes plus lead weights The weight of the shoes plus the lead weights was equal to the weight of the subjects' boots. The VO2 values with boots were significantly (p 05) higher (5 9 to 10 2 percent) at all speeds, except the slowest walk, 40 km/h also, VO with shoes plus lead weights were significantly (p 05) higher than shoes alone. Weight alone appeared to account for 48-70% of the added energy cost of wearing boots. The relative energy cost (VO2m ml/kg/min) of trained and untrained suggests were the same at all speeds, but heart rates for the untrained were significantly higher (p 05) in both shoes and boots except at the slowest walking speed (40 km/h) These data indicate that energy expenditure is increased by wearing boots. A large portion of this increase may be attributed to weight of footwear

N84-10736# Naval Health Research Center, San Diego, Calif A SURVEY OF BODY FAT CONTENT OF U.S. NAVY MALE **PERSONNEL Interim Report**

J A HODGDON and E J MARCINIK Feb 1983 16 p refs (AD-A131500, NAVHLTHRSCHC-83-4) Avail NTIS HC A02/MF A01 CSCL 06E

In response to DOD directive 1308 1, the United States Navy has released a new instruction, OPNAVINST 6110 1B, covering health and physical readiness. This instruction changes the standards for weight control from height/weight tables to a 22% body fat (%BF) standard for men, estimated from neck and abdominal circumferences. In order to determine the possible impact of this change, height, weight, age, neck circumference and abdominal circumference measures were collected on a sample of 986 male U.S. Navy personnel 174 recruits, 309 recruit staff, 436 auxillary vessel crew members, and 67 submarine crew members Percent body fat was determined using the methods described in 6110 1B Compliance with heigh/weight standards was assessed using the table in 6110 1B. The mean %BF for the survey sample was 168% (+ or - 53) Adjusting for differences between age distribution of our sample and that of the total Navy male population, it is estimated that 15.8% (+ or - 1.2) of the Navy male population will exceed the 22% BF standard For the survey sample, 165% of the personnel exceeded the 22% standard while 15 4% exceeded the height/weight standards. This suggests changing to the %BF standard will not greatly effect the number of personnel on weight control programs

N84-10737# Army Research Inst of Environmental Medicine, Natick, Mass Altitude Research Div

PREVENTION OF ACUTE MOUNTAIN SICKNESS **DEXAMETHASONE**

T S JOHNSON (Beth Israel Hospital), P B ROCK, C S FULCO, L TRAD, R F SPARK, and J T MAHER 27 Jul 1983 20 p refs

(Contract DA PROJ 3E1-62777-A-879)

(AD-A131533, USARIEM-M-38/83) Avail NTIS HC A02/MF A01 CSCL 06E

Acute mountain sickness (AMS) is a syndrome which occurs when unacclimatized individuals rapidly ascend to high altitude. It is postulated that cerebral edema causes the symptoms of AMS Since dexamehtasone is useful in treating some forms of cerebral edema, we investigated its role in the prevention of AMS. Utilizing a double-blind, crossover design, eight young men were exposed to a simulated altitude of 4570 m (15,000 ft) on two occasions On one occasion, they received dexamethasone (4 mg every 6 h) for 36 h before and throughout the 42 h exposure. On the other, they received a placebo Presence of AMS symptoms was established by a questionnaire and a clinical interview Indices of Cerebral and respiratory symptoms(AMS-C and AMS-R, respectively) were derived from the questionnaire. During the clinical interview, subjects were scored from 0 (no symptoms) to 3 (severe symptoms) Dexamethasone significantly reduced AMS symptoms AMS-C decreased from (mean + or - SE) 1 09 + or -0 18 to 0 26 + or - 0 08 and AMS-R decreased from 0 64 + or -0 09 to 0 31 + or - 0 06 during dexamethasone treatment (both p0 0001) As judged by clinical interview, symptom score decreased from 1 10 + or - 0 11 to 0 28 + or - 0 07 (p0 0001) We conclude that dexamethasone is effective in preventing the symptoms of **AMS**

Georgia Inst of Tech, Atlanta N84-10738# School of Engineering Science and Mechanics **FUNCTION** USING MEASUREMENT OF LUNG THE MAGNETOMETER SYSTEM Final Report D L VAWTER and J D HUMPHREY Jul 1983 70 p refs

(Contract N00014-81-K-0126)

(AD-A130841) Avail NTIS HC A04/MF A01 CSCL 06P

In the last few years, several investigators have studied the idea of estimating lung volume by measuring the dimensional changes of the chest and abdomen during respiration. The prospect of being able to know the value of lung volume from information obtained noninvasively was intriguing. The most common method of measuring the dimensional changes is to use magnetometer pairs For the purpose of this report, it is sufficient to note that magnetometer pairs generate a voltage that is proportional to the change in their separation distance. The relationship between voltage and the change in separation distance is essentially linear over the separation distances measured in this study

N84-10739# Concordia Univ, Montreal (Quebec) Dept of Electrical Engineering CERVICAL SPLINE ANALYSIS FOR EJECTION INJURY PREDICTION Final Research Report, Oct. 1980 - Sep. 1982 S GRACOVETSKY, H F FARFAN (St Mary's Hospital), and C D HELLEUR 30 Nov 1982 99 p refs (Contract AF-AFOSR-0012-81, AF PROJ 2312) (AD-A131081, AFOSR-83-0590TR) Avail NTIS HC A05/MF A01 CSCL 06S

We have developed a sagittal plane mathematical model for the cervical spine (including T6-T1, C7-C1 and skull) In our model the moments due to the weight of the head and neck and the effect of external forces are balanced by forces generated internally by muscle, ligament, and intervertebral joint. With this formulation, the problem is to find a method for distributing the moment between muscle and ligament. Our calculations show that the mathematical representation of physiological behavior demands that stress be minimized at the intervertebral joint. It is interesting to note that Wolff has observed that bone architecture at the microscopic level responds to stress. Our findings suggest the system as a whole is controlled by stress. This model was then subjected to simulation in order to determine the maximum acceleration that the cervical spine would take for different postures. We found that the maximum supportable acceleration (i.e. acceleration that would result in any cervical component reaching 2/3 of its limit) depends upon the neck posture and orientation vis-a-vis the acceleration vector

GRA

N84-10740# EEG Systems Lab , San Francisco, Calif **NEUROCOGNITIVE PATTERN ANALYSIS Annual Technical** Report, 1 Nov. 1982 - 31 Oct. 1983

A S GEVINS, B A CUTILLO, S L BRESSLER, J C DOYLE, R S TANNEHILL, G M ZEITLIN, and B H BONHAM 1983 84 p refs

(Contract N00014-83-C-0022)

(AD-A131302, ONR-83-AE) Avail NTIS HC A05/MF A01 CSCL 05J

Completed and ongoing studies of neurocognitive processes using the new technique of Neurocognitive Pattern (NCP) Analysis are reported. The pilot and formal recording phases of a bimanual visuomotor experiment are described, as well as work on the elimination of scalp-muscle and eye-movement artifiacts from single-trial brain-potential data

N84-10741# Brookhaven National Lab , Upton, N Y FOURIER-PROCESSED OF IMAGES DYNAMIC LUNG **FUNCTION FROM LIST-MODE DATA**

I G ZUBAL, R W ROWE, I BIZAIS, H SUSSKIND, G W BENNETT, and A B BRILL 1983 5 p refs Presented at the 5th Ann Conf of IEEE/Eng in Med and Biol Soc., Columbus, Ohio, 10 Sep 1983

(Contract DE-AC02-76CH-00016)

(DE83-013276, BNL-33138, CONF-830994-1) Avail NTIS HC A02/MF A01

Time and volume correlated amplitude and phase images are computed from nuclear medical ventilation studies and for dynamic transmission scans of the lungs. This is made possible by a hardware interface and data acquisition system, developed in-house, allowing camera events and multiple ancillary physiological signals (including lung volume) to be acquired simultaneously in list mode. The first harmonic amplitude and phase images are constructed on an event by event basis. These are computed for both equal time and equal lung volume increments Time and volume correlated Fourier images for ventilation studies have shown details and functional structures not usually seen in conventional imaging techniques Processed transmission scans show similar results compared to ventilation images DOF

N84-10742# National Center for Devices and Radiological Health. Rockville, Md

PERFORMANCE OF A NEW 916 MHZ DIRECT CONTACT APPLICATOR WITH REDUCED LEAKAGE, A DETAILED **ANALYSIS Final Report**

G KANTOR and D M WITTERS, JR Apr 1983 29 p refs Submitted for publication

(PB83-226621, HHS/PUB/FDA-83-8100, FDA/NCDRH-83/42) Avail NTIS HC A03/MF A01 CSCL 06L

The paper demonstrates the feasibility of a direct contact diathermy applicator operating at 915 MHz. The design is a circular waveguide internally loaded with two orthogonal pairs of forward ridges to obtain circular polarization and two rear ridges with a probe to excite the guide Two designs were tested a 15-cm diameter applicator with one annular choke covered with a microwave absorber and a 25-cm diameter applicator with two additional concentric chokes to limit radiation leakage. In delivering a thermally effective specific absorption rate to a planar phantom, leakage levels were less than 5 mW/sq cm for applicators in direct contact with the phantom. If there is a small spacing between these applicators and planar phantoms, the net power and associated leakage is excessive Author (GRA)

N84-10743# Environmental Monitoring and Support Lab, Research Triangle Park, N C Data Management and Analysis

RECENT ADVANCES IN EPA'S (ENVIRONMENTAL PROG MONITORING AND METHODS DEVELOPMENT RESEARCH R H JUNGERS Jul 1983 14 p refs

(PB83-231209, EPA-600/D-83-085) Avail NTIS HC A02/MF A01 CSCL 06E

Several areas of advanced research related to sampling, analysis, and human exposure assessment of exhaust emission in ambient air were developed. These include studies of methods for volatile organic compounds and the development and application of personal exposure monitors in screening for polynuclear aromatics (PNA's) and carbon monoxide These methods for screening PNA's are fast, economical and accurate The more expensive and time consuming traditional methods of analysis may be judiciously applied to those samples which the screening methods indicate are high in PNA's Carbon monoxide, an emission product directly related to automobile emissions, is being monitored using personal exposure monitors in urban scale studies to obtain data on population exposures on a real time

N84-10744# Research Triangle Inst, Research Triangle Park, NC

PERSONAL EXPOSURE TO VOLATILE ORGANICS AND OTHER COMPOUNDS INDOORS AND OUTDOORS: THE TEAM (TOTAL **EXPOSURE ASSESSMENT METHODOLOGY) STUDY**

L A WALLACE, E D PELLIZZARI, T D HARTWELL, C SPARACINO, and H ZELON Jul 1983 35 p refs (Contract EPA-68-03-3679)

(PB83-231357, EPA-600/D-83-082) Avail NTIS HC A03/MF À01 CSCL 06E

A methodology for measuring individual human exposure to toxic substances was developed. Methods for estimating body burden with the use of biological measurements were also developed All significant pathways of exposure are addressed Sampling and analytical protocols were tested for volatile organic compounds, organochlorine pesticides, metals, and polyaromatic hydrocarbons Exposure through air and drinking water and excretion rates through inhaled breath were measured for a statistically valid sample population. It was determined that personal air median concentrations ranged from 40 to 320% higher than outdoor fixed air concentrations Correlations between personal and outdoor samples were poor GRA

N84-10745# Draper (Charles Stark) Lab , Inc , Cambridge, Mass

PROBABILISTIC MODEL FOR ASSESSING TIME-VARYING **CONTAMINANT LEVELS**

C WHITNEY 1983 27 p refs (Contract PHS-HSM-99-72-18)

(PB83-232108) Avail NTIS HC A03/MF A01 CSCL 06J

The health and well being of workers in an industrial environment that emits respirable contaminants depends in part on an effective program to monitor the concentration of airborne pollutants and compare them to given standards. The analysis described herein is aimed at some problems faced by an inspector determining exposure levels and making decisions of overexposure/safe-exposure for industrial workers. There is at present an acute need for an approach to the monitoring problem that (1) is generally applicable to any industrial environment, (2) specifies the most efficient way to collect the data, (3) indicates how to assess the accuracy and repeatability of the results, and (4) reduces to a few simple rules of thumb, numerical tables or computer programs readily applicable by workers in the field

GRA

N84-10746# Rochester Univ , N Y Dept of Medicine MICROWAVES, HYPERTHERMIA, AND HUMAN LEUKOCYTE

FUNCTION Final Report, Aug. 1979 - Jun. 1982 N J ROBERTS, JR, S T LU, and S M MICHAELSON 1983 24 p refs

(Contract EPA-R-808039, EPA-R-806390, F33615-81-K-0616, AF-AFOSR-0111-80)

(PB83-225375, EPA-600/1-83-008) Avail NTIS HC A02/MF CSCL 06R

Studies were performed to determine whether human leukocytes are affected by exposure to microwave energies that equal or even exceed current safety standard recommendations. There were no detectable effects on viability or function of human mononuclear leukocytes resulting from exposure to microwave energy at specific absorption rates up to 4 mW/ml in contrast to studies in other

laboratories, the results were highly reproducible and provided no evidence that current safety standard recommendations are inappropriate insofar as leukocyte function is concerned GRA

N84-10747# Health Effects Research Lab , Research Triangle Park, N C

RADIOFREQUENCY RADIATION EXPOSURE FOR BIO-EFFECTS RESEARCH AT THE HEALTH EFFECTS RESEARCH LABORATORY, RESEARCH TRIANGLE PARK, NORTH CAROLINA

J S ALI and C WEIL Mar 1983 64 p refs (PB83-229591, EPA-600/2-83-018) Avail NTIS HC A04/MF A01 CSCL 06R

The multi-user radiofrequency radiation exposure facilities for bio-effects research is described. Four facilities are (1) a 100 MHz CW exposure system, (2) a 2450 MHz CW exposure system, (3) a 2450 MHz AM exposure system, and (4) an X-band pulsed RF exposure system. The individual facility descriptions include construction details, specifications, photographs, circuit drawings and block diagrams. All of the facilities incorporate environmental control systems and three have RF power-level regulation.

N84-10748# National Inst. for Occupational Safety and Health, Cincinnati, Ohio

REGISTRY OF TOXIC EFFECTS OF CHEMICAL SUBSTANCES. USER'S GUIDE TO THE RTECS COMPUTER TAPE Annual Report

R L TATKEN and R J LEWIS Jan 1983 79 p (Contract PHS-NIOSH-210-81-8101) (PB83-223172, DHEW/DF-83/004A) Avail NTIS HC A05/MF A01 CSCL 06T

The User's Guide defines the record layouts and describes the types of data contained in the computer tape. The Guide defines all relevant terms and contains the introductory material and tables. The data file contains 218,746 entries (59,224 are names of unique chemicals with their associated toxicity data and 159,522 are synonymous names) and provides basic information on their known toxic and biological effects.

N84-10749# SRI International Corp , Menio Park, Calif DIRECT BIOLOGICAL EFFECTS OF INCREASED ATMOSPHERIC CARBON DIOXIDE LEVELS

M K BLAND, H C BALEY, and M J LIPSETT Jun 1983 136 p refs

(Contract EPA-68-02-3716)

(PB83-224360, EPA-600/6-83-001) Avail NTIS HC A07/MF A01 CSCL 06T

The likely biological nonclimatic, direct effects of carbon dioxide (CO2) on terrestrial and aquatic ecosystems and on human health are assessed it summarizes the literature on the direct effects of rising CO2 levels on the biosphere is summarized and technical information needs about direct biological effects of rising CO2 levels are identified. The environmental and human health implications of these effects were evaluated in the context of four scenarios describing possible carbon dioxide levels. Six categories of CO2 control options. (1) increasing the rate of carbon fixation or mass transfer, (2) changing the fuel use strategy, (3) changing energy use patterns, (4) using emission source controls (5) using institutional controls to adapt society, and (6) implementing exotic strategies are discussed.

N84-11694# Joint Publications Research Service, Arlington, Va STUDY OF CARDIOVASCULAR SYSTEM DURING LONG-TERM SPACEFLIGHTS

A D YEGOROV and O G ITSEKHOVSKIY In its USSR Rept Space Biol and Aerospace Med, V 17, No 5, Sep -Oct 1983 p 1-5 1 Nov 1983 refs Transl into ENGLISH from Kosmich Biol i Aviakosmich Med (Moscow), v 17, no 5, Sep -Oct 1983 p 4-6

Avail: NTIS HC A08

During the Salyut-6 spaceflights cardiac bioelectrical and mechanical activity, blood content and tone of cerebral and limb vessels, systemic arterial and venous pressure were measured in

10 primary crewmembers The measurements were taken at rest and during LBNP and ergometry tests. It is shown that the circulation changes are adaptive reactions of the body to a new environment, particularly weightlessness Cardiovascular responses to the provocative tests were changed and more marked, probably, due to blood redistribution.

Author

N84-11695# Joint Publications Research Service, Arlington, Va SIMULATION OF CEREBROCRANIAL TRAUMA FOR EVALUATION AND DEVELOPMENT OF GEAR TO PROTECT PILOTS AGAINST IMPACTS

A S BARER, V I KHARCHENKO, Y G KONAKHEVICH, L N SHOLPO, G N DUBALSKIY, V K PETLYUK, and N A UGLANOVA *In its* USSR Rept Space Biol and Aerospace Med, V 17, No 5, Sep-Oct 1983 p 6-15 1 Nov 1983 refs Transl into ENGLISH from Kosmich Biol i Aviakosmich Med (Moscow), v 17, no 5, Sep-Oct 1983 p 7-12 Avail NTIS HC A08

The results of developing a model of craniocerebral trauma are presented A man's head model was developed along with a criterion of impact safety. The model and the criterion can be used for experimental assessment of pilot's protective helmets

Author

N84-11697# Joint Publications Research Service, Arlington, Va CHANGES IN CARDIAC OUTPUT AND ORTHOSTATIC STABILITY OF COSMONAUTS

P V VASILYEV, A D VOSKRESENKIY, V G DOROSHEV, V V KALINICHENKO, N A LAPSHINA, and V V SHCHIGOLEV In its USSR Rept Space Biol and Aerospace Med, V 17, No 5, Sep-Oct 1983 p 32-35 1 Nov 1983 refs Transl into ENGLISH from Kosmich Biol i Aviakosmich Med (Moscow), v 17, no 5, Sep-Oct 1983 p 25-27 Avail NTIS HC A08

Examinations of 14 cosmonauts who performed orbital flights of 14 to 175 days wwere used to correlate cardiac output (CO) inflight with orthostatic tolerance and ALBNP reactions postflight in 3 crewmembers CO was lower than or close to the preflight level in 4 cosmonauts CO was higher than preflight The remaining 7 crewmembers showed lower orthostatic tolerance and stronger LBNP reactions. The difference between mean CO values before and during flight was in negative correlation with orthostatic tolerance (r = -0.6) and in positive correlation with LBNP reactions (r = 0.7). The correlation coefficients were derived from small samples but an identical relationship between the two different tests with inflight CO variations gives evidence that such a relationship actually exists.

N84-11698# Joint Publications Research Service, Arlington, Va HEMODYNAMIC REACTIONS TO POSITIVE INTRATHORACIC PRESSURE AT +G SUB Z ACCELERATIONS

M A TIKHONOV, D Y ARKHANGELSKIY, A V KONDAKOV, and V V LITOVCHENKO *In its* USSR Rept Space Biol and Aerospace Med, V 17, No 5, Sep-Oct 1983 p 36-40 1 Nov 1983 refs Transl into ENGLISH from Kosmich Biol i Aviakosmich Med (Moscow), v 17, no 5, Sep-Oct 1983 p 27-30

Avail NTIS HC A08

Eight male test subjects, aged 20 to 28, were exposed to acceleration +Gz and positive breathing pressure (PBP) of 30 mm Hg to study their hemodynamics under these conditions. The calculated and experimental decrease of blood pressure at the eye level during increasing acceleration and voluntary myorelaxation was comparable. The exposure to PBP helped tolerate higher (by 1 1 + or - 0 2 G) acceleration values without visual disorders. The exposure to 7 0 G and PBP caused a lower increase in heart rate and breathing frequency (by 6% and 12%, respectively), a smaller reduction of blood pressure at the eye level (by 20%) and a decreased muscular tension (by 18%)

Author

N84-11699# Joint Publications Research Service, Arlington, Va NORMAL HUMAN CORONARY CIRCULATION DURING POSTURAL TESTS AND DECOMPRESSION OF LOWER HALF OF BODY

V Y KATKOV, V V CHESTUKHIN, V V RUMYANTSEV, Y V KOLPAKOV, N V PRAVETSKIY, and S V AGAFONOV *In its* USSR Rept Space Biol and Aerospace Med, V 17, No 5, Sep-Oct 1983 p 41-49 1 Nov 1983 refs Transl into ENGLISH from Kosmich Biol i Aviakosmich Med (Moscow), v 17, no 5, Sep-Oct 1983 p 30-36 Avail NTIS HC A08

The effect of postural changes (orthostatic and antiorthostatic tests) and LBNP on coronary circulation was investigated in 11 healthy male test subjects. Volume blood flow velocity and pressure were measured and blood flowing from the heart was withdrawn using a Ganz catheter implanted into the coronary sinus. A thin Teflon catheter was implanted into the brachial artery. When the test subjects were transferred from the recumbent to the head up position their left ventricular oxygen consumption decreased by 3 2 m/min (21%) and coronary blood flow by 23 8 m/min (19%), while coronary vascular resistance increased by 32% When the test subjects were transferred from the head up to the head down position (at -15 deg), coronary oxygen consumption and blood flow increased by 55 (46%) and 453 (44%) m/min, respectively. and coronary resistance decreased by 36% In this situation the LBNP test (-30 mm Hg for 20 min) caused a reduction in oxygen consumption and coronary blood flow by 4 4 (25%) and 37 3 (25%) 7 m/min, respectively, and an increase in coronary resistance by

N84-11700# Joint Publications Research Service, Arlington, Va DYNAMICS OF RHEOGRAPHIC PARAMETERS OF CEREBRAL CIRCULATION AND CIRCULATION IN THE EXTREMITIES DURING ACTIVE ORTHOSTATIC TEST

N I SAPOVA *In its* USSR Rept Space Biol and Aerospace Med, V 17, (Moscow), v 17, no 5, Sep-Oct 1983 p 36-39 No 5, Sep-Oct 1983 p 50-55 1 Nov 1983 refs Transl into ENGLISH from Kosmich Biol i Aviakosmich Med Avail NTIS HC A08

Rheography was used to study brain, leg and forearm circulation in 30 male test subjects during tilt tests. In the head up position blood circulation in the above body parts decreased due to a reduction of stroke volume. The orthostatis reaction was considered normal, provided that leg blood content decreased and tone increased, cerebral and forearm blood content and tone varied slightly, and rheographic parameters in the stationary states (lying and standing) remained unchanged.

N84-11701# Joint Publications Research Service, Arlington, Va EFFECT OF REDISTRIBUTION OF BLOOD ON SEVERITY OF SPATIAL POSITION ILLUSIONS IN WEIGHTLESSNESS

F A SOLODOVNIK, A V CHAPAYEV, A A PRUSSKIY, and A A SIMAKOV *In its* USSR Rept Space Biol and Aerospace Med, V 17, No 5, Sep -Oct 1983 p 56-60 1 Nov 1983 refs Transl into ENGLISH from Kosmich Biol i Aviakosmich Med (Moscow), v 17, no 5, Sep -Oct 1983 p 40-43 Avail NTIS HC A08

Blood redistribution was produced using a tilt table (-30 deg) and a LBNP device. Illusionary sensations were measured by a Birtok unit and subjective reports of the test subjects. In the head down position, the feeling of blood rush to the head disappeared as soon as the weightless state was reached. In most cases illusionary sensations were similar to those in the horizontal position. When exposed to LBNP tests, the subjects developed no illusionary sensations during horizontal flight and felt their upper body going upwards and legs going downwards in the weightless state. Thus, illusionary sensations of the spatial position depend at large on blood redistribution in the human body.

N84-11702# Joint Publications Research Service, Arlington, Va FREE AMINO ACIDS OF BLOOD BEFORE AND AFTER SHORT-TERM SPACEFLIGHTS

T F VLASOVA, Y B MIROSHNIKOVA, and A S USHAKOV In Its USSR Rept Space Biol and Aerospace Med, V 17, No 5, Sep-Oct 1983 p 61-63 1 Nov 1983 refs Transl into ENGLISH from Kosmich Biol i Aviakosmich Med (Moscow), v 17, no 5, Sep-Oct 1983 p 43-45 Avail NTIS HC A08

The amino acid composition of plasma and serum of the crewmembers who performed short term flights (of 3 to 14 days) onboard the Salyut-6 orbital station was investigated. Immediately postflight total amino acids remained unchanged while variations in isolated amino acids (tendency toward increased aspartic acid and decreased crystein in plasma, and increased leucin in serum) were adaptive.

Author

N84-11703# Joint Publications Research Service, Arlington, Va CHANGES IN BLOOD UREA CONTENT UNDER HYPOKINETIC CONDITIONS

I S BALAKHOVSKIY and T A ORLOVA In its USSR Rept. Space Biol and Aerospace Med, V 17, No 5, Sep-Oct 1983 p 64-69 1 Nov 1983 refs Transl into ENGLISH from Kosmich Biol i Aviakosmich Med (Moscow), v 17, no 5, Sep-Oct 1983 p 45-48

Avail NTIS HC A08

The blood and urine content of urea and creatinine, as well as urea production and creatinine clearance were measured in 9 test subjects exposed to head-down tilting (at -6 deg) for 8 days. The trend for an increased urea content was more marked in the test subjects with its initially low concentration (3 3-4 2 mmol/l). Variations in the urea concentration were similar and included its decrease during the first day and increase thereafter. Creatinine excretion and clearance declined uniformly and significantly during the first 5 experimental days. No correlation was found between urea concentration and urea production, or between creatinine clearance and urea concentration.

N84-11704# Joint Publications Research Service, Arlington, Va ENERGY METALBOLISM ENZYMES IN SIMULATION OF SOME SPACEFLIGHT FACTORS

S KALANDAROV, V P BYCHKOV, I D FRENKEL, L P VOLKOVA, and G I PROSKUROVA *In its* USSR Rept Space Biol and Aerospace Med, V 17, No 5, Sep -Oct 1983 p 70-73 1 Nov 1983 refs Transl into ENGLISH from Kosmich Biol i Aviakosmich Med (Moscow), v 17, no 5, Sep -Oct 1983 p 49-51

Avail NTIS HC A08

The content of lactate dehydrogenase, amino transferases and creatine kinase was measured in the test subjects of three age groups (41 to 50, 50 to 57 and 26 to 33 years) exposed to head-down tilt, linear acceleration, exercise, and emotional stress. The enzyme activity increased in response to head-down tilt, acceleration and exercise. The enzyme content normalized under the influence of selected nutrients.

N84-11712# Joint Publications Research Service, Arlington, Va EXPERIMENTAL PSYCHOLOGICAL METHODS USED IN EXPERT EVALUATION OF MENTAL WORK CAPACITY OF FLIGHT PERSONNEL IN THE PRESENCE OF FUNCTIONAL DISTURBANCES AND CENTRAL NERVOUS SYSTEM DISEASES

I N LAVRENTYEVA, V I MYASNIKOV, and V F VOLOKHOV In its USSR Rept Space Biol and Aerospace Med, V 17, No 5, Sep -Oct 1983 p 111-116 1 Nov 1983 refs Transl into ENGLISH from Kosmich Biol i Aviakosmich Med (Moscow), v 17, no 5, Sep -Oct 1983 p 76-80 Avail NTIS HC A08

The mental state and work capacity of flight personnel with functional central nervous system disturbances were examined on the basis of assessing the professionally relevant traits and properties. Some elements of a pilot's task performance were simulated.

J M S

N84-11714# Joint Publications Research Service, Arlington, Va. DETERMINATION OF A SUBJECTS CONDITION ACCORDING TO PITCH OF THE VOCAL VOWEL 'A'

G I AKINSHCHIKOVA and O D VOLCHEK In its USSR Rept: Space Biol and Aerospace Med, V 17, No 5, Sep-Oct 1983 p 121-123 1 Nov 1983 refs Transl into ENGLISH from Kosmich Biol i Aviakosmich Med (Moscow), v 17, no 5, Sep-Oct. 1983 p 82-83

Avail NTIS HC A08

The phonation of 'A' by more than 200 individuals was recorded under different conditions. Several psychophysiological parameters were also recorded. Correlation analysis of the results identified a close link between magnitude of PVV'' PVV'A' and values of the psychophysiological parameters. The ellevel of significance constituted P=0.01 to 0.001 J M S.

N84-11716# Joint Publications Research Service, Arlington, Va A METHOD OF ASSESSING CARDIAC FUNCTION WITH BICYCLE ERGOMETRY IN EXPERT MEDICAL CERTIFICATION OF PILOTS

E G MUKHAMEDOV *In its* USSR Rept Space Biol and Aerospace Med, V 17, No 5, Sep-Oct 1983 p 127-130 1 Nov 1983 refs Transl into ENGLISH from Kosmich Biol i Aviakosmich Med (Moscow), v 17, no 5, Sep-Oct 1983 p 84-86

Avail NTIS HC A08

The functional state of the myocardium was examined using bicycle ergometry, taking into consideration maximum blood pressure and duration of electrical systole as the most efficient period of the cardiac cycle. The results indicate that, in the presence of early signs of atherosclerosis with adequate myocardial coronary reserve, the proposed parameter 'systolic product' could be used as an additional criterion for assessing the functional state of the cardiovascular system in the practice of expert medical certification of flight personnel.

N84-11717# Joint Publications Research Service, Arlington, Va EVALUATION OF SKELETAL MUSCLE TONE BY RECORDING LATERAL RIGIDITY

G I GEVLICH, L S GRIGORYEVA, M I BOYKO, and I B KOZLOVSKAYA *In its* USSR Rept Space Biol and Aerospace Med, V 17, No 5, Sep-Oct 1983 p 131-137 1 Nov 1983 refs Transl into ENGLISH from Kosmich Biol i Aviakosmich Med (Moscow), v 17, no 5, Sep-Oct 1983 p 86-89 Avail NTIS HC A08

The method of assessing muscle tone according to parameters of lateral rigidity is described. The electromyotonometer was used to record the force of application of the gage and tissular reaction over a wide range of strain energy. The findings indicate that when recording the forte of application of the gage and tissue reactions with standardization of position and level of muscular activity, the described method makes it possible to assess with adequate precision and reproducibility the lateral rigidity of muscles it can be used in experiments and clinical practice as a means of quantitative evaluation of muscle tone.

N84-11744* National Aeronautics and Space Administration Marshall Space Flight Center, Huntsville, Ala.

PROSTHETIC OCCLUSIVE DEVICE FOR AN INTERNAL

PASSAGEWAY Patent
J B TENNEY, JR, inventor (to NASA) (Rochester General Hospital) 11 Oct. 1983 6 p Filed 23 Apr 1982 Supersedes N82-26962 (20 - 17, p 2451) Sponsored by NASA (NASA-CASE-MFS-25740-1, US-PATENT-4,408,597,

US-PATENT-APPL-SN-371352, US-PATENT-CLASS-128-1R, US-PATENT-CLASS-128-346, US-PATENT-CLASS-128-DIG 25)

Avail US Patent and Trademark Office CSCL 06E

An occlusive device is disclosed for surgical implant to occlude the lumen of an internal organ. The device includes a cuff having a backing collar and two isolated cuff chambers. The fluid pressure of one chamber is regulated by a pump/valve reservoir unit. The other chamber is unregulated in pressure but its fluid volume is adjusted by removing or adding fluid to a septum/reservoir by

means of a hypodermic needle Pressure changes are transmitted between the two cuff chambers via faying surfaces which are sufficiently large in contact area and thin as to transmit pressure generally without attenuation. By adjusting the fluid volume of the septum, the operating pressure of the device may be adjusted to accommodate tubular organs of different diameter sizes as well as to compensate for changes in the organ following implant without reoperation.

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

N84-11745# Naval Medical Research Inst, Bethesda, Md EFFICIENCY OF HIGH-FREQUENCY VENTILATION AS DETERMINED BY NITROGEN WASHOUTS: A MODEL STUDY Final Progress Report

J R CLARKE, L D ROMER, and E T FLYNN Apr 1983 26 p refs

(Contract MR0000101)

(AD-A131331, NMRI-83-09) Avail NTIS HC A03/MF A01 CSCL 06S

We examined the frequency dependency of high-frequency ventilation (HFV) by using a two-compartment mechanical model A loudspeaker was used as an oscillator to assist mixing between the two compartments One compartment (C1) contained either O2 or SF6 prior to mixing, while the other (C2) contained air The rate of change of nitrogen concentration in the latter compartment was used as an index of mixing efficiency. The speaker was driven with either a sinusoidal or random signal, and the spectral characteristics and acoustic power of the pressures generated in each compartment were determined by a Fast Fourier Transform Analyzer and PDP 11/34 and /70 computers Transport coefficients describing mixing increased approximately linearly with power For a given power in C1, the mixing rates were highly frequency-dependent The frequencies for resonance and optimal mixing were essentially identical, and decreased as gas density increased When powers were matched in C2, however, mixing was much less dependent on frequency Random noise proved as effective in augmenting mixing as sinusoidal excitation. It can do so while decreasing the magnitude of pressure changes in the system and while reducing the influence of changing resonant frequencies Author (GRA)

N84-11746# Massachusetts Inst of Tech , Cambridge Artificial Intelligence Lab
COMPUTATIONAL STUDIES IN THE INTERPRETATION OF STRUCTURE AND MOTION: SUMMARY AND EXTENSION
S ULLMAN Mar 1983 28 p refs
(Contract N00014-80-C-0505, NSF MCS-79-23110)
(AD-A131598, AI-M-706) Avail NTIS HC A03/MF A01 CSCL 06P

Computational studies of the interpretation of structure from notion examine the conditions under which three dimensional structure can be recovered from motion in the image. The first part of this paper summarizes the main results obtained to date in these studies. The second part examines two issues, the robustness of the 3-D interpretation of perspective velocity fields, and the 3-D information contained in orthographic velocity fields The two are related because, under local analysis, limitations on the interpretation of orthographic velocity fields also apply to perspective projection. The following results are established. When the interpretation is applied locally, the 3-D interpretation of the perspective velocity field is unstable. The orthographic velocity field determines the structure of the inducing object exactly up to a depth-scaling, For planar objects, the orthographic velocity field always admits two distinct solutions up to depth-scaling, and The 3-D structure is determined uniquely by a view and a half of the orthographic velocity field Author (GRA) N84-11747# Utah Univ, Salt Lake City Dept of Mathematics ULTRASOUND TOMOGRAPHY BY GALERKIN OR MOMENT METHODS

S A JOHNSON and F STENGER 5 May 1983 30 p refs (Contract DAAG29-83-K-0012, PDP-110B, R01-CA1-29728) (AD-A131408, ARO-19297 2-MA) Avail NTIS HC A03/MF A01 CSCL 06F

Ultrasound B-scan imaging is now a well established and valuable clinical tool Improvements in transducer arrays and microprocessor controls have lead to the development of real time linear and sector scanners which produce images of remarkable clarity and resolution compared with B-scanners of only a few years ago Further improvements in B-scan images are predicted to occur as larger transducer apertures and improved dynamic focusing methods are employed. The use of Doppler ultrasound alone or in combination with real time B-scan imaging is expected to increase in importance as the clinical significance of high resolution Doppler images is appreciated. During the past decade X-ray CT (computed tomography) and recently NMR imaging have made remarkable contributions to the field of diagnostic imaging X-ray (CT) and NMR images not only provide resolution of about 1 mm but also can be calibrated by absolute reference standards. The resulting quantitative images have proven to be valuable because of the greater ability thus provided to distinguish healthly and diseased tissue by their image values

N84-11748# Pacific Northwest Lab , Richland, Wash CONCEPTS OF DOSE TO SOFT TISSUE AT THE CELLULAR LEVEL

D R FISHER May 1983 24 p refs Presented at the Health Phys Soc Summer School, Baltimore, 13-17 Jun 1983 (Contract DE-AC06-76RL-01830)

(DE83-013830, PNL-SA-11419, CONF-830665-3) Avail NTIS HC A02/MF A01

Radiation effects begin at the cellular level of biological organization Radiation dosimetry at the cellular level is particularly important for internally deposited alpha and beta particle emitters Microdosimetry is a mechanism for studying the dose imparted to microscopic sites, for determining hit probabilities, and for determining the probability that sites are missed Internal microdosimetry calculations are complex, but can be easily executed using computer programs. The target and its size must be specified, the radionuclide activity per unit mass for each region in which targets are located determined, the activity per radioactive particulate described, the geometrical relationship between the activity and the targets understood, and the biological retention of the activity in the region as a function of time accounted for Internal microdosimetry has many potential applications in radiological protection Microdosimetry is a special research area designed to provide a better understanding of the importance of microscopic patterns of radiation interactionn with cells within the broader framework of biochemistry and radiation biology

N84-11749# Pacific Northwest Lab , Richland, Wash EVALUATION OF A DRAFT STANDARD ON PERFORMANCE SPECIFICATIONS FOR HEALTH PHYSICS INSTRUMENTATION J L KENOYER, K L SWINTH, R L KATHREN, and J M SELBY Jun 1983 22 p refs Presented at the 28th Health Phys Soc Ann Meeting, Baltimore, 19-23 Jun 1983 Sponsored in part by Nuclear Regulatory Commission (Contract DE-AC06-76RL-01830)

(DE83-016169, PNL-SA-11055, CONF-830695-3) Avail NTIS HC A02/MF A01

The draft ANSI standard N42 17 on performance specifications for health physics instrumentation was written in 1981, the second draft of this standard is currently being evaluated by Pacific Northwest Laboratory Objectives of this project include the evaluation of the applicability and practicality of the proposed standard and the determination of the degree of conformance of a cross section of currently available commercial instruments to the proposed standard This standard is being tested against such instruments as ionization chambers, G M detectors, alpha survey

meters, and neutron dose equivalent survey meters. Results on the use of the first two categories will be presented in this paper. Procurement of instruments for testing was accomplished by direct purchase of off-the-shelf units and by loan from instrument manufacturers and others including DOE laboratories. The testing procedures were developed with emphasis on the requirements found in ANSI N42 17 with additional criteria from other draft and current ANSI and IEC standards. Details of procedures on effects of temperature, humidity, and ambient pressure, will be presented in this paper.

N84-11750# Pacific Northwest Lab , Richland, Wash EVALUATION OF A DRAFT STANDARD ON PERFORMANCE SPECIFICATIONS FOR HEALTH PHYSICS INSTRUMENTATION K L SWINTH, J L KENOYER, A P MILEHAM, R L KATHREN, and J M SELBY Jun 1983 20 p Presented at the Health Phys Soc Ann Meeting, Baltimore, 19-23 Jun 1983 Sponsored in part by the Nuclear Regulatory Commission (Contract DE-AC06-76RL-01830)

(DE83-016186, PNL-SA-11058, CONF-830695-4) Avail NTIS HC A02/MF A01

The draft ANSI standard N42 17D2 on performance specifications for health physics instrumentation is currently being evaluated by the Pacific Northwest Laboratory The primary objective of the project is the evaluation of the applicability and practicality of the proposed standard through testing of a cross-section of currently available commercial instruments to determine how well they conform to the standard. The standard is being tested against instruments such as ionization chambers, G M detectors, alpha survey meters, and neutron dose equivalent survey meters. This paper presents results of the preliminary radiological performance tests on ionization chambers and G M detectors. This includes both the data generated during the tests and a discussion of procedures developed to perform the testing Results are reported for response time, accuracy, precision, radiation overloads, and angular dependence. In addition, results are reported for parameters that affect instrument performance including battery lifetime, geotropism and stability

N84-11751# Oak Ridge National Lab , Tenn Health and Safety Research Div

ACCURACY OF EXTERNAL PERSONNEL DOSIMETRY SYSTEMS IN MIXED NEUTRON AND GAMMA RADIATION FIELDS

R E SWAJA 1983 3 p refs Presented at the 7th Intern Conf on Radiation Res , Amsterdam, 3-8 Jul 1983 (Contract W-7405-ENG-26)

(DE83-015712, CONF-830710-6) Avail NTIS HC A02/MF A01

Estimates of biological effects associated with exposure to external radiation fields are generally based on the measured response of passive personnel dosimetry systems to the incident radiation. The increasing number of persons occupationally exposed to mixed neutron and gamma fields and recent questions concerning the relative biological hazards of different types of radiation have emphasized the need for accurate personnel radiation dose measurements. The performance characteristics of various neutron and gamma personnel dosimetry systems under actual mixed-field conditions have been determined. Analysis of the results indicates that significant inaccuracies can occur in neutron and gamma dose measurements in mixed radiation fields unless dosimeter performance and characteristics of the monitoring environment are considered in dosimeter evaluation.

N84-11752# Bruker Analytische Messtechnik GmbH, Rheinstetten (West Germany)

DEVELOPMENT AND CONSTRUCTION OF AN APPARATUS BASED ON THE PRINCIPLE OF MULTIDIMENSIONAL NUCLEAR MAGNETIC RESONANCE FOR THE FORMATION OF IMAGES OF ORGANS AND PARTS OF THE BODY Final Report, May

B KNUETTEL Bonn Bundesministerium fuer Forschung und Technologie Jun 1983 In GERMAN, ENĞLISH 37 p summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-83-102, ISSN-0340-7608) Avail NTIS HC A03/MF A01. Fachinformationszentrum, Karlsruhe, West Germany DM 8

An NMR tomograph which uses an iron magnet and is designed for imaging objects up to 7.5 cm diameter at a frequency of 30 MHz, and an NMR tomograph for application to large objects (head and whole body scanning) with a large air-core magnet at 15 kG (6 MHz) were built. The iron magnet system has good resolution but long measuring times for two dimensional imaging, while worse resolution and rather shorter time for three dimensional imaging. Two dimensional images obtained by the air core magnet provide good resolution even for details like skull bones with Author (ESA) 1

N84-11753# AEG-Telefunken, Heilbronn (West Germany) Geschaeftsbereich Elektronische Bauelemente

CIVIL APPLICATIONS OF INFRARED TECHNIQUES Final Report, Mar. 1982

H MAIER and K ABEL (Eltro GmbH) Bonn Bundesministerium fuer Forschung und Technologie Jul 1983 314 p refs In GERMAN, ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-83-132, ISSN-0340-7608) Avail NTIS HC A14/MF A01, Fachinformationszentrum, Karlsruhe, West Germany DM 48

Infrared detectors, pyrometers and thermographic cameras were analyzed with respect to applications in medicine, energy conservation, industrial equipment and production control Results show that modern technologies and product programs largely fulfil civil requirements. However, adaption to specific problems is often necessary Modifications and additional equipment are suggested where desirable Author (ESA)

N84-11754# Health Effects Research Lab, Research Triangle Park, N C

BIOASSAY OF PARTICULATE ORGANIC MATTER FROM **AMBIENT AIR**

J L HUISINGH, M WATERS, L CLAXTON, A KOLBER (Research Triangle Inst.), T. WOLFF (Research Triangle Inst.), T. HUGHES (Research Triangle Inst.), and E. D. PELLIZZARI (Research Triangle Inst) Jul 1983 28 p refs (PB83-239731, EPA-600/D-81-266) Avail NTIS HC A03/MF

CSCL 061

The influence of industrialization and consequent increased concentration of urban particulate matter on the incidence of cancer has long been a concern The first bloassys used to evaluate complex ambient air samples were whole-animal carcinogenesis bioassays. In these studies, organic extracts of urban particulate matter were found to be carcinogenic in rodents. Carcinogenic polycyclic aromatic hydrocarbons (PAH), such as benzo(a)pyrene, were defected in these extracts, however, these compounds did not account for all of the carcinogenic activity reported

N84-11755# California Univ , Davis Human Performance Lab OZONE TOXICITY EFFECTS CONSEQUENT TO PROLONGED, HIGH INTENSITY EXERCISE Final Report, Dec. 1980 - Aug. 1982

W C ADAMS and E S SCHELEGLE Aug 1982 61 p refs (PB83-237388, ARB-R-83-191) Avail NTIS HC A04/MF A01 CSCL 06T

The purpose of the study was (1) to investigate the effects of ozone exposure combined with very high ventilation volumes during exercise and (2) to study selected ventilatory and respiratory metabolism parameters and subjective symptomatology which suggests mechanisms for loss of maximal aerobic performance following ozone exposure Author (GRA)

53

BEHAVIORAL SCIENCES

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

A84-10388* Georgia Inst of Tech, Atlanta ANALYSIS AND CLASSIFICATION OF HUMAN ERROR

W B ROUSE (Georgia Institute of Technology, Atlanta, GA) and S H. ROUSE (Search Technology, Inc., Norcross, GA) IEEE Transactions on Systems, Man, and Cybernetics (ISSN 0018-9472), vol SMC-13, July-Aug 1983, p 539-549 refs (Contract NAG2-123)

The literature on human error is reviewed with emphasis on theories of error and classification schemes. A methodology for analysis and classification of human error is then proposed which includes a general approach to classification identification of possible causes and factors that contribute to the occurrence of errors is also considered. An application of the methodology to the use of checklists in the aviation domain is presented for illustrative purposes

A84-10971* Tufts Univ, Medford, Mass THE EFFECTS OF CUING IN TIME-SHARED TASKS

R A CHECHILE and D M SADOSKI (Tufts University, Medford, Human Factors (ISSN 0018-7208), vol 25, Aug 1983, p 371-377 refs (Contract NAG2-51)

The results of two divided-attention experiments involving the editing of route-way-point displays on an avionics computer unit are reported Two side tasks were required of the subjects, and either no cue, verbal cues appearing on the CRT, or symbolic cues (lights on the keyboard adjacent to keys to be used) were given to facilitate the primary editing task. Forty female and 30 male undergraduates were trained in the separate and combined tasks and divided randomly into groups of 25 for the cuing tests A second test with three 10-subject groups was conducted at least one month later to investigate the efficacy of cuing for infrequently used procedures. It is found that only symbolic cuing significantly improved primary-task performance, increasing editing accuracy in the repetitive tests and reducing editing time in the delayed tests. Verbal cuing, probably because it requires additional cognitive effort, has no significant beneficial effect. These results are considered important for designing instruments for work environments requiring the performance of concurrent tasks, and as aircraft cockpits

A84-10972

AN APPLICATION OF SIGNAL DETECTION THEORY TO AIR **COMBAT TRAINING**

J L EUBANKS and P R KILLEEN (Arizona State University, Human Factors (ISSN 0018-7208), vol 25, Aug Tempe, AZ) 1983, p 449-456 refs (Contract F33615-77-C-0054)

Mission-qualified F-4 pilots scheduled for training in the Simulator for Air-to-Air Combat (SAAC) flew two consecutive 2-min engagements against a computer-simulated adversary aircraft both before and after SAAC training. The SAAC models the flight characteristics of the different F-4 missile systems and was programmed to specify on a continual basis whether or not the adversary aircraft was within the pilot's weapon-firing envelope for each missile system. Data collected were used to calculate hit rates and false-alarm rates in an application of the theory of signal detectability (TSD) Relevant parameters were derived by solving for the (inferred) decision window that optimized goodness-of-fit to power-law ROC curves. The results suggest that TSD represents

a promising approach to systematically studying changes in pilot decision-making behavior as a function of training Author

A84-10973

FLYING PERFORMANCE ON THE ADVANCED SIMULATOR FOR PILOT TRAINING AND LABORATORY TESTS OF VISION

R KRUK, D REGAN, K I BEVERLEY (Dalhousie University, Halifax, Canada), and T LONGRIDGE (USAF, Air Force Human Resources Laboratory, Williams AFB, AZ) Human Factors (ISSN 0018-7208), vol 25, Aug 1983, p 457-466 Sponsorship Natural Sciences and Engineering Research Council of Canada refs (Contract NSERC-A-0323, AF-AFOSR-78-3711)

The results of simulated flight and laboratory visual tests using 12 fighter pilots, 12 instructor pilots, and 12 graduating student pilots as subjects are reported. The simulator tasks were formation flight, low-level flight, bombing, and restricted-visibility landing. The sensory visual tests involved superthreshold velocity discrimination of a radially expanding flow pattern, depth-motion and frontal-plane-motion manual tracking, moving square motion and contrast thresholds, and a static sinusoidal grating. The results are presented in tables and discussed it is found that expanding-flow-pattern discrimination is positively correlated with landing, formation-flight, low-level-flight, and bombing performance, and with aircraft-flying grades (for the student pilots). It is suggested that such visual testing be used in the preselection of candidates for flight training, and that attention be given to improving the accuracy of motion effects in flight-simulator visual displays. T.K.

A84-11337

DISTRIBUTION OF INDIVIDUAL INDICES OF THE SUBJECTIVE EVALUATION OF LOUDNESS [O RASPREDELENII INDIVIDUAL'NYKH POKAZATELEI SUB'EKTIVNOI OTSENKI GROMKOSTII

I A RYBIN, N V SHAMKOV, V I LUPANDIN, and L I PRIKHODKINA (Ural'skii Gosudarstvennyi Universitet, Sverdlovsk, USSR) Fiziologiia Cheloveka (ISSN 0131-1646), vol 9, Sept -Oct 1983, p 806-811 In Russian refs

An analysis is made of the distribution of individual power-law exponents of subjective loudness scaling in a large sample of subjects (253 persons 9 to 63 years of age). It is shown that the distribution of these exponents has not a normal but a Poisson character. This leads to the suggestion that individual variations of this exponent have a discrete character. Several peaks were revealed on the distribution curve, indicating the heterogeneity of the sample, analogous peaks were found in the distribution of the rims error of the regression equation. An absence of correlation between the peaks of the two distributions indicates that these exponents are independent. The distributions of individual evaluations were normal (in the case of mean values of loudness) or positive-excessive.

A84-11338

THE ROLE OF ADRENALIN IN THE GENESIS OF DISORDERS OF MOTOR SKILLS IN CONDITIONS OF EMOTIONAL STRESS [ROL' ADRENALINA V GENEZE RASSTROISTV DVIGATEL'NYKH NAVYKOV V USLOVIIAKH EMOTSIONAL'NOGO STRESSA]

I S MOROZOV, G S PUKHOVÁ, and E R IVANOV (Vsesoiuznyi Nauchno-Issledovateľskii Institut Fizicheskoi Kuľtury, Moscow, USSR) Fiziologiia Cheloveka (ISSN 0131-1646), vol 9, Sept-Oct 1983, p 812-818 In Russian refs

A84-11343

THE RELATIONSHIP BETWEEN THE OPERATOR PERFORMANCE UNDER MAXIMUM INFORMATION LOADS AND THE INDIVIDUAL PARAMETERS OF THE EEG ALPHA RHYTHM [ZAVISIMOST' KACHESTVA RABOTY OPERATOROV V USLOVIIAKH MAKSIMAL'NYKH INFORMATSIONNYKH NAGRUZOK OT INDIVIDUAL'NYKH PARAMETROV AL'FA-RITMA EEG]

S E POPOV, A V MIROLIUBOV, and I L SOLOMIN (Voenno-Meditsinskaia Akademiia, Leningrad, USSR) Fiziologiia Cheloveka (ISSN 0131-1646), vol 9, Sept-Oct 1983, p 865, 866 In Russian

A84-11756#

MODERN METHOD AND INSTRUMENT FOR MEASURING PSYCHIC PERFORMANCE

J HIDEG, P REMES, L BOGNAR, M AGOSTON, and Z KASA (Hungarian Academy of Sciences, Intercosmos Council, Budapest, Hungary) International Astronautical Federation, International Astronautical Congress, 34th, Budapest, Hungary, Oct 10-15, 1983 6 p refs

(IAF PAPER 83-181)

An objective method of assessing a pilot's psychic performance is presented in terms of a four choice reaction time presentation instrument. The device presents a flashing light, to which the subject had to respond by throwing an associated switch, and also by performing a predetermined arithmetic computation. The tests are cycled so as to limit the information which can be perceived over a given time period, thereby permitting the bit/sec rate of data processing to be computed by means of an algebraic formulation. Once a pilot's psychic response capabilities are quantified, the test can at any time in the future reveal any decrements in the pilot's abilities. Likewise, periodic employment of the tests by space station personnel will permit monitoring of the state of the astronauts' long-term mental performance.

MSK

A84-12786

AN EFFECT OF SPEED ON INDUCED MOTION

H WALLACH and R BECKLEN (Swarthmore College, Swarthmore, PA) Perception and Psychophysics (ISSN 0031-5117), vol 34, no 3, Sept 1983, p 237-242 (Contract PHS-11089)

Reciprocating horizontal motion of a pattern of vertical lines caused horizontal induced motion of a dot that underwent vertical reciprocating motion. The real vertical motion and the induced horizontal motion of the dot resulted in a circular or oval apparent path Increasing the two motion speeds caused the horizontal component of this resultant path to become smaller, a change that indicated a diminished induced effect. This effect of high motion speed was not due to a blurring of the moving line pattern at high speeds, since strong objective blurring of the line pattern did not diminish the extent of the induced motion it caused When the eyes pursued the line pattern, speed increases that changed the apparent path of the dot when the dot was tracked had only a small effect, which was shown to result from incomplete tracking It is concluded that, in that case, the dot's apparent path was not due to induced motion, but rather to the retinal path of the dot's ımage Author

N84-10750# Naval Personnel Research and Development Center, San Diego, Calif

EFFECTS OF BEHAVIORAL OBJECTIVES AND INSTRUCTIONS ON EARNING A CATEGORY TASK Special Report, FY 82 P J KONOSKE and J A ELLIS May 1983 14 p refs

(Contract ZF66512001) (AD-A130386, NPRDC-SR-83-33) Avail NTIS HC A02/MF A01 CSCL 05I

This study compares the effects of behavioral objectives and explicit instructions on learning a category task. Subjects were assigned to one of four groups a read-only control group, a standard Navy behavioral objective group, a revised behavioral objective group, and an instructions group Results of a recall test

and a classification test showed a significant difference in group performance. The data indicated that giving students instructions or behavioral objectives that have been revised so that they are clear to the student facilitates recall and classification performance more than giving nonspecific behavioral objectives. The instructional implications are that students should be given explicit instructions or behavioral objectives that use familiar terminology and consist of specific information about the nature of the testing situation when learning from text.

Author (GRA)

N84-10751# Colorado Univ , Boulder Center for Research on Judgment and Policy

DIRECT COMPARISON OF INTUITIVE, QUASI-RATIONAL AND ANALYTICAL COGNITION

K R HAMMOND, R M HAMM, J GRASSIA, and T PEARSON Jun 1983 84 p refs (Contract N00014-77-C-0336)

(AD-A130273, CRJP-248) Avail NTIS HC A05/MF A01 CSCL 05J

The relative efficacy of intuitive and analytical cognition in analytically competent persons was directly compared. More subjects performed best in the intuitive mode when inconsistency was removed from their judgments, an indication that the subjects possessed implicit knowledge that they did not utilize in the analytical mode. More subjects made larger errors in the analytical mode than in the intuitive mode. Subjects' confidence was generally inappropriately placed.

Author (GRA)

N84-10752# Air Force Human Resources Lab , Brooks AFB, Tex Plans and Programs Office

FLYING TRAINING R&D (RESEARCH AND DEVELOPMENT) AT THE AIR FORCE HUMAN RESOURCES LABORATORY Final Technical Report

H J CLARK and K W POTEMPA Jun 1983 10 p refs Presented at the Aviation Psychology Symp, Columbus, Ohio, 27-29 Apr 1983

(AD-A130250, AFHRL-TP-83-24) Avail NTIS HC A02/MF A01 CSCL 05I

This paper describes the Air Force Human Resources Laboratory and its research and development (R&D) programs in Flying Training Studies in flight simulation, part-task trainer development, performance measurement, and pilot selection are described R&D issues in Flying Training which merit continued attention are discussed, and opportunities for participation in Air Force sponsored R&D programs by universities and industrial organizations are briefly outlined

Author (GRA)

N84-10753# Midwest Research Inst , Kansas City, Mo TASK VALIDATION FOR STUDIES ON FRAGMENTED SLEEP AND COGNITIVE EFFICIENCY UNDER STRESS Final Report, 1 May 1980 - 30 Sep. 1982

C ĞRAHAM and H D COHEN Nov 1982 98 p (Contract DAMD17-80-C-0075, DA PROJ 3E1-62777-A-879) (AD-A130260, MRI-2007-E) Avail NTIS HC A05/MF A01 CSCL 06S

A computer gaming approach was used to create a new type of automated performance task (STAR) The task unobtrusively measures multiple cognitive skills and risk-taking behavior under various stress and workload conditions. A training manual and protocol were developed, and performance criteria established Measurement reliability and performance under different task difficulty levels and crisis conditions were assessed STAR is shown to be a sensitive task which promises to reliably measure major aspects of human function under a variety of conditions

Author (GRA)

N84-10754# Naval Biodynamics Lab , New Orleans, La Bureau of Medicine and Surgery

EFFECTS OF HEAD IMPACT ACCELERATION ON HUMAN PERFORMANCE: OVERVIEW AND PRELIMINARY BATTERY IDENTIFICATION

A C BITTNER, JR, J P SHORTAL, III, and M M HARBESON May 1983 18 p refs

(AĎ-A130286, NBDL-83R004) Avail NTIS HC A02/MF A01 CSCI 05.1

A review of the human performance effects of impact acceleration was conducted as part of an effort to assemble an experimental test battery. Tasks were designated for inclusion only if suitable for repeated measures applications and sensitive to closed-head impact acceleration. Two human performance tasks which met these criteria were identified after separate reviews of experimental and clinical research. In addition, three tasks sensitive to impact effects and potentially suitable for repeated measures applications were also identified. A third category of tasks which are suitable for repeated measures research but have not yet been shown to be sensitive to impact acceleration have been identified in other reports from this laboratory, but are beyond the scope of the present study Short-term Consonant Memory, Adaptive Serial Addition, and Adaptive Visuospatial Judgement tasks were determined to be sensitive candidate measures with potential for repeated measures applications and were recommended for development Choice Reaction Time (CRT) and Manikan Spatial Orientation Tasks were recommended for inclusion in an impact acceleration test battery for current applications

GRA

N84-10755# Rice Univ , Houston, Tex Dept of Psychology
A CRITICAL ANALYSIS OF THE USES OF MULTIPLE
REGRESSION IN THE STUDY OF HUMAN JUDGEMENT
S P KERKAR Jul 1983 48 p refs

(Contract N00014-82-C-0001, NR PROJ 197-074)

(AD-A131224, TR-83-2) Avail NTIS HC A03/MF A01 CSCL 05J

The present paper represents an effort toward integration and extension of existing knowledge in one area of the decision-judgment field. It analyzes the widespread use that is being made of the multiple regression (MR) paradigm in judgement research, distinguishes two major orientations apparent in that work, and suggests ways to integrated and extend them in the interest of making the resulting data more useful.

N84-10756# Syracuse Univ, N Y
EXTENDED DEVELOPMENT PROCEDURE EDEP USER'S
MANUAL Final Report

C M REIGELUTH, P DOUGHTY, F SARI, C J POWELL, L FREY, and J SWEENEY Nov 1982 67 p refs Sponsored by Army

(AD-A131381) Avail NTIS HC A04/MF A01 CSCL 05I

This is a reference Manual (not a training manual) organized to be appropriate for use at the level of knowledge of the user about instructional design. It provides the essential core of design prescriptions for people who do not have much experience or background in design. It is organized in chronological order and takes the form of the steps that are keyed to, and should be integrated into, the steps laid out in the (IPISD)(Interservice Procedures for Instructional Systems Development) This User's Manual and its companion EDeP Advanced Reference Manual outline and describe such macro level activities as selecting and sequencings, then the major instructional requirements for each skill and knowledge that needs to be taught and the planning of major components or strategies for meeting those requirements Selection of the most appropriate instructional approach (or combination of approaches) for each skill and knowledge follows Necessary materials and instructor's manual are then developed in such a way as to utilize the components that were prescribed GRA earlier

N84-10757# California Univ, San Diego, La Jolla Center for **Human Information Processing**

REPRESENTATION IN MEMORY

D E RUMELHART and D A NORMAN 7 Jun 1983 132 p refs Sponsored in part by the System Development Foundation (Contract N00014-79-C-0323, NR PROJ 667-437) (AD-A130662, CHIP-116, REPT-8302-ONR) Avail NTIS HC A07/MF A01 CSCL 05J

This paper provides a review of work on the representation of knowledge from within psychology and artificial intelligence. The work covers the nature of representation, the distinction between the represented world and the representing world, and significant issues concerned with propositional, analogical, and superpositional representations Major controversies within psychology - such as distinctions between declarative and procedural representation, propositional and analogical representation, and the nature of visual images - are analyzed and found not to reflect fundamental disagreements Author (GRA)

N84-10758# Boeing Aerospace Co , Seattle, Wash INTEGRATED CUING REQUIREMENTS (ICR) STUDY: FEASIBILITY ANALYSIS AND DEMONSTRATION STUDY Final Report

R FARRELL and R BARKER **AFHRL** Williams AFB, Ark Jun 1983 53 p (Contract F33615-79-C-0014, AF PROJ 6114)

(AD-A131039, AFHRL-TP-82-25(1)) Avail NTIS HC A04/MF A01 CSCL 051

The goal of the Integrated Cuing Requirements (ICR) Study consolidate and synthesize existing sensory/perceptual data, principles and models in a manner which would make this information readily accessible and useful to the community of aircrew training device (ATD) design engineers. There exists an extensive body of research literature on human perception which could potentially be of value in the specification, design, and evaluation of aircrew training devices. The data in this domain are distributed among numerous different publications and are written in the specialized terminology of perceptual psychology Consequently, this information is not generally accessible to ATD engineers. The goal of the ICR study was to extract and consolidate the relevant data into an accessible format and to provide, where feasible, a synthesis of the literature which included recommendations relevant to equipment design. The intended output of this activity was (1) an ICR Data Base containing the available sensory/perceptual data in a form useful for specification and design purposes, and (2) an ICR Users Guide to facilitate access to the data by the ATD engineer GRA

N84-10759# Stanford Univ , Calif Dept of Psychology REPRESENTATIONS OF PERCEPTIONS OF RISKS

E J JOHNSON (Carnegie-Mellon Univ) and A TVERSKY 1983 36 p refs Sponsored in part by NSF (Contract N00014-79-C-0077, NR PROJ 197-058) (AD-A131443) Avail NTIS HC A03/MF A01 CSCL 05J

The perceptions of risks (e.g., diseases, accidents, natural hazards) is investigated using a multi-task, multi-model approach We studied the proximities among 18 risks induced by three tasks judgment of similarity, conditional prediction and dimensional evaluation The comparative judgments (similarity and prediction) were reasonably close but the dimensional evaluation did not correlate highly with either similarity or prediction. Similarity judgments and conditional predictions appear to be represented best by tree models, which are based on discrete features, while the dimensional evaluations are better explained by spatial models, such as multidimensional scaling and factor analysis. We discuss the implications of these results for the study of mental representation and for the analysis of risk perception

Author (GRA)

N84-11715# Joint Publications Research Service, Arlington, Va METHOD FOR ASSESSING MENTAL STRESS IN OPERATORS B N RYZHOV and V P SALNITSKIY *In its* USSR Rept Space Biol and Aerospace Med , V 17, No 5, Sep -Oct 1983 p 124-126 1 Nov 1983 refs Transl into ENGLISH from Kosmich Biol i Aviakosmich Med (Moscow), v 17, no 5, Sep -Oct 1983 p 83-84

Avail NTIS HC A08

The method of combining different parameters into an integral evaluation of stress is tested. The validity of the method was determined in the first series of studies by finding coefficients of correlation between parameters of tension and rate of delivery of information to the operator Investigation of parameters of productivity of operator work, distinctions of their reactions during work, as well as their own accounts enable us to demonstrate a rather high discriminatory sensitivity of the integral rating for qualitatively dissimilar types of mental tension that are inherent in the types of operator work in question

N84-11756# Carnegie-Mellon Univ, Pittsburgh, Pa Dept of Computer Science

METAPHOR AND COMMON-SENSE REASONING Interim

J G CARBONELL and S MINTON 5 Mar 1983 27 p refs (Contract N00014-79-C-0661, N00014-82-C-5076) (AD-A131423, CMU-CS-83-110) Avail NTIS HC A03/MF A01 CSCL 05J

Inferences based on metaphors appear to play a major role in human common sense reasoning. This paper identifies and analyzes general inference patterns based upon underlying metaphors, in particular the pervasive balance principle. Strategies for metaphor comprehension are explored, and analogical mapping structures are proposed as a means of representing metaphorical relationships between domains. In addition, a framework for a computational model embodying principles of metaphorical common sense reasoning is discussed

N84-11757# Air Force Human Resources Lab, Brooks AFB, Tex

COMPANION TRAINER AIRCRAFT: CONCEPT TEST Final

R T NULLMEYER, T H KILLION, and M E WOOD Jun 1983 53 p refs

(Contract AF PROJ 1123)

(AD-A131378, AFHRL-TR-82-33) Avail NTIS HC A04/MF A01 CSCL 051

Faced with increasing budget constraints and a need to conserve the B-52 weapon system, the Strategic Air Command (SAC) has pursued several avenues to make continuation training programs more efficient. Because actual flight training is considered to be critical, one proposed solution involved the use of a low cost business jet aircraft to supplement reduced B-52 flying schedules This aircraft would be augmented to provide training for the radar navigator, navigator, and electronic warfare officer (EWO), in addition to the pilot and copilot. Some training missions would be flown in this Companion Trainer Aircraft (CTA) to reduce the need to fly the B-52 The training effectiveness of a CTA program depends on two main assumptions first, appropriate behaviors trained in the CTA will transfer positively to the B-52, and second, inappropriate behaviors will not transfer. A theoretical approach based on transfer-of-learning considerations for a CTA revealed particular difficulties in specifying transfer expectations for pilots and copilots. Previous attempts to use a second aircraft as a surrogate trainer have met with mixed results. Both positive and negative effects on primary aircraft performance were observed in response to a congressional request for proof of the concept that a CTA could provide effective training, a study was designed involving operational SAC crews. This study employed a modified T-39B aircraft to supplement B-52 training for eight aircrews The purpose of the study was to answer two major questions First, what effect does flying the secondary aircraft have on primary aircraft performance?

54

MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

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

A84-10025#

A VOICE INTERACTIVE SYSTEM FOR AIDING AND DOCUMENTATION OF SPACE-BASED TASKS

V RILEY and R VESTEWIG (Honeywell Systems and Research Center, Minneapolis, MN) IN Computers in Aerospace Conference, 4th, Hartford, CT, October 24-26, 1983, Collection of Technical Papers New York, American Institute of Aeronautics and Astronautics, 1983, p 171-177 (AIAA PAPER 83-2355)

The application of a voice-interactive maintenance-aiding device (VIMAD) to the performance assembly and maintenance tasks in space is considered. The problems presented by the complexity of the tasks to be performed, by the crew limitations of space missions, by the space environment in general, and by the further restrictions of extravehicular activities are reviewed VIMAD has been developed for ground use and comprises a helmet-mounted, hand-held, or full-size portable display unit linked by RF or cable to a computer or microcomputer controlling the presentation of video or audio information. User command is by voice or portable keyboard, and the instructions and diagrams are stored on random-access video and audio disks. The modifications in software and hardware which might be needed to adapt VIMAD to space use are discussed, taking the need for task documentation into account, and the advantages and feasibility of a VIMAD-type system are demonstrated

A84-10035*# Mitre Corp , Bedford, Mass MANNED SPACEFLIGHT ACTIVITY PLANNING WITH KNOWLEDGE-BASED SYSTEMS

J MOGILENSKY, R E DALTON (Mitre Corp., Greenbelt, MD), and E A SCARL (Mitre Corp., Bedford, MA) IN Computers in Aerospace Conference, 4th, Hartford, CT, October 24-26, 1983, Collection of Technical Papers New York, American Institute of Aeronautics and Astronautics, 1983, p 224-228. refs (Contract F19628-82-C-0001, NASA PROJECT 8980) (AIAA PAPER 83-2374)

An on-board expert system, capable of assisting with crew-activity planning and platform-status monitoring, could provide unprecedented autonomy to the crew of a permanently manned space station. To demonstrate this concept's feasibility, an existing knowledge-based system is adapted to support Space Shuttle crew-activity timeline planning. Proposed timeline changes are to be checked for compliance with crew capabilities and mission operating guidelines, so that a nonexpert can be guided through a successful plan modification. Early lessons that have been learned about the scope of the adaptation needed to achieve this objective are presented.

A84-10070*# National Aeronautics and Space Administration Langley Research Center, Hampton, Va

A SYSTEM FOR INTELLIGENT TELEOPERATION RESEARCH
N E ORLANDO (NASA, Langle Accessor Center, Hampton,

VA) American Institute of Aeronautics and Astronautics, Computers in Aerospace Conference, 4th, Hartford, CT, Oct 24-26, 1983 7 p refs

(AIAA PAPER 83-2376)

The Automation Technology Branch of NASA Langley Research Center is developing a research capability in the field of artificial intelligence, particularly as applicable in teleoperator/robotics development for remote space operations. As a testbed for experimentation in these areas, a system concept has been developed and is being implemented. This system termed DAISIE (Distributed Artificially Intelligent System for Interacting with the

Environment), interfaces the key processes of perception, reasoning, and manipulation by linking hardware sensors and manipulators to a modular artificial intelligence (AI) software system in a hierarchical control structure. Verification experiments have been performed one experiment used a blocksworld database and planner embedded in the DAISIE system to intelligently manipulate a simple physical environment, the other experiment implemented a joint-space collision avoidance algorithm. Continued system development is planned.

A84-10473

THEORY AND EXPERIMENT IN THE ANALYSIS OF THE WORK OF OPERATORS [TEORIIA I EKSPERIMENT V ANALIZE TRUDA OPERATOROV]

V. F VENDA, ED and V A VAVILOV, ED Moscow, Izdatel'stvo Nauka, 1983, 336 p. In Russian

The methodological bases of engineering psychology and problems of the multilevel mutual adaptation of humans and machines in modern systems of control are examined Topics studied include the informational interaction of operators during the solution of a task by a group, a mathematical model of the group activity of an operator with the consideration of individual strategies of behavior, the processes of the adaptation of operators to a system during the course of study, and the psychological analysis of strategies. Other aspects discussed include the problems of the agreement of the strategies of airline pilots, the evaluation of the quality of representation during the formulation method of the presentation of information on the screen of an automated control system, structural aspects engineering-psychological experiment, and an investigation of methods for increasing the accuracy of the work of operators in hierarchical man-machine systems. No individual items are abstracted in this volume

A84-10708

BALLISTIC PROTECTIVE HEADGEAR FOR NAVY/MARINE CORPS ROTARY WING AIRCREW

D S MCCAULEY (U.S. Naval Material Command, Naval Air Development Center, Warminster, PA) IN SAFE Association, Annual Symposium, 20th, Las Vegas, NV, December 6-10, 1982, Proceedings Van Nuys, CA, SAFE Association, 1983, p 11-14

Experimental results from attempts to define ballistic protective headgear that can handle fragments travelling at 1150 fps are reported Various Kevlar panels were fired at with 17 grain, 22 caliber, type 2 projectiles V50 values were obtained in terms of the five highest velocity partial penetrations and the five lowest velocity total penetrations Kevlar in phenolic/polyvinyl butaryl was determined suitable for both type 1 and type 2 conditions when featuring 8 plies and weighing 17 5 oz The shell will resist fragments with 1250 fps velocities A type 2 helment will weigh up to 50 oz

A84-10710

COMPUTER ANALYSIS IN HELMET DESIGN

R VANDERBY, JR, S J BONIFAS (Illinois Institute of Technology, Chicago, IL), and E E HAHN (Multitech Engineering Associates, Chicago, IL) IN SAFE Association, Annual Symposium, 20th, Las Vegas, NV, December 6-10, 1982, Proceedings Van Nuys, CA, SAFE Association, 1983, p 27-30 Research sponsored by the Illinois Institute of Technology refs

A numerical model for analyzing the biodynamic response of a helmeted head to impact is described. Consideration is given to nine articulated body segments connected at eight articulation points, yielding 27 deg of freedom. The helmet is added as a tenth element Account is taken of gravitational, resisting spring, torsional spring, and linear and torsional damping at each joint, as well as normal, frictional contact, deformation, and restoration forces. Model inputs cover the body height, weight, body type, physical condition, linear position and head velocity, and angular positions and velocities of all body segments. Numerical output is received on the displacements, velocities, and accelerations of each body segment, together with forces and bending moments.

at each joint, peak head accelerations, the Severity Index, and the head Injury criteria DHK

A84-10712

THE F-16 ON BOARD OXYGEN GENERATION SYSTEM (OBOGS)

R L CRAMER (Litton Industries, Instruments and Life Support Div, Davenport, IA) IN SAFE Association, Annual Symposium, 20th, Las Vegas, NV, December 6-10, 1982, Proceedings Van Nuys, CA, SAFE Association, 1983, p 39-42 USAF-supported research

The current status and preliminary results of developing a man-rated molecular sieve oxygen concentration system for the F-16 are reported. The system is intended to provide an air mixture directly from the concentrator, be directly interchangeable with existing O2 components, improve breathing by controlling mask pressure swings and affording enhanced peak breathing performance, and provide a back-up O2 supply with pilot override options. Data from 35 flights with 20 different pilots verified most design goals, except for two occasions when the O2 supply from the concentrator fell below normal limits. Both failure mechanisms were identified and rectified, and improvements were added in terms of the reduction of one of the selector valve options.

DHK

A84-10713

THE USAFSAM ADVANCED OXYGEN SYSTEM CONCEPT

J B TEDOR and R L MILLER (USAF, School of Aerospace Medicine, Brooks AFB, TX) IN SAFE Association, Annual Symposium, 20th, Las Vegas, NV, December 6-10, 1982, Proceedings Van Nuys, CA, SAFE Association, 1983, p 43-46

The design requirements for a new breathing gas system for high performance military aircraft are described, together with probable system components, expected problems, and projected solutions. Flows of 50-60 l/min are needed, in conjunction with 200 l/min in high-g maneuvering situations. The advanced oxygen system (AOS) regulator will maintain a constant breathing mask flow of 100 l/min, with allowances made for altitudes between 39,000-60,000 ft in case crew members have to leave the aircraft Account will also be taken of maintaining lowered pressure in the aircraft below 25,000 ft to prevent lung collapse or middle ear block. Flow control of the emergency O2 supply will also be provided, with control by either pneumatic or electronic means.

DHK

A84-10716

IN SEARCH OF - AN ACCEPTABLE LAP BELT

B HARRISON (USAF, San Antonio Air Logistics Center, Kelly AFB, TX) IN SAFE Association, Annual Symposium, 20th, Las Vegas, NV, December 6-10, 1982, Proceedings Van Nuys, CA, SAFE Association, 1983, p 65-67

The history of testing, use, discovery of defects, corrections, and redesign of ejection seat lap belts for USAF aircraft is traced from the first unit, operational in 1946, to the third generation program initiated in 1977 Problems have persisted in terms of the lap belt opening too early or failing to open after ejection Lap belts until 1980 featured either ballistic powered or pin puller versions for opening. The latter mechanism has been incorporated in all new aircraft. A redesign started in 1980 resulted in the HBU-12/A production belt, which has male and female halves, a gold key for automatic parachute opening, adjustments for crew member size, and the ability to separate completely from the seat during operation.

A84-10717

IMPROVING RESTRAINT SYSTEMS CAPABILITIES IN OLDER EGRESS SYSTEMS

J F BRIGANTI (USAF, San Antonio Air Logistics Center, Kelly AFB, TX) IN SAFE Association, Annual Symposium, 20th, Las Vegas, NV, December 6-10, 1982, Proceedings Van Nuys, CA, SAFE Association, 1983, p 68-71 refs

Improvements in ejection seat systems performance in the past 20 yr are reviewed, noting the performance enhancements that

will be required in the future Attention is given to the ACES II seat and HBU-12A belt design and performance, and to the benefits and disadvantages of the negative G strap, the latter being ameliorated by proper training Emphasis is laid on the increasing weights of the 95th percentile crewmember due to added survival equipment and clothes Finally, the necessity of incorporating limb restraints into supersonic aircraft ejection seats to prevent flail injuries is stressed, particularly for new aircraft where retrofit costs can be avoided

A84-10719

HEAT STRESS RELATED TO THE OPERATION OF CANADIAN FORCES AIRCRAFT - A HISTORICAL REVIEW AND POSSIBLE SOLUTION

C J BROOKS, A G HYNES, L V ALLIN, and L A KUEHN (Defence and Civil Institute of Environmental Medicine, Toronto, Canada) IN SAFE Association, Annual Symposium, 20th, Las Vegas, NV, December 6-10, 1982, Proceedings Van Nuys, CA, SAFE Association, 1983, p 91-94 refs

British and Canadian efforts in the development of liquid cooled garments (LCG) for military aircraft pilots are described LCG development began in the U K in 1959 and consisted of tubes stitched into the fabric Water was used as the heat transfer medium, and the LCG units, attached to chipped ice cooling apparatus, were used in flights over Lybia, Cyprus, and the Far East in 1965, and variants were employed on the Apollo flights Vest cooling was effected with the chiller unit based on a commercial design that produced ice cubes for the DC-10, 747, and A300 Airbus Over 100 hr of successful flight time has been performed with the unit mounted in a Sea King helicopter

DHK

A84-10721

COMPATIBILITY ANALYSIS OF THE MBU-14/P OXYGEN MASK AND U.S. NAVY OXYGEN REGULATORS

J W CASTINE (U.S. Naval Material Command, Naval Air Development Center, Warminster, PA) IN SAFE Association, Annual Symposium, 20th, Las Vegas, NV, December 6-10, 1982, Proceedings Van Nuys, CA, SAFE Association, 1983, p 107-113 refs

This paper provides information resulting from an investigation concerning the compatibility of the recently introduced MBU-14/P oxygen mask assembly and U.S. Navy oxygen regulators currently in operational use. In addition to providing some brief background information, this paper discusses the problem of occasional excessive resistance to exhalation and the hazard which is created with the use of the MBU-14/P oxygen mask with regulators without safety pressure relief

A84-10725

PHYSIOLOGICAL TESTING OF A HELICOPTER MOBILE AIRCREWMAN COOLING SYSTEM

D S MCCAULEY (U.S. Naval Material Command, Naval Air Development Center, Warminster, PA) IN SAFE Association, Annual Symposium, 20th, Las Vegas, NV, December 6-10, 1982, Proceedings Van Nuys, CA, SAFE Association, 1983, p 130-133

Helicopter aircrewmen performing missions such as search and rescue, vertical replenishment of cargo, mine counter-measures, anti-submarine warfare, and cargo and troop transport are often required to perform physically demanding work in high temperature environments. Heat stress resulting from high temperature environments degrades crewmen performance in accomplishing both physically demanding and psycho-motor tasks. The Naval Air Development Center, under the sponsorship of Naval Air Systems Command, has developed a cooling system for the mobile helicopter aircrewman. Prototype cooling systems were tested in high temperature environments. Physiological responses of subjects with and without cooling systems were measured during testing. This paper presents the results of those tests.

A84-10726

DOWN IN THE ARCTIC - EQUIPMENT AND TRAINING FOR SURVIVAL

P A WENDT (U.S. Coast Guard, Aviation Training Center, Mobile, AL) IN SAFE Association, Annual Symposium, 20th, Las Vegas, NV, December 6-10, 1982, Proceedings Van Nuys, CA, SAFE Association, 1983, p. 134-137

The contents of the U.S. Coast Guard polar survival kit are inventoried and training procedures for a 3-man crew are outlined The hard-shelled kit holds three 5-lb goose-down sleeping bags that are wind and water resistant and colored international vellow or orange, three goose-down parkas and pants, one geodesic four man tent, three pairs of goose-down booties, and three rain gear sets. Also included are three bivouac covers, three foam pads, two back packs, a survival stove with fuel and manual, three abandon ship rations, 12 long range rations, two sets of snow shoes, a snow shovel, and a survival radio battery Polar Survival school simulates an aircrew with four students in each class and training in terrain resembling, as much as possible, the worst case crash scenario Prioritizing needs is taught, as are outdoor shelter skills, navigation, innovation, and shelter construction The trainees are given a 24 hr solo with only their clothes as a test MSK

A84-10729

U.S. NAVY LIFE SUPPORT R&D PROGRAMS

D N DESIMONE (U.S. Naval Material Command, Naval Air Development Center, Warminster, PA) IN SAFE Association, Annual Symposium, 20th, Las Vegas, NV, December 6-10, 1982, Proceedings Van Nuys, CA SAFE Association, 1983, p 153-157

This paper highlights the major research and development programs within the Navy's Aviation Life Support System RDT&E effort for FY-83 Major program discussions include the OBOGS (Onboard Oxygen Generating System) program, the results of the recently curtailed Maximum Performance Escape System (MPES), and how the products of this program will be utilized under a joint Air Force/Navy advanced escape system program, CREST The Navy's Advanced Aircrew Restraint program is progressing well on two fronts, the near-term restraint retrofit program and the downstream advanced aircrew restraint program. The Navy's work in the area of multi-wavelength laser protective system, which is based on the use of holograms to defeat a multitude of laser frequencies appears to be the way to go for future aircrew protection A method whereby activities outside the Navy can influence the Navy Life Support R&D new start process is suggested

A84-10732

A SERVO CONTROLLED RAPID RESPONSE ANTI-G VALVE

R J CROSBIE (US Naval Material Command, Naval Air Development Center, Warminster, PA) IN SAFE Association, Annual Symposium, 20th, Las Vegas, NV, December 6-10, 1982, Proceedings Van Nuys, CA, SAFE Association, 1983, p. 165-171 refs

Design and circuitry features, as well as test results, with a new servo valve for pilot anti-g suits are described. The high acceleration capability of modern combat jets offer a tactical advantage but increase the workload on the heart, which may not be strong enough to maintain a blood supply to the brain. The anti-G suit inflates to constrict the blood in the legs and abdominal areas to prevent blood pooling in those locations. However, the inflation level must be tailored to respond to the level of g-forces or the pilot may experience pain and discomfort that inhibit performance, or may not receive adequate, timely protection. The servocontrolled valve unit responds to accelerometer signals by increasing or decreasing suit pressure to preset levels. Subjects wearing the suit were exposed to centifuge trials at various acceleration levels, and g-tolerance was compared with that obtained performing the M-1 maneuvers, which alleviate some q-force deletenous effects. The M-1 maneuver was more effective when wearing the suit, and it was concluded that new valve significantly augments suit performance

A84-10734

A COCKPIT AND EQUIPMENT INTEGRATION LABORATORY

R C HILL, P H R GILL (USAF, School of Aerospace Medicine, Brooks AFB, TX), and W J SEARS (Technology, Inc., Dayton, OH) IN. SAFE Association, Annual Symposium, 20th, Las Vegas, NV, December 6-10, 1982, Proceedings Van Nuys, CA, SAFE Association, 1983, p 179-183.

The background and plan for use of a Cockpit and Equipment Integration Laboratory for effectively reconfiguring or adding apparatus to the personal protection equipment (PPE) for aircrew without degrading their performance are described. Various reasons are given for the lack of organization between designers and engineers of PPE, including the constant shifting of personnel and the lack of good communications between development and operations personnel The Laboratory would integrate developmental items for the PPE with existing PPE components, validate the fit and function of PPE equipment at an early development stage, ensure that efforts are directed toward increasing mission effectiveness and aircrew survival at acceptable costs, establish an integration technology, and provide support to other investigators. Cockpit mockups, a FOV device, a crewmember suspension system, a rotation chair, immersion capability, and anthropometry equipment will be included in the Laboratory apparatus MSK

A84-10735

AIRCREW RESTRAINT IMPROVEMENT PROGRAM

J RODRIQUEZ (U.S. Navy, Naval Air Test Center, Patuxent River, MD) and L C MEAD (Sperry Corp., Sperry Univac Div., Lexington Park, MD) IN SAFE Association, Annual Symposium, 20th, Las Vegas, NV, December 6-10, 1982, Proceedings Van Nuys, CA, SAFE Association, 1983, p. 184-187 refs

Eighteen different harness configurations were evaluated against the U.S. Navy MA-2 torso harness with respect to protecting a human body from displacements in the -Gz environment Additional attention was given to the effect of the harnesses on comfort, mobility, aircraft ingress and egress, and flight equipment compatibility. It was found that the addition of a 5th strap, a center belt, to the MA-2, attached to the seat bucket, offered the best available restraint in the -1Gz environment. The supplementary strap configuration is regarded as a good temporary fix, while the study provides a data base for the development of aircrew restraint systems for aircraft in the 1990s.

A84-10736

NAVAL AVIATION ON-BOARD OXYGEN GENERATION SYSTEM 1982 - A STATUS REPORT

C F BENTLEY, JR (US Naval Air Systems Command, Washington, DC) and M J LAMB (US Naval Material Command, Naval Air Development Center, Warminster, PA) IN SAFE Association, Annual Symposium, 20th, Las Vegas, NV, December 6-10, 1982, Proceedings Van Nuys, CA, SAFE Association, 1983, p 191-195 refs

The Naval Air Systems Command has been directing a development program, conducted by the Naval Air Development Center (NADC), to incorporate the concept of oxygen enriched air via molecular sieve technology into Naval carrier aircraft. The objective of the program is to eliminate hazardous and logistically burdensome liquid oxygen (LOX) installations on ships, as well as forward basing areas. Program progress to date includes physiologic assessment (man rating) of the system, laboratory test. & evaluation (T & E) TECHEVAL and operational deployment. This paper presents the status of the program, including the final results of a deployment of six aircraft equipped with the system and hardware development.

A84-10737

NAVAL AVIATION SOLID CHEMICAL OXYGEN EMERGENCY SYSTEM PROGRAM

C F BENTLEY, JR (US Naval Air Systems Command, Washington, DC) and R L ROUTZAHN (US Naval Material Command, Naval Air Development Center, Warminster, PA) IN SAFE Association, Annual Symposium, 20th, Las Vegas, NV, December 6-10, 1982, Proceedings Van Nuys, CA, SAFE Association, 1983, p 196, 197

The goals, scheudle, and configuration of a qualification program for a solid chemical oxygen (SCOX) supply system for the U S Navy are described Sodium chlorate candles have been manufactured in a way that the product oxygen from burning is regarded as acceptable for emergency breathing oxygen A decade ago two elliptical SCOX candles were incorporated into the lid of the rigid seat survival kits (RSSK) for ignition by connection to the battery or if immersion occurred A new program has been instituted to develop a design of SCOX candles for the SKU-3/A survival container on the F/A-18 The system is required to supply 200 I of breathing O2 using two or three candles. The candles will ignite in response to ejection or water immersion, with the gas delivered to the crewmember through an accumulator, filter, and pressure reducer. Tests will be run to climatically, environmentally, and shock qualify the equipment.

A84-10970

DESIGN STRATEGIES FOR COMPUTER-BASED INFORMATION DISPLAYS IN REAL-TIME CONTROL SYSTEMS

C M MITCHELL (George Mason University, Fairfax, VA) and R A MILLER (Ohio State University, Columbus, OH) Human Factors (ISSN 0018-7208), vol 25, Aug 1983, p 353-369 refs

Two strategies are defined for the design of integrated, computer-based information displays for real-time control systems. Subjects controlled a simulated system using a conventional display console or one of two integrated displays. The effects of display type on operator performance were considered. Integrated display tended to degrade performance unless the display preprocessed information, synthesizing and presenting it in a form more compatible with an operator's high-level information needs.

Author

A84-11057#

EXTENSION OF THE CAPABILITY OF ARMY AIRCRAFT PERSONNEL FOR CONDUCTING NIGHT OPERATIONS, BY MEANS OF IMAGE-INTENSIFYING EYEGLASSES [ERWEITERUNG DER NACHTEINSATZFAEHIGKEIT DER HEERESFLIEGERTRUPPE DURCH BILDVERSTAERKER-BRILLEN]

H HESSE (Heeresfliegerwaffenschule, Bueckeburg, West Germany) IN International Helicopter Forum, 14th, Bueckeburg and Hanover, West Germany, May 20, 21, 1982, Proceedings Part 1 Hanover, West Germany, Deutsche Messe- und Ausstellungs-AG, 1983, 11 p In German

According to general expectations with respect to the scenarios in central Europe in the case of an armed conflict, a situation could arise which will require an intensification of army aircraft activities. In order to meet these requirements, it will also be necessary to conduct helicopter operations under conditions of darkness and reduced visibility. During the last two years, equipment and flight procedures were developed which will provide the army aircraft units with the capability needed for these missions, taking into account the implementation of helicopter missions involving low-level night operations, and the general admission of the helicopter models CH-53 G and UH-1D for low-level flight operations during the night. Attention is given to helmet-mounted image-intensifying eyeglasses, the solution of map-reading problems, material and personnel requirements, and cockpit modifications, including black-out procedures.

A84-11058#

ANALYSIS AND OUTLOOK CONCERNING AN EMPLOYMENT OF MILITARY HELICOPTERS IN NIGHT OPERATIONS [NACHTEINSATZ MILITAERISCHER HUBSCHRAUBER ANALYSE UND AUSBLICK]

K SCHYMANIETZ and H-D V BOEHM (Messerschmitt-Boelkow-Blohm GmbH, Munich, West Germany) IN International Helicopter Forum, 14th, Bueckeburg and Hanover, West Germany, May 20, 21, 1982, Proceedings Part 1 Hanover, West Germany, Deutsche Messe- und Ausstellungs-AG, 1983, 19 p In German refs

An important demand which future helicopter weapon systems will have to satisfy is related to the possibility of an operational employment during the night, under adverse weather conditions In the case of a military helicopter used in combat operations, there are additional requirements with respect to an appropriate night-combat vision system. The design requirements related to the desired capability of the military helicopter to conduct night flights are made more complex because of simultaneous demands for a contour-flying capability of a very high degree. The present investigation is essentially concerned with the possibilities regarding a utilization of vision systems for military helicopters employed in night operations. Attention is given to specific mission requirements, the basic tasks of flight control, various types of equipment and sensors which can be used as an aid in the conduction of night operations, the technological possibilities, an evaluation of promising night vision systems, and future systems and possibilities for their employment

A84-11059#

INTEGRATION AND EMPLOYMENT OF NIGHT VISION DEVICES FOR THE CONDUCTION OF A MILITARY MISSION UNDER CONDITIONS OF DARKNESS [INTEGRATION UND EINSATZ VON NACHTSICHTGERAETEN FUER DIE DURCHFUEHRUNG EINER VBH-MISSION BEI DUNKELHEIT]

E DANNEBERG (Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Institut fuer Flugfuehrung, Brunswick, West Germany) IN International Helicopter Forum, 14th, Bueckeburg and Hanover, West Germany, May 20, 21, 1982, Proceedings Part 1 Hanover, West Germany, Deutsche Messe- und Ausstellungs-AG, 1983, 16 p In German

In cases involving an employment of helicopters at very low altitudes under conditions of darkness and bad weather, it is necessary to compensate for insufficient visibility by providing the pilot with appropriate technical aids. Such aids are based on an electrooptical sensor, which will provide images of sufficient brightness even under conditions of a very low level of illumination or which will make the infrared radiation of the ground visible Devices which present an artificial view of the environment on the basis of a utilization of electrooptical sensors include image-intensifying eyeglasses, image-intensifying eyeglasses in combination with a head-down display, a head-down display with mini-FLIR (forward-looking infrared) as sensor, a head-down display with Low Light Level Television (LLLTV) as sensor, a helmet mounted sight/display with FLIR sensor, and a helmet mounted sight/display with LLLTV The results of flight experiments conducted for testing three different night-vision systems are discussed

A84-11570

INTEGRATOR OF CLIMATE DATA FOR ASSESSING INDOOR MICROCLIMATE [INTEGRATOR KLIMATICHESKIKH DANNYKH DLIA OTSENKI MIKROKLIMATA POMESHCHENII]

K RUBLAK, R F AFANASEVA, KH GEBELIAIN, N S MIKHAILOVA, KH NOAK, IU A OKOLUKHIN, and G SHULTS (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR, Ministerstvo Zdravookhraneniia, Tsentral'nyi Institut Rabochei Meditsiny, Berlin, East Germany) Gigiena i Sanitariia (ISSN 0016-9900), May 1983, p 47-50 In Russian refs

A method for assessing microclimate using a climate-data integrator is proposed which is based on the measurement and analysis of indoor-microclimate parameters, and of data on the physical activity and degree of clothing heat-insulation of people

in this microclimate. The method makes it possible to express the effect of microclimate on the thermal condition of the human body in a single indicator q-dry, the dry heat flux density. A direct relation is found between q-dry and thermal responses of the human body (mean-weighted skin temperature, thermal sensations, etc.) generally accepted in microclimate hygiene. Thermal comfort in a state of rest is observed at q-dry values ranging from -27 to +37 kcal/(sq. m. h). A block diagram of the integrator is presented.

A84-11754#

ENVIRONMENTAL CONTROL AND LIFE SUPPORT (ECLS) SYSTEM FOR SPACE STATION - NO SINGLE ANSWER

R E BREEDING and H F BROSE (United Technologies Corp, Hamilton Standard Div, Windsor Locks, CT) International Astronautical Federation, International Astronautical Congress, 34th, Budapest, Hungary, Oct 10-15, 1983 5 p (IAF PAPER 83-173)

Design features for a space station environmental and life support control system (ECLS) which will permit flexibility during growth and evolution of the station, as well as permit interfaces with the Orbiter, are discussed Many components and operations have already been defined through development for the Apollo, Skylab, and Orbiter spacecraft Further developments are necessary to close the water and air loops, as well as configure selected equipment so that replacement is facilitated when new systems are produced Studies are still needed to guide choice of fuel cells or batteries for eclipse conditions, with attention given to the fact that fuel cells have an electrolysis system that can be interfaced with the potable water and hygience systems, as well as the air supply One supply of the H2 and O2 would be scavenge-capable Shuttle ETs carrying cryogenic fuels. The actual hardware chosen is concluded to be favored in a payback analysis.

A84-11755#

BIOLOGICAL LIFE SUPPORT SYSTEM

H P LEISEIFER, A I SKOOG (Dornier System GmbH, Friedrichshafen, West Germany), and A O BROUILLET (United Technologies Corp., Hamilton Standard Div., Windsor Locks, CT) International Astronautical Federation, International Astronautical Congress, 34th, Budapest, Hungary, Oct. 10-15, 1983 11 p (IAF PAPER 83-174)

The results of a study to assess the feasibility of biological life support systems (BLSS) for a space station are reported. The BLSS will, if implemented, be significant in closing the carbon loop in a space station supporting 4-8 person crews for 30-60 day missions. The BLSS would be required to perform atmosphere maintenance, waste water and solid waste reclamation, and food production, thus instilling a regenerative character in the life support system as well as avoiding significant resupply costs. The BLSS is a balanced ecological system consisting of a combination of humans, animals, plants, and microorganisms integrated with mechanical and physico-chemical hardware. A buffering capability will be needed to assure that space ecosystems will not degrade, die, and decay Studies will be required on the intensification of cultures, waste treatment, and possible control mechanisms, as well as microgravity effects, cosmic ray effects, the use of direct solar insolation in space to enhance growth, and the implementation of appropriate monitoring and control instruments

A84-11757#

STUDY AND DEVELOPMENT ACTIVITIES OF DORNIER SYSTEM ON SPACE BIOLOGY/MEDICINE EQUIPMENT AND PAYLOADS FOR SPACELAB AND FREEFLYING PLATFORM APPLICATION

H W K FRANCOIS and P SCHILLER (Dornier System GmbH, Friedrichshafen, West Germany) International Astronautical Federation, International Astronautical Congress, 34th, Budapest, Hungary, Oct 10-15, 1983 10 p (IAF PAPER 83-183)

Projects in space biology and medicine being pursued by the Dornier System are outlined. Studies were performed on the

biorack, botany rack, and biochamber as life science payloads on the Spacelab The company also designed the environmental control and life support system for the Spacelab Current projects include a 1-g control centrifuge, experiment containers, and passive thermal conditioning units for the Spacelab biocrack The botany facility is being redesigned for installation on the EURECA free-flying platform, and will carry 6 experiments and no centrifuge in that application An Anthrorack is under development for the Spacelab for performing investigations in cardiovascular/pulmonary function and adaptation, metabolic processes and adaptation, hormonal functions, and sensormotor function and adaptation, as well as recording, transmitting, and analyzing data

A84-11921

HUMAN FACTORS IN FLIGHT SIMULATOR DEVELOPMENT

E A STARK (Singer Co , Link Flight Simulation Div , Binghamton, NY) IN World Congress on System Simulation and Scientific Computation, 10th, Montreal, Canada, August 8-13, 1982, Proceedings Volume 2 Montreal, International Association for Mathematics and Computers in Simulation, 1983, p 76-78

Simulators have a number of advantages with respect to the systems and the environments which they represent These advantages are related to aspects of economy, safety, convenience, and the degree of control permitted over the practice and learning environments. Aspects of skill learning are discussed, taking into account parameter recognition, control selection and modulation, a feedback and response comparison, and an evaluation of simulator versus aircraft. A description of human factors functions is presented, giving attention to training requirements, learning processes, and instructor/student/simulator relationships. There is room for improvement in connection with aspects of user involvement, the learning functions, and simulator utilization.

A84-11935

SIMULATION OF THE MOTION OF A SHUTTLE-ATTACHED FLEXIBLE MANIPULATOR ARM

R A MILLER, W R GRAHAM, and F R VIGNERON (Department of Communications, Ottawa, Canada) IN World Congress on System Simulation and Scientific Computation, 10th, Montreal, Canada, August 8-13, 1982, Proceedings Volume 3 Montreal, International Association for Mathematics and Computers in Simulation, 1983, p 225-227

An overview of the Shuttle's Remote Manipulator Control System is presented, followed by a description of a two-joint, two-link model of the arm used to study its flexible behavior. Two methods of modelling link flexibility are formulated. Non real-time and real-time simulations are described, and conclusions regarding the arm's flexible behavior and the simulation methodology are presented.

A84-12025

BIOFEEDBACK MONITORING-DEVICES FOR ASTRONAUTS IN SPACE ENVIRONMENT

G ROTONDO, P PANCHERI, F MONESI, G GRANTALIANO, and V DEPASCALIS (Roma, Universita, Rome, Italy) (International Astronautical Federation, International Astronautical Congress, 33rd, Paris, France, Sept 27-Oct 2, 1982) Acta Astronautica (ISSN 0094-5765), vol 10, Aug 1983, p 591-598 refs

After a reconsideration of the state-of-the-art in biofeedback research the implementation of biofeedback systems is envisioned as a countermeasure of stress for the psychoprophylaxis of the astronaut A one-session experiment performed on two groups of subjects to assess the interference from EMG-feedback on the performance in a simultaneous psychomotor trial with a view to expanding biofeedback application is described. The results show that the experimental group performed in the same way as the control without feedback, but with less CNS activation. Some general conclusions are drawn from the advances in technology

Author

A84-12059

VERTICAL IMPACT EVALUATION OF THE F/FB-111 CREW RESTRAINT CONFIGURATION, HEADREST POSITION, AND UPPER EXTREMITY BRACING TECHNIQUE

B F HEARON, J W BRINKLEY, and J H RADDIN, JR (USAF, Aerospace Medical Research Laboratory, Wright-Patterson AFB, OH) Aviation, Space, and Environmental Medicine (ISSN 0095-0562), vol 54, Nov 1983, p 977-987 refs (Contract F33615-79-C-0523, F33657-78-C-0651)

The results of experimental studies to compare the vertical impact performances of a modified F/FB-111 restraint system with the in-use model are reported. The trials were performed to determine the effects of the restraint harness configuration, the fore-aft headrest position, and the upper extremity bracing technique on humans during vertical impacts. A total of 21 subjects submitted to the trials, which were carried out in a crew-election module from an F/FB-111 Data were taken on acceleration of the carriage and test seat, the velocity of the carriage, loads at the seat, loads at the harness attachment points, accelerations at the head and chest of the subject, and photometric photography of motions induced in drop tests on a vertical deceleration tower The conventional arrangement was found to produce increases in head acceleration, head severity index, lap belt loads, and seat loads An arms-extended posture procedure was concluded to offer the best bracing configuration for ejected crewmembers preparing for landing impact of the escape module

A84-12064

SINGLE BREATH CARDIAC OUTPUT - ENHANCED SAMPLING AND ANALYSIS TECHNIQUES

N S DENO, E KAMON, and J S ULTMAN (Pennsylvania State University, University Park, PA) Aviation, Space, and Environmental Medicine (ISSN 0095-0562), vol 54, Nov 1983, p 1009-1014 Sponsorship U S Bureau of Mines refs (Contract USBM-G0155006)

Enhanced sampling and analysis techniques for estimation of the cardiac output using the single breath method are described. The computerized technique is applied to calculate oxygen consumption, CO2 elimination rate, and CO2 blood concentration for every breath during a subject's response to exercise Each breath is directed into a pneumotachograph for pressure measurements and then to gas analysis apparatus. The computer algorithms for automated analysis of the tidal volume, the instantaneous flow rate, the fraction of expired oxygen, and the instantaneous oxygen fraction are presented, together with the enhancement formulae which permit analysis of the mixed venous CO2 partial pressure. Tests were run with four subjects on a treadmill at a resting and two work levels. Computer analysis was found to overcome noise levels with sampling rates of 0.05 liters or more. Any breathing pattern above that was amenable to the computerized scans.

A84-12110

SUFFICIENT CONDITIONS FOR THE ASYMPTOTIC STABILITY OF A HOMEOSTAT [DOSTATOCHNYE USLOVIIA ASIMPTOTICHESKOI USTOICHIVOSTI GOMEOSTATA]

I T BORISENOK IN The method of Liapunov functions in the dynamics of nonlinear systems Novosibirsk, Izdatel'stvo Nauka, 1983, p 150-157 In Russian

The present study examines the stability of a system of multiconnected control simulating the group activity of operators in the course of a psychophysiological experiment based on the homeostatic method. A homeostat with three operators is considered, and operator-behavior conditions are established which are sufficient for the asymptotic stability of the homeostat-operator system. Particular attention is given to a linear structurally unstable homeostat. It is noted that the present approach can be used to develop methods for the creation of conflict stress in a group of people, which is of practical interest for the psychological selection of small groups.

A84-12127

THE EYE AND LIGHT [GLAZ I SVET]

A V LUIZOV Leningrad, Energoatomizdat, 1983, 144 p In Russian refs

The organization and operation of the eye considered as an optical-information receiver are described. The dependence of visual functions on the optical situation is examined, and the establishment of optimal optical conditions for visual work is discussed. Reference is made to light-engineering concepts, including the design of signal devices and observing instruments.

3.1

A84-12181

INDUSTRIAL ROBOTS AND THEIR APPLICATIONS - ROBOTICS FOR MACHINE BUILDING (2ND REVISED AND ENLARGED EDITION) [PROMYSHLENNYE ROBOTY I IKH PRIMENENIE - ROBOTOTEKHNIKA DLIA MASHINOSTROENIIA /2ND REVISED AND ENLARGED EDITION/]

P N BELIANIN Moscow, Izdatel'stvo Mashinostroenie, 1983, 312 p In Russian refs

The fundamentals of robotics are reviewed, and the principal design and performance characteristics of various industrial robots manufactured in the USSR are presented. Systems for the programmed control of industrial robots are briefly characterized. Attention is given to the kinematic analysis of manipulator mechanisms, the dynamic modeling of robots, the structural and kinematic synthesis of manipulators, and the dynamic synthesis of robots. Finally, the design and manufacture of hydraulic, pneumatic, and electromechanical robots are discussed.

A84-12293

MOMENT-METHOD SOLUTIONS AND SAR CALCULATIONS FOR INHOMOGENEOUS MODELS OF MAN WITH LARGE NUMBER OF CELLS

J F DEFORD, O P GANDHI (Utah, University, Salt Lake City, UT), and M J HAGMANN (National Institutes of Health, Bethesda, MD) IEEE Transactions on Microwave Theory and Techniques (ISSN 0018-9480), vol MTT-31, Oct 1983, p 848-851 refs (Contract NIH-ES-02304)

An iterative band approximation method (BAM) that is useful for solving large matrix equations where the elements of the matrix decrease in magnitude with increasing distance from the diagonal is described Inversion of a band about the diagonal is used to obtain a first estimate of the solution. This estimate, along with the remaining elements in the matrix above and below the band, is used to iterate to the final solution. The method is applied to the solution of full complex matrix equations involving up to 1698 unknowns BAM is used to obtain distributions of electromagnetic energy absorption for man models with 180-1132 cells.

N84-10760# Army Aeromedical Research Lab, Fort Rucker, Ala Biodynamics Research Div

IMPACT AND VIBRATION TESTING OF A MODIFIED UH-1 CREW SEAT Final Report

D F SHANAHAN, J L HALEY, J C JOHNSON, J H WELLS, and H KNOCHE (German Air Force, Bonn) Jun 1983 85 p

(Contract DA PROJ 3E1-62777-A-878)

(AD-A130279, USAARL-83-10) Avail NTIS HC A05/MF A01 CSCL 01C

The German Air Force has developed a modified UH-1 pilot seat designed to improve comfort by increasing support to the thigh and lower back, providing better vibration dampening and increasing cold weather comfort. This seat was tested for vibration dampening, pilot acceptance, and impact tolerance in a side-by-side test with the standard UH-1 seat. The modified seat is more comfortable than the standard UH-1 seat. The modified seat provides better impact protection than the standard seat, provided that the seat frame and restraint system do not tear loose. The modified seat does not provide better vibration dampening than the standard UH-1 seat.

Author (GRA)

N84-10761# Naval Coastal Systems Lab , Panama City, Fla DESIGN GUIDELINES FOR CARBON DIOXIDE SCRUBBERS
M L NUCKOLS, A PURER, and G A DEASON May 1983
72 p refs

(AD-A130459, NCSC-TECH-MAN-4110-1-83) Avail NTIS HC A04/MF A01 CSCL 06K

Design data and guidelines are presented to help predict the performance of axial flow carbon dioxide canister designs using alkali metal hydroxide absorbers. The design data are derived from a large series of laboratory tests conducted at the Naval Coastal Systems Center to isolate the effects of environmental and geometric parameters on canister absorption efficiency Sample canister designs are considered to demonstrate the use of the derived data to predict effective canister life and pressure drop levels. Alternative techniques for the sorption of carbon dioxide are also reviewed.

N84-10762# Naval Coastal Systems Center, Panama City, Fla DEVELOPMENT OF PASSIVE DIVER THERMAL PROTECTION SYSTEM

M W LIPPITT, JR and M I NUCKOLS May 1983 65 p refs (AD-A130685, NCSC-TM-378-83) Avail NTIS HC A04/MF A01 CSCL 06Q

The development of the US Navy Passive Diver Thermal protection system, designed to satisfy a majority of the air mode thermal protection requirements of fleet diving activities in cold water, is described. The requirements, the evolution of system design, the development and test of the various prototypes, and the system operational and performance evaluations are discussed. The final system demonstrated its ability to maintain a resting diver within acceptable thermal limits for 6 hours in 4.5 degrees C water. The protection system allows sufficient mobility to allow the diver to engage in typical special warfare activities such as helicopter cast and recovery, parachuting, boat cast and recovery, and long surface and underwater swims.

N84-10763# Air Force Wright Aeronautical Labs, Wright-Patterson AFB, Ohio Control Dynamics Branch PROCEEDINGS OF THE 18TH ANNUAL CONFERENCE ON MANUAL CONTROL Interim Report

F L GEORGE Jan 1983 568~p refs Conf held at Dayton, Ohio, 8-10 Jun 1982

(Contract AF PROJ 9991)

(AD-A131256, AFWAL-TR-83-3021) Avail NTIS HC A24/MF A01 CSCL 05H

This volume contains proceedings of the Eighteenth Annual Conference on Manual Control, held at Dayton, Ohio, June 8-10, 1982 These proceedings contain 43 of the 45 Conference papers, either as abstracts or complete manuscripts Topics covered include control and controller design, analysis and definition of display requirements, and integration of control and display considerations

N84-10764# Oak Ridge National Lab, Tenn INTERCOMPARISON OF STABLE-ELEMENT CONTENT OF FOODS BY STATISTICAL METHODS

H M BRAUNSTEIN, D J. PACK, and T W OAKES 1982 20 p refs Presented at the 16th Ann Conf on Trace Substance in Environ Health, Columbia, Mo , 31 May 1982 (Contract W-7405-ENG-26)

(DE83-014029, CONF-8205201-2) Avail NTIS HC A02/MF A01
The concentrations of 40 elements, which were determined in each of 87 foods from 3 sources and in 7 food groups, were analyzed statistically to develop a basis for intercomparing the foods Mean values of the elemental concentrations are given for each food group and for each source. The possibility of ingerprinting a food by examining the distribution of elements in it is explored by using a clustering procedure to isolate groups of foods that have similar ranking patterns. The source of a food as well as the extent of processing has a strong influence on its clustering pattern.

N84-11339# Joint Publications Research Service, Arlington, Va REPORT ON DEVELOPMENT, INSTALLATION OF INDUSTRIAL ROBOTS

K KRAKAT *In its* East Europe Rept Sci Affairs, no 789 (JPRS-84426) p 9-24 28 Sep 1983 refs Transl into ENGLISH from FS Analysen (West Germany), no 1, Avail NTIS HC A03 1981 p 1-23

Different attitudes towards the utilization of industrial robots efficiency in the GDR economy, rationalization solutions to overcome bottle necks and defects, industrial robots for taking over certain working processes, characteristics figures and criteria for the useful economic effect of industrial robots, long term planning objectives, the current use of industrial robots and products of robot technology and their manufacturers

N84-11696# Joint Publications Research Service, Arlington, Va AIRCRAFT CREW DIET IN EMERGENCY SITUATIONS

I G POPOV *In its* USSR Rept. Space Biol and Aerospace Med, V 17, No 5, Sep-Oct 1983 p 16-31 1 Nov 1983 refs Transl into ENGLISH from Kosmich Biol i Aviakosmich Med (Moscow), v 17, no 5, Sep-Oct 1983 p 12-24 Avail NTIS HC A08

The problems of emergency rations for flight crews are surveyed. Limitations to providing adequate nutrition and water supply in emergency situations that meet the pilot's nutritional requirements are discussed. Methods of providing nutrition, maintaining metabolism and work capacity under the conditions of food and water shortage, and avoiding starvation and dehydration of the body are discussed.

N84-11709# Joint Publications Research Service, Arlington, Va PHYSIOLOGICAL AND ECOLOGICAL CHARACTERISTICS OF THE WATER FERN, AZOLLA PINNATA, AND PROSPECTS OF USING IT IN BIOLOGICAL LIFE-SUPPORT SYSTEM FOR MAN Y Y SHEPELEV, N THYOK, G I MELESHKO, A A ANTONYAN, T B GALKINA, and V P NAYDINA In its USSR Rept Space Biol and Aerospace Med, V 17, No 5, Sep -Oct 1983 p 96-101 Nov 1983 refs Transl into ENGLISH from Kosmich Biol i Aviakosmich Med (Moscow), v 17, no 5, Sep -Oct 1983 p 66-69

Avail NTIS HC A08

The principal physiological and ecological characteristics of Azolla prinata were investigated in order to determine its potential use in biological life support systems. Plant requirements for biogenic elements were specified in order to develop balanced nutrient, mixtures for continuous cultivation. Data on the growth and development, photosynthetic and nitrogen fixation rate, and biochemical composition of the plant were obtained for optimal cultivation conditions. The plant biomass contains large quantities of carotenoids and sulfur-containing amino acids, which are deficient in unicellular algae. This makes Azolla an attractive source of the above compounds for biological life support systems and other applications.

N84-11718# Joint Publications Research Service, Arlington, Va METHOD FOR IDENTIFYING TRACE CONTAMINANTS IN CHAMBER ATMOSPHERE AT HIGH PRESSURE

B L AVETISYANTS, O A SUKHORUKOV, O N SKALATSKIY, and L B ZHUKOVA *In its* USSR Rept Space Biol and Aerospace Med, V 17, No 5, Sep-Oct 1983 p 138-141 1 Nov 1983 refs Transl into ENGLISH from Kosmich Biol i Aviakosmich Med (Moscow), v 17, no 5, Sep-Oct 1983 p 90-91

Avail NTIS HC A08

Methods for collection, concentration, and chromatographic analysis of trace contaminants in an artificial atmosphere at elevated pressure are described. Three different methods are used to collect and concentrate trace contaminants from the atmosphere at the working pressure in the chamber: system of cryogenic traps cooled by liquid air; passing samples through adsorption traps, use of adsorption traps without pumping (with diffusion delivery of substances to be analyzed).

N84-11758* National Aeronautics and Space Administration Lyndon B Johnson Space Center, Houston, Tex ABSORBENT PRODUCT AND ARTICLES MADE THEREFROM Patent

F S DAWN and J V CORREALE, inventors (to NASA) 25 Oct 1983 5 p Filed 14 Apr 1982 Supersedes N82-26960 (20-17, p 2450) Division of US Patent-4,338,371, Patent Appl-SN-219681, filed 24 Dec 1981 Sponsored by NASA (NASA-CASE-MSC-18223-2, US-PATENT-4,411,660, US-PATENT-4,338,371, US-PATENT-APPL-SN-368187, US-PATENT-4,338,371, US-PATENT-APPL-SN-368187, US-PATENT-CLASS-604-396, US-PATENT-CLASS-604-378, US-PATENT-CLASS-604-368) Avail US Patent and Trademark Office CSCL 06K

A multilayer absorbent product for use in contact with the skin to absorb fluids is described. The product has a water pervious facing layer for contacting the skin, and a first fibrous wicking layer overlaying the water pervious layer. A first container section is defined by inner and outer layers of a water pervious wicking material in between a first absorbent mass and a second container section defined by inner and outer layers of a water pervious wicking material between what is disposed a second absorbent mass, and a liquid impermeable/gas permeable layer overlaying the second fibrous wicking layer.

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

N84-11759 Prins Maurits Lab TNO, Rijswijk (Netherlands)
RESULTS AND INTERPRETATION OF LABOR-HYGIENIC
STUDIES IN THE PAINTSHOP OF THE JET ENGINE DEPOT
OF THE WOENSDRECHT AIRBASE [RESULTATEN EN
INTERPRETATIVE VAN ARBEIDSHGIENISCH ONDERZOEK
VERRICHT IN DE SCHILDERSWERKPLAATS VAN HET DEPOT
STRAALMOTOREN TEVENS VLIEGBASIS WOENSDRECHT]

J KAAIJK and F OESEBURG Nov 1982 19 p refs In DUTCH, ENGLISH summary (Contract A78/KLU/065)

(PML-1982-54, TDCK-77638) Avail Issuing Activity

A paintshop atmosphere was analyzed for health hazardous organic gases and dust. The concentrations of the identified organic compounds are far below the Dutch Hygienic Standards (MAL-valves). The concentration of total dust is of the order of the MAL value. The protection given by the respirators used by the personnel during the work is found to be insufficient.

Author (ESA)

N84-11760*# National Aeronautics and Space Administration Ames Research Center, Moffett Field, Calif

COMPOSITION AND ANALYSIS OF A MODEL WASTE FOR A CELSS (CONTROLLED ECOLOGICAL LIFE SUPPORT SYSTEM)

T WYDEVEN Sep 1983 13 p refs (NASA-TM-84368, A-9350, NAS 1 15 84368, CELSS-24) Avail NTIS HC A02/MF A01 CSCL 06K

A model waste based on a modest vegetarian diet is given, including composition and elemental analysis. Its use is recommended for evaluation of candidate waste treatment processes for a Controlled Ecological Life Support System (CELSS)

N84-11761*# National Aeronautics and Space Administration Marshall Space Flight Center, Huntsville, Ala

SELF-LOCKING TELESCOPING MANIPULATOR ARM Patent Application

M F NESMITH, inventor (to NASA) 30 Sep 1983 14 p (NASA-CASE-MFS-25906-1, US-PATENT-APPL-SN-537757) Avail NTIS HC A02/MF A01 CSCL 05H

A telescoping manipulator arm and pivotable finger assembly are disclosed. The telescoping arm assembly includes a generally T-shaped arm having three outwardly extending fingers guided on the grooved roller guides to compensate for environmental variations. The pivotable finger assembly includes four pivoting fingers. Arcuate teeth are formed on the ends of the fingers. A rack having teeth on four sides meshes with each one of the fingers. One surface of the rack includes teeth along its entire

surface which mesh with teeth of the finger. The teeth at the remote end of the rack engage teeth of a gear wheel NASA

N84-11762# Naval Ship Research and Development Center, Bethesda, Md

A SURVEY OF ROBOTIC TECHNOLOGY

G CASTORE Jul 1983 79 p refs

(AD-A130999, DTNSRDC-83/053) Avail NTIS HC A05/MF A01 CSCL 13I

Robotic Technology is surveyed as a prelude to examination of its use in Naval Air Maintenance tasks. Topics include Robot Classification schemes, programming techniques, power systems, manipulators, control systems, sensors, and end effectors. In this survey, a robot is defined as a machine with three components a multifunctional manipulator to move objects and tools, a controller to store data and direct the manipulator, a power system for the manipulator.

N84-11763# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho

METHOD FOR EVALUATING OPERATOR INPUTS TO DIGITAL CONTROLLERS

J R VEHNUIZEN 1983 6 p refs Presented at the 29th Intern Symp of the Instrument Soc of Am , Albuquerque, N Mex , 2-6 May 1983

(Contract DE-AC07-76ID-01570)

(DE83-013521, EGG-M-17882, CONF-830518-5) Avail NTIS HC A02/MF A01

Most industrial processes employ operator-interactive control systems. The performance of these control systems is influenced by the choice of control station (device through which operator enters control commands). While the importance of proper control station selection is widely accepted, standard and simple selection methods are not available for the control station using color graphics terminals. A facility for evaluating the effectiveness of various control stations is described. In the facility, a process is simulated on a hybrid computer, color graphics display terminals provide information to the operator, and different control stations accept input commands to control the simulation. Tests are being conducted to evaluate a keyboard, a graphics tablet, and a CRT touch pane for use as control stations on a nuclear power plant. Preliminary results indicate that the facility can be used to determine those situations where each type of station is advantageous.

DOE

N84-11764# Sandia Labs, Albuquerque, N Mex AN APPROACH TO MODELING OF HUMAN PERFORMANCE FOR PURPOSES OF PROBABILISTIC RISK ASSESSMENT

A D SWAIN 1983 29 p refs Presented at the NATO Human Factors Meeting on the Theory and Nature of Human Error, Bellagio, Italy, 5-10 Sep 1983

(Contract DE-AC04-76DP-00789)

(DE83-009292, SAND-83-0447C, CONF-830902-1) Avail NTIS HC A03/MF A01

The general approach taken in NUREG/CR-1278 to model human performance in sufficient detail to permit probabilistic risk assessments of nuclear power plant operations is described. To show the basis for the more specific models in the above NUREG, a simplified model of the human component in man-machine systems is presented, the role of performance shaping factors is discussed, and special problems in modeling the cognitive aspect of behavior are described.

N84-11765# Institute for Perception RVO-TNO, Soesterberg (Netherlands) Afd Audiologie

TECHNIQUE FOR MEASURING THE SOUND PRESSURE LEVELS UNDER FLYING HELMETS AND HEADSETS

A M MIMPEN and G F SMOORENBURG Dec 1982 25 p refs In DUTCH, ENGLISH summary (Contract A80/K/112)

(IZF-1982-39, TDCK-77630) Avail NTIS HC A02/MF A01

A measuring technique was developed to determine the equivalent sound pressure levels under flying helmets and

headsets Subjectively these sound levels are qualified as very high and potentially damaging for the ear. A miniature electret microphone placed near the entrance of the ear canal of subjects in the laboratory measured the frequency characteristic, corresponding to the chosen microphone position. It is shown that only the difference between the frequency characteristics of the electret microphone and the standard microphone of the noise dose meter is important. A frequency dependent correction for the position of the electret microphone near the ear canal is not required However, this is true only if helmets or headsets are used Additional corrections are required for the unprotected ear A preliminary measurement in an Alouette 3 helicopter shows in the cockpit a level of 96 dB(A), an Leq = 85 dB(A) under the helmet without speech and an Leq of about 95 dB(A) with communication speech. Author (ESA)

55

PLANETARY BIOLOGY

Includes exobiology, and extraterrestnal life

A84-10655* National Aeronautics and Space Administration Ames Research Center, Moffett Field, Calif

SIMULATION OF VIKING BIOLOGY EXPERIMENTS SUGGESTS SMECTITES NOT PALAGONITES, AS MARTIAN SOIL ANALOGUES

A BANIN (NASA, Ames Research Center, Moffett Field, CA, Jerusalem, Hebrew University, Rehovot, Israel) and L MARGULIES (Jerusalem, Hebrew University, Rehovot, Israel) Nature (ISSN 0028-0836), vol 305, Oct 6, 1983, p. 523-525 refs (Contract NSG-7512)

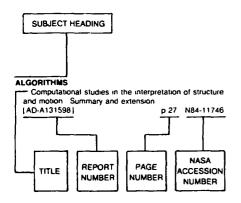
An experimental comparison of palagonites and a smectite (montmorillonite) was performed in a simulation of the Viking Biology Labelled Release (LR) experiment in order to judge which mineral is a better Mars soil analog material (MarSAM) Samples of palagonite were obtained from cold weathering environments and volcanic soil, and the smectite was extracted from Wyoming Bentonite and converted to H or Fe types Decomposition reaction kinetics were examined in the LR simulation, which on the Lander involved interaction of the martian soil with organic compounds Reflectance spectroscopy indicated that smectites bearing Fe(III) in well-crystallized sites are not good MarSAMS. The palagonites did not cause the formate decomposition and C-14 emission detected in the LR, indicating that palagonites are also not good MarSAMS. Smectites, however, may be responsible for ion exchange, molecular adsorption, and catalysis in martian soil

MSK

AEROSPACE MEDICINE AND BIOLOGY / A Continuing Bibliography (Supplement 255)

FEBRUARY 1984

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

ABDOMEN

Prediction of vomiting in dogs exposed to radiation with p 11 N84-11710 shielding of midabdomen

ABSORBENTS

Absorbent product and articles made therefrom [NASA-CASE-MSC-18223-2] p 40 N84-11758

ACCELERATION STRESSES (PHYSIOLOGY) Inflight loss of consciousness

p 15 A84-10739 A hydrenic evaluation of elevated dynamic loads on passengers in urban transport vehicles

p 19 A84-11569

ACCELERATION TOLERANCE

Hemodynamic reactions to positive intrathoracic pressure at +G sub z accelerations p 25 N84-11698 Energy metalbolism enzymes in simulation of some spaceflight factors p 26 N84-11704

ACCURACY

Evaluation of a draft standard on performance specifications for health physics instrumentation

p 28 N84-11750 [DE83-0161861 Accuracy of external personnel dosimetry systems in

nixed neutron and gamma radiation fields p 28 N84-11751 [DE83-0157121

ACID BASE EQUILIBRIUM

Metabolic acids and H(+) regulation in brain tissue during acclimatization to chronic hypoxia

p.9 A84-12659

ACOUSTIC MEASUREMENT

Technique for measuring the sound pressure levels under flying helmets and headsets

p 40 N84-11765 [IZF-1982-39]

ACTIVATED SLUDGE

Hygienic microbiological/virological examination of an airwasher concerning the emission of airborne microorganisms [BMFT-FB-T-83-130] p 14 N84-11742

ACTIVITY (BIOLOGY)

Regulatory functions of actin in the cell p 5 A84-11349

ADENOSINE TRIPHOSPHATE

Calcium modulation of plant plasma membrane-bound ATPase activities p 12 N84-11723

ADIPOSE TISSUES

Adrenergic activation of triodothyronine production in brown adipose tissue AR4-11268 A survey of body fat content of US Navy male

p 23 N84-10736 FAD-A1315001

ADRENAL GLAND

Exterionzation of the effect of hyperthermia by observing the sympathoadrenal activity in subjects under psychoemotional stress p 18 A84-11555 Morphometric study of rat adrenal medulla during p 10 N84-11705 long-term hypokinesia

ADRENOCORTICOTROPIN (ACTH)

Plasma adrenocorticotropin and cortisol responses to submaximal and exhaustive exercise p 21 A84-12656 **AEROSPACE ENVIRONMENTS**

Biofeedback monitoring-devices for astronauts in space p 37 A84-12025

AEROSPACE MEDICINE

Study and development activities of Dornier System on space biology/medicine equipment and payloads for Spacelab and freeflying platform application

p 37 A84-11757 [IAF PAPER 83-183] General results of medical investigations in Salyut-6 manned space flights

[IAF PAPER 83-202] p 20 A84-11761 Transdermal scopolamine in the prevention of motion

sickness Evaluation of the time course of efficacy p 20 A84-12061

Cardiovascular examinations and observations of deconditioning during the Space Shuttle orbital flight test program p 20 A84-12062

Diaphragmatic rupture during G-maneuvers in a T33 jet p 20 A84-12069 trainer

USSR report Space Biology and Aerospace Medicine, volume 17, no 5, September October 1983 [JPRS-84655] p 10 N84-11693

Programmatic comments p 13 N84-11732

AGE FACTOR

Effect of physical training on myocardial enzyme activities in aging rats p 2 A84-10288 Economical regimes of running for athletes of different p 18 A84-11552 ages in a hot climate A quantitative evaluation of various cardiac regions in

young and old white rats p 5 A84-11558 Age-related responses to mild restraint in the rat p 8 A84-12654

AIR POLLUTION

External respiration in electric welders

p 19 A84-11571 The design and operation of systems for inhalation exposure of animals

p 10 N84-10727 [DE83-015388] Recent advances in EPA's (Environmental Prog

monitoring and methods development research p 24 N84-10743

Probabilistic model for assessing contaminant levels

p 24 N84-10745 [PB83-2321081 Bioassay of particulate organic matter from ambient

[PB83-239731] p 29 N84-11754 Results and interpretation of labor-hygienic studies in

the paintshop of the jet engine depot of the Woensdrecht authase [PML-1982-54] p 40 N84-11759

AIR PURIFICATION

Hygienic microbiological/virological examination of an airwasher concerning the emission of airborne microorganisms [BMFT-FB-T-83-130] p 14 N84-11742

AIR QUALITY

An evaluation of the bacterial environment on motor p 6 A84-11575

AIR SAMPLING

An evaluation of the bacterial environment on motor buses p 6 A84-11575

AIR TO AIR MISSILES

An application of signal detection theory to air combat p 29 A84-10972 training

AIR TRAFFIC CONTROLLERS (PERSONNEL)

Indicators of catecholamine metabolism hemodynamics in air traffic controllers with neurocirculatory dystonia of the hyper tension type p 19 A84-11568

AIRBORNE EQUIPMENT

Naval aviation on-board oxygen generation system 1982 p 35 A84-10736

AIRBORNE/SPACEBORNE COMPUTERS

A voice interactive system for aiding and documentation space-based tasks p 33 A84-10025 [AIAA PAPER 83-2355] Manned spaceflight planning activity with knowledge-based systems [AIAA PAPER 83-2374] p 33 A84-10035

AIRCRAFT EQUIPMENT

A cockpit and equipment integration laboratory

p 35 A84-10734 Naval aviation solid chemical oxygen emergency system p 36 A84-10737 Impact and vibration testing of a modified UH-1 crew

seat p 38 N84-10760 [AD-A130279]

AIRCRAFT MAINTENANCE

A survey of robotic technology [AD-A130999]

p 40 N84-11762 AIRCRAFT PILOTS

p 15 A84-10739 Inflight loss of consciousness AIRCRAFT SAFETY

The F-16 on board oxygen generation system

(OBOGS) p 34 A84-10712 The USAFSAM advanced oxygen system concept

p 34 A84-10713

In search of - An acceptable lap belt

p 34 A84-10716 Improving restraint systems capabilit ties in older egres

p 34 A84-10717 systems **ALGORITHMS**

Computational studies in the interpretation of structure

and motion. Summary and extension FAD-A1315981 p 27 N84-11746 ALTITUDE ACCLIMATIZATION

Renin, angiotensin-converting enzyme, and aldosterone p 14 A84-10279 in humans on Mount Everest Cardiorespiratory response to ex-repeatedly exposed to extreme altitude exercise in men

p 21 A84-12651 Metabolic acids and H(+) regulation in brain tissue during acclimatization to chronic hypoxia p 9 A84-12659

ALTITUDE SICKNESS

Prevention of acute mountain sickness by dexamethasone [AD-A131533] p 23 N84-10737

AMINO ACIDS

Changes in the amino acid contents of saliva and unne in oil and gas drillers p 19 A84-11573

Free amino acids of blood before and after short-term p 26 N84-11702 spaceflights Effect of hypokinesia on amino acid metabolism in rats

on diets differing in calcium and phosphorus content p 11 N84-11707

AMPHIBIA

Polanty of the amphibian egg p 12 N84-11731 AMPLITUDES Founer-processed images of dynamic lung function from

list-mode data [DE83-013276] p 24 N84-10741 ANALOGIES

Metaphor and common-sense reasoning

[AD-A131423] p 32 N84-11756

ANALYSIS (MATHEMATICS) Neurocognitive pattern analysis

[AD-A131302] p 24 N84-10740

circulation and circulation in the extremities during active orthostatic test p 26 N84-11700

Effect of redistribution of blood on seventy of spatial existion illusions in weightlessness p 26 N84-11701

position illusions in weightlessness

ANALYZERS	Bioassay of particulate organic matter from ambient	The effect of a constant magnetic field on the processes
Efficiency of high-frequency ventilation as determined by nitrogen washouts. A model study	air [PB83-239731] p 29 N84-11754	of peroxide oxidation of lipids in phospholipid membranes p 8 A84-12570
[AD-A131331] p 27 N84-11745	BIOASTRONAUTICS	Personal exposure to volatile organics and other
ANESTHESIA	Human physiology research under microgravity	compounds indoors and outdoors. The TEAM (Total
Pharmacokinetics of pentobarbital under hyperbaric and	conditions and the proposed 'anthrorack' facility	Exposure Assessment Methodology) study
hyperbaric hyperoxic conditions in the dog p 6 A84-12063	p 15 A84-10397 The frog-statolith-experiment (STATEX) of the German	[PB83-231357] p 24 N84-10744 Radiofrequency radiation exposure for bio-effects
ANGULAR ACCELERATION	Spacelab mission D1 - Scientific background and technical	research at the Health Effects Research Laboratory,
Displacement of liquid in a model of semicircular canals	description	Research Triangle Park, North Carolina
under the effect of angular accelerations in	[IAF PAPER 83-184] p 6 A84-11758	[PB83-229591] p 25 N84-10747 Registry of toxic effects of chemical substances User's
weightlessness p 18 A84-11350 ANIMALS	Oxygen regimen in the human peripheral tissue during space flights	guide to the RTECS computer tape
The design and operation of systems for inhalation	[IAF PAPER 83-197] p 19 A84-11760	[PB83-223172] p 25 N84-10748
exposure of animals	General results of medical investigations in Salyut-6	Direct biological effects of increased atmospheric
[DE83-015388] p 10 N84-10727 The relevance of experimental animal studies to the	manned space flights [IAF PAPER 83-202] p 20 A84-11761	carbon dioxide levels [PB83-224360] p 25 N84-10749
human experience	Biofeedback monitoring-devices for astronauts in space	Concepts of dose to soft tissue at the cellular level
[DE83-014053] p 10 N84-10729	environment p 37 A84-12025	[DE83-013830] p 28 N84-11748
Influence of nitrogen dioxide on xenobiotic metabolism in animals	BIOCHEMICAL OXYGEN DEMAND	Accuracy of external personnel dosimetry systems in mixed neutron and gamma radiation fields
[PB83-239723] p 14 N84-11743	In vivo comparison of cytochrome aa3 redox state and tissue PO2 in transient anoxia p 1 A84-10276	[DE83-015712] p 28 N84-11751
ANOXIA	BIOCHEMISTRY	BIOLOGICAL EVOLUTION
In vivo comparison of cytochrome aa3 redox state and tissue PO2 in transient anoxia p 1 A84-10276	The fractionation of plasma proteins in large scale	Local calcium entry and the guidance of growth p 12 N84-11726
ANTHROPOMETRY	preparations of blood Russian book p 3 A84-10492	BIOLOGICAL MODELS (MATHEMATICS)
U.S. Navy ejectee anthropometry - 1 January 1969	Biochemical criteria for evaluating cardiotoxic effects	Level of arterial pressure and vegetative cardiac
through 31 December 1979 p 16 A84-10742	p 5 A84-11567	regulation during the simulation of intense operator
APPROXIMATION Ultrasound tomography by Galerkin or moment	Biochemical mechanisms of stress Russian book p 7 A84-12156	activity p 16 A84-11327 Displacement of liquid in a model of semicircular canals
methods	The effect of a constant magnetic field on the processes	under the effect of angular accelerations in
[AD-A131408] p 28 N84-11747	of peroxide oxidation of lipids in phospholipid	weightlessness p 18 A84-11350
AQUICULTURE Aquaculture techniques A production forecasting model	membranes p 8 A84-12570	Sufficient conditions for the asymptotic stability of a homeostat for operator group activity simulation
for aquaculture systems	Evidence for a regulatory role of calcium in gravitropism p 11 N84-11721	p 38 A84-12110
[PB83-221713] p 10 N84-10730	Intracellular calcium receptors Calmodulin and related	Moment-method solutions and SAR calculations for
ARCTIC REGIONS Down in the Arctic - Equipment and training for	proteins p 12 N84-11724	inhomogeneous models of man with large number of cells Specific Absorption Rate of human body
survival p 35 A84-10726	BIOCONTROL SYSTEMS Principles of the physiology of functional systems	p 38 A84-12293
Heat-transfer characteristics of port workers in the	Russian book p 3 A84-10487	BIOLOGY
Arctic p 19 A84-11572 ARM (ANATOMY)	BIODYNAMICS	Conference on Ultrasonics in Biology and Medicine, UBIOMED 6 Report summaries
Dynamics of rheographic parameters of cerebral	Computer analysis in helmet design for biodynamic response of head to impact p 33 A84-10710	[ISSN-0208-5658] p 9 N84-10723
circulation and circulation in the extremities during active	Economical regimes of running for athletes of different	BIOLUMINESCENCE
orthostatic test p 26 N84-11700	ages in a hot climate p 18 A84-11552	The role of metals in free radical oxidation processes
ARMED FORCES (UNITED STATES) A survey of body fat content of U.S. Navy male	Motor units of human skeletal muscles Russian book p 21 A84-12158	in the tissues of organisms according to data of spontaneous and initiated chemiluminescence
personnel	The effect of mechanical conditions on chronoinotropy	p 2 A84-10483
[AD-A131500] p 23 N84-10736	of the myocardium p 8 A84-12572	Spontaneous biochemiluminescence of mitochondria of
ARRHYTHMIA Predicting ventricular arrythmia of the heart in patients	Simulation of cerebrocranial trauma for evaluation and development of gear to protect pilots against impacts	several tissues in normal conditions and during the action of physical factors p 2 A84-10484
with myocardial infarction p 18 A84-11564	p 25 N84-11695	BIOMETRICS
ARTIFICIAL INTELLIGENCE	BIOELECTRIC POTENTIAL	Cardiovascular examinations and observations of
Manned spaceflight activity planning with knowledge-based systems	Dependence of the time of recognition of significant optical stimuli on the features characterizing the	deconditioning during the Space Shuttle orbital flight test program p 20 A84-12062
[AIAA PAPER 83-2374] p 33 A84-10035	space-time organization of brain bipotentials	Evaluation of skeletal muscle tone by recording lateral
A system for intelligent teleoperation research	p 17 A84-11336	ngidity p 27 N84-11717
[AIAA PAPER 83-2376] p 33 A84-10070 Representation in memory	Generation of electric potentials on mitochondrial membranes during the hydrolysis of inorganic	*BIONICS Principles of the physiology of functional systems
[AD-A130662] p 32 N84-10757	pyrophosphate p 5 A84-11366	Russian book p 3 A84-10487
ASTRONAUT PERFORMANCE	The destruction of a bilayer lipid membrane as a result	BIOPHYSICS
Biofeedback monitoring-devices for astronauts in space environment p 37 A84-12025	of electrical breakdown p 7 A84-12568 The hormonal regulation of calcium channels of cardiac	Physical methods of treatment in neurology Russian book p 15 A84-10488
ATMOSPHERIC COMPOSITION	membranes p 8 A84-12571	Pseudo-critical heat capacity of single lipid bilayers
Direct biological effects of increased atmospheric	BIOELECTRICITY	p 4 A84-11115
carbon dioxide levels [PB83-224360] p 25 N84-10749	Hyperventilation as a method for detecting disorders of atnoventricular conductivity in athletes	Rheoencephalography - Biophysical foundations, information content, and limits of application
AUDITORY PERCEPTION	p 18 A84-11562	p 5 A84-11326
Distribution of individual indices of the subjective evaluation of loudness p 30 A84-11337	A hygienic evaluation of elevated dynamic loads on	BIOSPHERE
evaluation of loudness p 30 A84-11337 AUTOMATIC CONTROL	passengers in urban transport vehicles p 19 A84-11569	Direct biological effects of increased atmospheric carbon dioxide levels
Industrial robots and their applications - Robotics for	BIOENGINEERING	[PB83-224360] p 25 N84-10749
machine building (2nd revised and enlarged edition) Russian book p 38 A84-12181	Prosthetic occlusive device for an internal	BIOSYNTHESIS
Russian book p 38 A84-12181 Method for evaluating operator inputs to digital	passageway [NASA-CASE-MFS-25740-1] p 27 N84-11744	The growth of paracoccus halodenitrificans in a defined medium
controllers	BIOFEEDBACK	[NASA-TM-84411] p 9 N84-10724
[DE83-013521] p 40 N84-11763 AUTONOMIC NERVOUS SYSTEM	Biofeedback monitoring-devices for astronauts in space	BLACKOUT (PHYSIOLOGY)
The physiology of the vegetative nervous system	environment p 37 A84-12025 BIOINSTRUMENTATION	Inflight loss of consciousness p 15 A84-10739 BLOOD
Russian book p 3 A84-10489	Rhecencephalography - Biophysical foundations,	Changes in blood urea content under hypokinetic
-	information content, and limits of application	conditions p 26 N84-11703
В	p 5 A84-11326 Study and development activities of Dornier System on	BLOOD CIRCULATION
B-52 AIRCRAFT	space biology/medicine equipment and payloads for	The use of functional rheovasography for the examination of athletes with circulatory disorders in lower
Companion trainer aircraft Concept test	Spacelab and freeflying platform application	extremities p 18 A84-11551
[AD-A131378] p 32 N84-11757	[IAF PAPER 83-183] p 37 A84-11757 BIOLOGICAL EFFECTS	The effect of ischemia and postischemic restoration of
BACTERIA	Respective role of microgravity and cosmic rays on	blood circulation on the ultrastructure of the neurons
Microbial fouling and its effect on power generation [AD-A131084] p 10 N84-10726	paramecium tetraurelia cultured aboard Salyut 6	p 5 A84-11556 The microcirculatory bed of the liver according to data
BINOCULAR VISION	[IAF PAPER 83-186] p 6 A84-11759 Diaphragmatic rupture during G-maneuvers in a T33 jet	of scanning electron microscopy p 5 A84-11560
The eye and light Russian book p 38 A84-12127	trainer p 20 A84-12069	Dynamics of rheographic parameters of cerebral

and treatment

of electrical breakdown

Fetal development - Effects of decompression sickness

The destruction of a bilayer lipid membrane as a result felectrical breakdown p 7 A84-12568

p 7 A84-12070

BIOASSAY

Evaluation of motor vehicle and other combustion

emissions using short-term genetic bioassays [PB83-233270] p 10 N84-10731

BLOOD FLOW

Influence of training on blood flow to different skeletal muscle fiber types p 1 A84-10278 Regional distribution of blood flow during mild dynamic leg exercise in the baboon p 2 A84-10283

BLOOD PLASMA

The fractionation of plasma proteins in large scale preparations of blood --- Russian book

p 3 A84-10492

The effect of diuretics on the concentration of calcium in blood serum and its excretion with the unne

p 18 A84-11563

Plasma adrenocorticotropin and cortisol responses to submaximal and exhaustive exercise p 21 A84-12656 Free amino acids of blood before and after short-term spaceflights p 26 N84-11702

BLOOD PRESSURE

Level of arterial pressure and vegetative cardiac regulation during the simulation of intense operator activity p 16 A84-11327

Rhythmoinotropic phenomena in the human heart p 16 A84-11329

Hemodynamic reactions to positive intrathoracic pressure at +G sub z accelerations p 25 N84-11698 BLOOD VESSELS

Demonstration of gas bubbles in canine pulmonary artery and aorta by means of ultrasonic echography with intravenous air infusion p 11 N84-11708

BODY COMPOSITION (BIOLOGY)

Morphofunctional correlations as exemplified by the relationships between the cardiovascular system and the physique p 17 A84-11342

BODY SIZE (BIOLOGY)

Morphofunctional correlations as exemplified by the relationships between the cardiovascular system and the physique p 17 A84-11342

BODY TEMPERATURE

Human body temperature - Its measurement and regulation p 16 A84-11017

Thermoregulation in Erythrocebus patas - A thermal balance study p 9 A84-12663

BODY VOLUME (BIOLOGY)

Morphofunctional correlations as exemplified by the relationships between the cardiovascular system and the physique p 17 A84-11342

RODY WEIGHT

ODY WEIGHT

A survey of body fat content of U.S. Navy male personnel

[AD-A131500] p 23 N84-10736 Effect of eleuterococcus extract on recovery processes in rats following seven-day hypokinesia

p 11 N84-11706

Bone and calcium alterations during spaceflight p 12 N84-11729

BONES

Summary of study group session discussions

p 13 N84-11739

The seasonal characteristics of the effect of low temperature on the activity of brain monamine oxidase

and the sensitivity of rats to hyperoxia p 4 A84-10846
Protein phosphorylation in the brain p 4 A84-11253
Neuron correlates of the recognition of visual stimuli. I
Dynamics of the means and vanances of the current
discharge frequency of neuron populations of the human
brain in tests involving visual-stimulus recognition. II
Investigation of space-time correlations between current
frequencies of the impulse activity of neuron populations
of the human brain during the recognition of visual
stimuli.

The Golgi-Hortega-Lavilla technique, with a useful additional step for application to brain tissue after prolonged fixation p 7 A84-12274

Metabolic acids and H(+) regulation in brain tissue during acclimatization to chronic hypoxia

p 9 A84-12659
Stability of rat brain glutamine synthetase to oxygen

toxicity (oxygen at high pressure)
[AD-A131049] p 9 N84-10725

Neurocognitive pattern analysis
[AD-A131302] p 24 N84-10740

BRAIN CIRCULATION

The pattern of local vascular responses in conditions of an increased activity of the cerebral cortex

p 3 A84-10844
The application of an electromagnetic field in patients following disorders of brain blood circulation

p 18 A84-11561

Dynamics of rheographic parameters of cerebral circulation and circulation in the extremities during active orthostatic test p 26 N84-11700

Effect of redistribution of blood on seventy of spatial position illusions in weightlessness p 26 N84-11701

BRAIN DAMAGE

Functions of the frontal lobes of the brain --- Russian book p 20 A84-11962 RUBRI FS

Demonstration of gas bubbles in canine pulmonary artery and aorta by means of ultrasonic echography with intravenous air infusion p 11 N84-11708

C

CALCIUM

The effect of an increased mechanical load on the dependence of the contraction of isolated heart muscle on the concentration of Ca(2+) in the perfusate

p 3 A84-10843
The Regulatory Functions of Calcium and the Potential
Role of Calcium in Mediating Gravitational Responses in
Cells and Tissues
INASA-CP-22861
p 11 N84-11720

[NASA-CP-2286] p 11 N84-11720
Evidence for a regulatory role of calcium in gravitropism p 11 N84-11721
Calcium and mitosis p 12 N84-11722
Calcium modulation of plant plasma membrane-bound

ATPase activities p 12 N84-11723 Intracellular calcium receptors Calmodulin and related proteins p 12 N84-11724

Role of calcium and calmodulin in plant cell regulation p 12 N84-11725 Local calcium entry and the guidance of growth

p 12 N84-11726
Bone and calcium alterations during spaceflight

p 12 N84-11729 Gravitational study of the central nervous system

P 12 N84-11730
Carboxylic acid ionophores as probes of the role of calcium in biological systems p 13 N84-11735
Measurement and control of free calcium inside small intact cells p 13 N84-11735

CALCIUM METABOLISM

The effect of diuretics on the concentration of calcium in blood serum and its excretion with the urine

p 18 A84-11563
The hormonal regulation of calcium channels of cardiac membranes p 8 A84-12571
Bone and calcium alterations during spaceflight

p 12 N84-11729 The plasma membrane calcium pump p 13 N84-11734

Summary of study group session discussions p 13 N84-11739

CANCER

The role of metals in free radical oxidation processes in the tissues of organisms according to data of spontaneous and initiated chemiluminescence

p 2 A84-10483

Nonparametric estimation of the distribution of time to onset for specific diseases in survival/sacrifice experiments

[DE83-013726] p 10 N84-10728
The relevance of experimental animal studies to the human experience
[DE83-014053] p 10 N84-10729
Bioassay of particulate organic matter from ambient air
[PB83-239731] p 29 N84-11754

[PB83-239731]

Design guidelines for carbon dioxide scrubbers
[AD-A130459] p 39 N84-10761

CAPILLARY FLOW

Skin capillary bed under the prolonged limitation of human muscular activity in the antiorthostatic position p 17 A84-11334

CARBOHYDRATE METABOLISM

Effect of a 42 2-km footrace and subsequent rest or exercise on muscle glycogen and enzymes

Exercise training and glucose uptake by skeletal muscle in rats p8 A84-12652 Inhibition of glycolysis potentiates hypoxic vasoconstriction in rat lungs p8 A84-12658

CARBON DIOXIDE

Direct biological effects of increased atmospheric carbon dioxide levels

[PB83-224360] p 25 N84-10749

CARBON DIOXIDE REMOVAL

Design guidelines for carbon dioxide scrubbers [AD-A130459] p 39 N84-10761

CARBON MONOXIDE

Recent advances in EPA's (Environmental Prog monitoring and methods development research [PB83-231209] p 24 N84-10743

CARBON MONOXIDE POISONING

Ventilatory response of intact cats to carbon monoxide hypoxia p 1 A84-10277

CARCINOGENS

The relevance of experimental animal studies to the human experience (DE83-014053) p. 10 N84-10729

Evaluation of motor vehicle and other combustion emissions using short-term genetic bioassays

[PB83-233270] p 10 N84-10731 Bioassay of particulate organic matter from ambient

[PB83-239731] p 29 N84-11754

CARDIAC AURICLES

The hormonal regulation of calcium channels of cardiac membranes p 8 A84-12571

CARDIAC VENTRICLES

Predicting ventricular arrythmia of the heart in patients with myocardial infarction p 18 A84-11564

CARDIOLOGY

A quantitative evaluation of various cardiac regions in young and old white rats p 5 A84-11558

Hyperventilation as a method for detecting disorders of

atnoventricular conductivity in athletes p 18 A84-11562

A hygienic evaluation of elevated dynamic loads on passengers in urban transport vehicles

p 19 A84-11569

CARDIOVASCULAR SYSTEM

Circadian fluctuations of certain indicators of the condition of the cardiovascular system and skin electrical characteristics in young female athletes engaged in academic rowing p 17 A84-11332

Morphofunctional correlations as exemplified by the relationships between the cardiovascular system and the physique p 17 A84-11342

Cardiovascular injury from blunt thoracic impact of epinephrine and isoproterenol injected rabbits

p 6 A84-12060 Cardiovascular examinations and observations of

deconditioning during the Space Shuttle orbital flight test program p 20 A84-12062 Single breath cardiac output - Enhanced sampling and analysis techniques p 38 A84-12064

Study of cardiovascular system during long-term spaceflights p 25 N84-11694

CATECHOLAMINE

Indicators of catecholamine metabolism and hemodynamics in air traffic controllers with neurocirculatory dystonia of the hypertension type p 19 A84-11568

CELLS (BIOLOGY)

Protein phosphorylation in the brain p 4 A84-11253
Regulatory functions of actin in the cell

p 5 A84-11349
The hormonal regulation of calcium channels of cardiac membranes p 8 A84-12571

Morphometric study of rat adrenal medulla during long-term hypokinesia p 10 N84-11705

The Regulatory Functions of Calcium and the Potential Role of Calcium in Mediating Gravitational Responses in Cells and Tissues
[NASA-CP-2286] p 11 N84-11720

Evidence for a regulatory role of calcium in gravitropism p 11 N84-11721 Calcium modulation of plant plasma membrane-bound

ATPase activities p 12 N84-11723
Intracellular calcium receptors Calmodulin and related proteins p 12 N84-11724

Role of calcium and calmodulin in plant cell regulation
p 12 N84-11725

Local calcium entry and the guidance of growth
p 12 N84-11726

Developing higher plant systems in space
p 12 N84-11727

Calcium ions, stores, and modulators What is the gravity receptor connection? p 13 N84-11733

The plasma membrane calcium pump

p 13 N84-11734

Measurement and control of free calcium inside small intact cells p 13 N84-11736

Role of calmodulin in cell proliferation p 13 N84-11737

Controls of intracellular communication mediated by gap junctions p 13 N84-11738
Concepts of dose to soft tissue at the cellular level [DE83-013830] p 28 N84-11748

CENTRAL NERVOUS SYSTEM

Cervical spline analysis for ejection injury prediction [AD-A131081] p. 23 N84-10739 Experimental psychological methods used in expert evaluation of mental work capacity of flight personnel in the presence of functional disturbances and central nervous system diseases p. 26 N84-11712 Gravitational study of the central nervous system.

p 12 N84-11730

CEREBRAL CORTEX

CEREBRAL CORTEX

The pattern of local vascular responses in conditions of an increased activity of the cerebral cortex p 3 A84-10844

The spatial organization of neurons of the brain visual cortex during the stimulation by light spots

p 4 A84-10847 A comparative study of dendritic spines in the principal cortical regions of the turtle forebrain p 5 A84-11557

Functional asymmetry of the cerebral hemispheres and unconscious perception --- Russian book

p 20 A84-12131 Prevention of acute mountain sickness by dexamethasone

AD-A1315331 p 23 N84-10737 CHEMICAL COMPOSITION

Intercompanson of stable-element content of foods by statistical methods [DE83-014029] p 39 N84-10764

CHEMICAL FRACTIONATION

The fractionation of plasma proteins in large scale preparations of blood --- Russian book

CHEMICAL REACTIONS

Simulation of Viking biology experiments suggests smectites not palagonites, as martian soil analogues p 41 A84-10655

CHEMILUMINESCENCE

The role of metals in free radical oxidation processes in the tissues of organisms according to data of spontaneous and initiated chemiluminescence

p 2 A84-10483 Spontaneous biochemiluminescence of mitochondria of several tissues in normal conditions and during the action D 2 A84-10484 of physical factors

CHEMORECEPTORS

The cardiostimulating action of norepinephrine contained in the liposomes in conditions of adrenoreceptor p 3 A84-10842 blockade

CHEMOTHERAPY

Prevention of mountain sickness devamethasone [AD-A131533] p 23 N84-10737

CHLOROPLASTS

Role of calcium and calmodulin in plant cell regulation p 12 N84-11725

CIRCADIAN RHYTHMS

Circadian fluctuations of certain indicators of the condition of the cardiovascular system and skin electrical characteristics in young female athletes engaged in p 17 A84-11332

CLAMPS

Prostheuc occlusive device for an internal passageway [NASA-CASE-MFS-25740-1]

CLINICAL MEDICINE

Physical methods of treatment in neurology --- Russian p 15 A84-10488

p 27 N84-11744

Rheoencephalography - Biophysical foundations, information content, and limits of application

p 5 A84-11326 Metabolism of certain trace elements and the prophylaxis of their deficit in athletes p 18 A84-11553

The application of an electromagnetic field in patients following disorders of brain blood circulation

p 18 A84-11561 Comparative evaluation of changes in MB CPK activity and indicators of precardial mapping --- for myocardial necrosis diagnosis p 19 A84-11565

Fetal development - Effects of decompression sickness p 7 A84-12070 and treatment

CLOSED ECOLOGICAL SYSTEMS

Biological life support system

[IAF PAPER 83-174] p 37 A84-11755

Physiological and ecological characteristics of the water fern, azolla pinnata, and prospects of using it in biological p 39 N84-11709 life-support system for man

Intercomparison of stable-element content of foods by statistical methods

[DE83-014029]

COCKPITS

A cockpit and equipment integration laboratory

p 35 A84-10734

COGNITION

Neurocognitive pattern analysis

[AD-A1313021 p 24 N84-10740 Task validation for studies on fragmented sleep and

cognitive efficiency under stress [AD-A130260] p 31 N84-10753

Metaphor and common-sense reasoning AD-A131423] p 32 N84-11756 [AD-A131423]

COGNITIVE PSYCHOLOGY

Problems in theory and methodology for the investigation of higher nervous activity in man - Selected works Russian book p 21 A84-12154

COLD ACCLIMATIZATION

The seasonal characteristics of the effect of low temperature on the activity of brain monamine oxidase and the sensitivity of rats to hyperoxia p 4 A84-10846 COLD TOLERANCE

Adrenergic activation of triodothyronine production in brown adipose tissue p 4 A84-11268

COLD WEATHER

Impact and vibration testing of a modified UH-1 crew seat

[AD-A130279]

p 38 N84-10760 COLOR

controllers

Method for evaluating operator inputs to digital [DE83-013521] p 40 N84-11763

An application of signal detection theory to air combat p 29 A84-10972 training

COMBUSTION PRODUCTS

Evaluation of motor vehicle and other combustion emissions using short-term genetic bioassays [PB83-233270] p 10 N84-10731 (PB83-2332701

COMPLEX SYSTEMS

Mathematical modeling of ecological processes p 7 A84-12151 Russian book

COMPUTATION

Computational studies in the interpretation of structure and motion Summary and extension [AD-A131598]

p 27 N84-11746

COMPUTER AIDED DESIGN

Computer analysis in helmet design --- for biodynamic response of head to impact p 33 A84-10710 Computational studies in the interpretation of structure and motion Summary and extension p 27 N84-11746 FAD-A1315981

COMPUTER ASSISTED INSTRUCTION

Extended development procedure EDeP user's (AD-A1313811 p 31 N84-10756

COMPUTER GRAPHICS

Method for evaluating operator inputs to digital controllers [DE83-013521] p 40 N84-11763

COMPUTER TECHNIQUES

Design strategies for computer-based information displays in real-time control systems p 36 A84-10970

COMPUTERIZED SIMULATION

An application of signal detection theory to air combat p 29 A84-10972 Moment-method solutions and SAR calculations for inhomogeneous models of man with large number of cells - Specific Absorption Rate of human body

p 38 A84-12293

CONCENTRATION (COMPOSITION)

Changes in blood urea content under hypokinetic p 26 N84-11703 Measurement and control of free calcium inside small intact cells p 13 N84-11736

CONDITIONED REFLEXES

Problems in theory and methodology for the investigation of higher nervous activity in man - Selected works Russian book p 21 A84-12154

CONFERENCES

Conference on Ultrasonics in Biology and Medicine, UBIOMED 6 Report summanes [ISSN-0208-5658] n 9 N84-10723

Proceedings of the 18th Annual Conference on Manual Control

[AD-A131256] p 39 N84-10763

The Regulatory Functions of Calcium and the Potential Role of Calcium in Mediating Gravitational Responses in Cells and Tissues [NASA-CP-2286]

p 11 N84-11720

CONTROL EQUIPMENT

Design strategies for computer-based information displays in real-time control systems p 36 A84-10970 CONTROL STABILITY

Sufficient conditions for the asymptotic stability of a homeostat --- for operator group activity simulation p 38 A84-12110

CONTROLLED ATMOSPHERES

Method for identifying trace contaminants in chamber atmosphere at high pressure p 39 N84-11718 COOLING SYSTEMS

Physiological testing of a helicopter mobile aircrewman cooling system p 34 A84-10725

CORONARY ARTERY DISEASE

Endothelium-dependent relaxation of coronary arters by p 4 A84-11261 noradrenaline and scrotonin

CORONARY CIRCULATION

Normal human coronary circulation during postural tests and decompression of lower half of body

CORRELATION

n 26 N84-11699

Neuron correlates of the recognition of visual stimuli I Dynamics of the means and variances of the current discharge frequency of neuron populations of the human brain in tests involving visual-stimulus recognition II -Investigation of space-time correlations between current frequencies of the impulse activity of neuron populations of the human brain during the recognition of visual p 17 A84-11335

Founer-processed images of dynamic lung function from list-mode data p 24 N84-10741

[DE83-013276] CORRELATION COEFFICIENTS

Dependence of the time of recognition of significant optical stimuli on the features characterizing the space-time organization of brain bipotentials

p 17 A84-11336

Morphofunctional correlations as exemplified by the relationships between the cardiovascular system and the physique CORROSION p 17 A84-11342

Microbial fouling and its effect on power generation p 10 N84-10726 (AD-A1310841

COSMIC RAYS Respective role of microgravity and cosmic rays on

paramecium tetraurelia cultured aboard Salyut 6 [IAF PAPER 83-186] p 6 A84-11759 CRASH INJURIES

Effects of impact acceleration on somatosensory evoked potentials [AD-A130280]

p 22 N84-10734 CREATININE

Changes in blood urea content under hypokinetic conditions p 26 N84-11703

CRYSTAL STRUCTURE Calcium ions, stores, and modulators What is the gravity p 13 N84-11733 receptor connection?

CUES The effects of cuing in time-shared tasks --- for aircraft flight route-way-point information p 29 A84-10971 Integrated Cuing Requirements (ICR) study Feasibility analysis and demonstration study

[AD-A131039] p 32 N84-10758 CUFFS Prosthetic occlusive device for an ınternal

passageway [NASA-CASE-MFS-25740-1] p 27 N84-11744

CULTURE TECHNIQUES The growth of paracoccus halodenitrificans in a defined medium

[NASA-TM-84411] p 9 N84-10724 CURVE FITTING

Effects of impact acceleration on somatosensory evoked notentials [AD-A130280] p 22 N84-10734

CYTOCHROMES In vivo comparison of cytochrome aa3 redox state and tissue PO2 in transient anoxia p 1 A84-10276 CYTOLOGY

Role of calmodulin in cell proliferation

p 13 N84-11737 CYTOPLASM Calcium and mitosis p 12 N84-11722

D

DARK ADAPTATION

Preliminary investigation of variation in some dark adaptation aspects for possible relevance to military helicopter aircrew

p 22 N84-10733

p 39 N84-10763

[AD-A130231] DÈATH

Control

Nonparametric estimation of the distribution of time to for specific diseases in survival/sacrifice experiments p 10 N84-10728

[DE83-013726] **DECISION MAKING**

Heart-rhythm reaction to sensorimotor loads of varying complexity p 16 A84-11331 Task validation for studies on fragmented sleep and

cognitive efficiency under stress p 31 N84-10753 [AD-A130260]

A critical analysis of the uses of multiple regression in

the study of human judgement [AD-A131224] p 31 N84-10755 Proceedings of the 18th Annual Conference on Manual

[AD-A131256] DECOMPRESSION SICKNESS

Fetal development - Effects of decompression sickness and treatment p 7 A84-12070

S	FOODVOTENO	FUOTIONAL FACTORS
Demonstration of gas bubbles in canine pulmonary artery and aorta by means of ultrasonic echography with	ECOSYSTEMS Direct biological effects of increased atmospheric	EMOTIONAL FACTORS Exteriorization of the effect of hyperthermia by observing
intravenous air infusion p 11 N84-11708	carbon dioxide levels	the sympathoadrenal activity in subjects under
DECONDITIONING	[PB83-224360] p 25 N84-10749	psychoemotional stress p 18 A84-11555
Cardiovascular examinations and observations of	EDUCATION	ENDOCRINE SYSTEMS
deconditioning during the Space Shuttle orbital flight test program p 20 A84-12062	Long-term retarded training effect of force loads p 18 A84-11554	Effect of eleuterococcus extract on recovery processes in rats following seven-day hypokinesia
program p 20 A84-12062 DEHYDRATION	Effects of behavioral objectives and instructions on	p 11 N84-11706
Hypohydration and exercise - Effects of heat acclimation,	earning a category task	ENDOTHELIUM
gender, and environment p 15 A84-10281	[AD-A130386] p 30 N84-10750	Endothelium-dependent relaxation of coronary arteris by
DENSITY DISTRIBUTION	Extended development procedure EDeP user's manual	noradrenaline and scrotonin p 4 A84-11261
Training-dependent changes of red cell density and	[AD-A131381] p 31 N84-10756	ENERGY ABSORPTION
erythrocytic oxygen transport p 21 A84-12653 DEOXYRIBONUCLEIC ACID	EFFERENT NERVOUS SYSTEMS	Moment-method solutions and SAR calculations for inhomogeneous models of man with large number of cells
Vacuum UV laser induced scission of Simian virus 40	Motor units of human skeletal muscles Russian	Specific Absorption Rate of human body
DNA p 7 A84-12425	book p 21 A84-12158 EGGS	p 38 A84-12293
DESIGN ANALYSIS	Polanty of the amphibian egg p 12 N84-11731	ENERGY CONSUMPTION
Extended development procedure EDeP user's	EJECTION	The energy cost and heart rate response of trained and
manual	Cervical spline analysis for ejection injury prediction	untrained subjects walking and running in shoes and boots
[AD-A131381] p 31 N84-10756	[AD-A131081] p 23 N84-10739	[AD-A131420] p 23 N84-10735
DIAGNOSIS Comparative evaluation of changes in MB CPK activity	EJECTION INJURIES Vertical impact evaluation of the F/FB-111 crew restraint	ENERGY SPECTRA
and indicators of precardial mapping for myocardial	configuration, headrest position, and upper extremity	Calculations of radiation fields and monkey mid-head
necrosis diagnosis p 19 A84-11565	bracing technique p 38 A84-12059	and mid-thorax responses in AFRRI-TRIGA reactor facility
Method for assessing mental stress in operators	EJECTION SEATS	experiments
p 32 N84-11715	In search of - An acceptable lap belt	[DE63-015483] p 13 N84-11741 ENVIRONMENT EFFECTS
DIAPHRAGM (ANATOMY)	p 34 A84-10716	Direct biological effects of increased atmospheric
Diaphragmatic rupture during G-maneuvers in a T33 jet trainer p 20 A84-12069	Improving restraint systems capabilities in older egress systems p 34 A84-10717	carbon dioxide levels
DIETS P 20 A64-12009	Aircrew restraint improvement program	[PB83-224360] p 25 N84-10749
Effect of hypokinesia on amino acid metabolism in rats	p 35 A84-10735	ENVIRONMENT MODELS
on diets differing in calcium and phosphorus content	US Navy ejectee anthropometry - 1 January 1969	Mathematical modeling of ecological processes
p 11 N84-11707	through 31 December 1979 p 16 A84-10742 ELECTRIC BATTERIES	Russian book p 7 A84-12151
DIFFERENTIATION (BIOLOGY)	Evaluation of a draft standard on performance	ENVIRONMENT POLLUTION A hygienic evaluation of the working environment of
Morphometric study of rat adrenal medulla during long-term hypokinesia p 10 N84-11705	specifications for health physics instrumentation	off-shore oil rigs p 19 A84-11574
DISPLAY DEVICES	[DE83-016186] p 28 N84-11750	ENVIRONMENTAL CONTROL
Analysis and classification of human error	ELECTRIC FIELD STRENGTH	Integrator of climate data for assessing indoor
p 29 A84-10388	The destruction of a bilayer lipid membrane as a result of electrical breakdown p 7 A84-12568	microclimate p 36 A84-11570 Environmental control and life support (ECLS) system
Design strategies for computer-based information	ELECTRIC WELDING	for space station - No single answer
displays in real-time control systems p 36 A84-10970 Proceedings of the 18th Annual Conference on Manual	External respiration in electric welders	[IAF PAPER 83-173] p 37 A84-11754
Control	p 19 A84-11571	Biological life support system
[AD-A131256] p 39 N84-10763	ELECTRICAL FAULTS The destruction of a bilayer lipid membrane as a result	[IAF PAPER 83-174] p 37 A84-11755
DISTRIBUTION (PROPERTY)	of electrical breakdown p 7 A84-12568	ENVIRONMENTAL LABORATORIES A cockpit and equipment integration laboratory
Distribution of individual indices of the subjective evaluation of loudness p 30 A84-11337	ELECTRO-OPTICS	p 35 A84-10734
DIURETICS	Integration and employment of night vision devices for	ENZYME ACTIVITY
The effect of diuretics on the concentration of calcium	the conduction of a military mission under conditions of	Renin, angiotensin-converting enzyme, and aldosterone
in blood serum and its excretion with the unine	darkness by helicopter p 36 A84-11059 ELECTROCARDIOGRAPHY	in humans on Mount Everest p 14 A84-10279 Effect of a 42 2-km footrace and subsequent rest or
p 18 A84-11563 DIVING (UNDERWATER)	Parameters of the distribution of EKG R-R intervals in	exercise on muscle glycogen and enzymes
Development of passive diver thermal protection	the prediction of the work capacity of human operators	p 15 A84-10285
system	p 16 A84-11330	Effect of physical training on myocardial enzyme
[AD-A130685] p 39 N84-10762	ELECTROENCEPHALOGRAPHY The relationship between the operator performance	activities in aging rats p 2 A84-10288 Comparative evaluation of changes in MB CPK activity
DOCUMENTATION	under maximum information loads and the individual	and indicators of precardial mapping for myocardial
A voice interactive system for aiding and documentation of space-based tasks	parameters of the EEG alpha rhythm p 30 A84-11343	necrosis diagnosis p 19 A84-11565
[AIAA PAPER 83-2355] p 33 A84-10025	Effects of impact acceleration on somatosensory evoked	Energy metalbolism enzymes in simulation of some
DRUGS	potentials [AD-A130280] p 22 N84-10734	spaceflight factors p 26 N84-11704
An analysis of the mechanism of the hypothermic action	[AD-A130280] p 22 N84-10734 Neurocognitive pattern analysis	Effect of eleuterococcus extract on recovery processes in rats following seven-day hypokinesia
of neurotropic compounds p 3 A84-10845 The confirmation of 9-carboxy-THC in unne by gas	[AD-A131302] p 24 N84-10740	p 11 N84-11706
chromatography/mass spectrometry p 20 A84-12068	ELECTROMAGNETIC ABSORPTION	Calcium modulation of plant plasma membrane-bound
Effect of intravenous dopamine on hypercaphic	Moment-method solutions and SAR calculations for	ATPase activities p 12 N84-11723
ventilatory response in humans p 21 A84-12655	inhomogeneous models of man with large number of cells Specific Absorption Rate of human body	EPINEPHRINE The role of advancing in the gaponic of discretize of motor
Provention of acute mountain sickness by	p 38 A84-12293	The role of adrenalin in the genesis of disorders of motor skills in conditions of emotional stress
dexamethasone [AD-A131533] p 23 N84-10737	ELECTROMAGNETIC FIELDS	p 30 A84-11338
DRY HEAT	The application of an electromagnetic field in patients	ERROR ANALYSIS
The influence of the neuropeptide arginine-vasopressin	following disorders of brain blood circulation	Analysis and classification of human error
on human tolerance to a hot dry environment	p 18 A84-11561 ELECTRON MICROSCOPY	p 29 A84-10388 Task validation for studies on fragmented sleep and
p 17 A84-11339	The microcirculatory bed of the liver according to data	cognitive efficiency under stress
Ozone toxicity effects consequent to prolonged, high	of scanning electron microscopy p 5 A84-11560	[AD-A130260] p 31 N84-10753
intensity exercise	Calcium ions, stores, and modulators. What is the gravity	ERYTHROCYTES
[PB83-237388] p 29 N84-11755	receptor connection? p 13 N84-11733 EMBEDDED COMPUTER SYSTEMS	Training-dependent changes of red cell density and erythrocytic oxygen transport p 21 A84-12653
DYNAMIC LOADS	A system for intelligent teleoperation research	erythrocytic oxygen transport p 21 A84-12653 Condition of erythrocytes during long-term exposure to
A hygienic evaluation of elevated dynamic loads on passengers in urban transport vehicles	[AIAA PAPER 83-2376] p 33 A84-10070	magnetic field p 11 N84-11711
p 19 A84-11569	EMBRYOLOGY	ESCAPE SYSTEMS
•	Developing higher plant systems in space p 12 N84-11727	Improving restraint systems capabilities in older egress
E	Polanty of the amphibian egg p 12 N84-11731	systems p 34 A84-10717 U.S. Navy ejectee anthropometry - 1 January 1969
_	EMBRYOS	through 31 December 1979 p 16 A84-10742
EARPHONES	The frog-statolith-experiment (STATEX) of the German	ESTIMATES
Technique for measuring the sound pressure levels	Spacelab mission D1 - Scientific background and technical	The relevance of experimental animal studies to the
under flying helmets and headsets [IZF-1982-39] p 40 N84-11765	description [IAF PAPER 83-184] p.6 A84-11758	human experience 1DE83-014053] p 10 N84-10729
[12F-1982-39] p 40 N84-11765	EMERGENCIES	[DE83-014053] p 10 N84-10729 Measurement of lung function using the magnetometer
Mathematical modeling of ecological processes	Aircraft crew diet in emergency situations	system
Russian book p 7 A84-12151	p 39 N84-11696	[AD-A130841] p 23 N84-10738
ECONOMIC FACTORS	EMERGENCY LIFE SUSTAINING SYSTEMS	EURECA (ESA)
Report on development, installation of industrial robots p 39 N84-11339	Naval aviation solid chemical oxygen emergency system program p 36 A84-10737	Utilisation of the European retrieval camer EURECA for life science research p 6 A84-11753
- Doub p do 1904-11000	P.30 W04-10/3/	ing produce readment by Vol-111/20

EVALUATION	EYE (ANATOMY)	ELICUT CAFETY
EYALUATION Effects of behavioral objectives and instructions on	The eye and light Russian book p 38 A84-12127	FLIGHT SAFETY A servo controlled rapid response anti-G valve
earning a category task	Hemodynamic reactions to positive intrathoracic	p 35 A84-10732
[AD-A130386] p 30 N84-10750 EXERCISE PHYSIOLOGY	pressure at +G sub z accelerations p 25 N84-11698	FLIGHT SIMULATION Flying training R&D (Research and Development) at the
Influence of training on blood flow to different skeletal	EYE MOVEMENTS Neurocognitive pattern analysis	Air Force Human Resources Laboratory
muscle fiber types p 1 A84-10278	[AD-A131302] p 24 N84-10740	[AD-A130250] p 31 N84-10752
Lactate accumulation during incremental exercise with varied inspired oxyen fractions p 14 A84-10280		FLIGHT SIMULATORS An application of signal detection theory to air combat
Hypohydration and exercise - Effects of heat acclimation,	F	training p 29 A84-10972
gender, and environment p 15 A84-10281		Flying performance on the advanced simulator for pilot
Regional distribution of blood flow during mild dynamic leg exercise in the baboon p 2 A84-10283	F-111 AIRCRAFT	training and laboratory tests of vision p 30 A84-10973 Human factors in flight simulator development
'Anaerobic threshold' - Problems of determination and	Vertical impact evaluation of the F/FB-111 crew restraint configuration, headrest position, and upper extremity	p 37 A84-11921
validation p 15 A84-10284 Effect of a 42 2-km footrace and subsequent rest or	bracing technique p 38 A84-12059	FLIGHT STRESS (BIOLOGY) Determination of a subjects condition according to pitch
exercise on muscle glycogen and enzymes	F-16 AIRCRAFT	of the vocal vowel 'A' p 27 N84-11714
p 15 A84-10285	The F-16 on board oxygen generation system (OBOGS) p 34 A84-10712	Bone and calcium alterations during spaceflight
Effect of physical training on myocardial enzyme activities in aging rats p 2 A84-10288	FAST FOURIER TRANSFORMATIONS	p 12 N84-11729 FLIGHT TRAINING
The use of functional rheovasography for the	Efficiency of high-frequency ventilation as determined	Integrated Cuing Requirements (ICR) study Feasibility
examination of athletes with circulatory disorders in lower extremities p 18 A84-11551	by nitrogen washouts A model study [AD-A131331] p 27 N84-11745	analysis and demonstration study [AD-A131039] p 32 N84-10758
Metabolism of certain trace elements and the	FATIGUE (BIOLOGY)	FLUENCE P 32 No4-10/30
prophylaxis of their deficit in athletes p 18 A84-11553	Impact and vibration testing of a modified UH-1 crew	Calculations of radiation fields and monkey mid-head
Hyperventilation as a method for detecting disorders of atnoventricular conductivity in athletes	seat [AD-A130279] p 38 N84-10760	and mid-thorax responses in AFRRI-TRIGA reactor facility experiments
p 18 A84-11562	FEASIBILITY ANALYSIS	[DE83-015483] p 13 N84-11741
Cardiorespiratory response to exercise in men	Integrated Cuing Requirements (ICR) study Feasibility	FLUID FILMS
repeatedly exposed to extreme altitude p 21 A84-12651	analysis and demonstration study [AD-A131039] p 32 N84-10758	Microbial fouling and its effect on power generation [AD-A131084] p 10 N84-10726
Exercise training and glucose uptake by skeletal muscle	FEMALES	FLYING PERSONNEL
in rats p 8 A84-12652	Assessment of the functional condition of the female	Experimental psychological methods used in expert
Plasma adrenocorticotropin and cortisol responses to submaximal and exhaustive exercise p 21 A84-12656	organism in factories p 17 A84-11341 FETUSES	evaluation of mental work capacity of flight personnel in the presence of functional disturbances and central
Control of breathing at the start of exercise as influenced	Fetal development - Effects of decompression sickness	nervous system diseases p 26 N84-11712
by posture p 21 A84-12657 Optimizing the exercise protocol for cardiopulmonary	and treatment p 7 A84-12070	A method of assessing cardiac function with bicycle ergometry in expert medical certification of pilots
assessment p 22 A84-12662	FIGHTER AIRCRAFT A servo controlled rapid response anti-G valve	p 27 N84-11716
The energy cost and heart rate response of trained and	p 35 A84-10732	FOLDING STRUCTURES
untrained subjects walking and running in shoes and boots	FINGERS	Self-locking telescoping manipulator arm [NASA-CASE-MFS-25906-1] p 40 N84-11761
[AD-A131420] p 23 N84-10735	Self-locking telescoping manipulator arm [NASA-CASE-MFS-25906-1] p 40 N84-11761	FORECASTING
Ozone toxicity effects consequent to prolonged, high	[NASA-CASE-MFS-25906-1] p 40 N84-11761 FLEXIBLE SPACECRAFT	Aquaculture techniques A production forecasting model
intensity exercise [PB83-237388] p 29 N84-11755	Simulation of the motion of a Shuttle-attached flexible	for aquaculture systems [PB83-221713] p 10 N84-10730
EXHAUST EMISSION	manipulator arm p 37 A84-11935	FOULING
Evaluation of motor vehicle and other combustion emissions using short-term genetic bioassays	FLIGHT CLOTHING Ballistic protective headgear for Navy/Marine Corps	Microbial fouling and its effect on power generation [AD-A131084] p 10 N84-10726
[PB83-233270] p 10 N84-10731	rotary wing aircrew p 33 A84-10708	FOURIER TRANSFORMATION
Recent advances in EPA's (Environmental Prog	Heat stress related to the operation of Canadian forces	Fourier-processed images of dynamic lung function from
monitoring and methods development research [PB83-231209] p 24 N84-10743	aircraft - A historical review and possible solution p 34 A84-10719	list-mode data [DE83-013276] p 24 N84-10741
EXOBIOLOGY	Physiological testing of a helicopter mobile aircrewman	FREE RADICALS
Simulation of Viking biology experiments suggests	cooling system p 34 A84-10725	The role of metals in free radical oxidation processes
smectites not palagonites, as martian soil analogues p 41 A84-10655	Absorbent product and articles made therefrom [NASA-CASE-MSC-18223-2] p 40 N84-11758	in the tissues of organisms according to data of spontaneous and initiated chemiluminescence
Utilisation of the European retrieval carner EURECA for	FLIGHT CONDITIONS	p 2 A84-10483
life science research p 6 A84-11753 Study and development activities of Dornier System on	Extension of the capability of army aircraft personnel	
space biology/medicine equipment and payloads for	for conducting night operations, by means of image-intensifying eyeglasses p 36 A84-11057	G
Spacelab and freeflying platform application	Analysis and outlook concerning an employment of	
[IAF PAPER 83-183] p 37 A84-11757 USSR report Space Biology and Aerospace Medicine,	military helicopters in night operations p 36 A84-11058	GALERKIN METHOD Ultrasound tomography by Galerkin or moment
volume 17, no 5, September - October 1983	Integration and employment of night vision devices for	methods
[JPRS-84655] p 10 N84-11693 Programmatic comments p 13 N84-11732	the conduction of a military mission under conditions of	[AD-A131408] p 28 N84-11747
EXPERIMENT DESIGN	darkness by helicopter p 36 A84-11059 FLIGHT CREWS	GALVANIC SKIN RESPONSE Circadian fluctuations of certain indicators of the
The frog-statolith-experiment (STATEX) of the German	Ballistic protective headgear for Navy/Marine Corps	condition of the cardiovascular system and skin electrical
Spacelab mission D1 - Scientific background and technical description	rotary wing aircrew _ p 33 A84-10708 Computer analysis in helmet design for biodynamic	characteristics in young female athletes engaged in academic rowing p 17 A84-11332
[IAF PAPER 83-184] p 6 A84-11758	response of head to impact p 33 A84-10710	GAMMA RAYS
EXPERT SYSTEMS Manned spaceflight activity planning with	Physiological testing of a helicopter mobile aircrewman	Calculations of radiation fields and monkey mid-head
Manned spaceflight activity planning with knowledge-based systems	cooling system p 34 A84-10725 Aircrew restraint improvement program	and mid-thorax responses in AFRRI-TRIGA reactor facility experiments
[AIAA PAPER 83-2374] p 33 A84-10035	p 35 A84-10735	[DE83-015483] p 13 N84-11741
EXPOSURE The design and operation of systems for inhalation	U S Navy ejectee anthropometry - 1 January 1969 through 31 December 1979 p 16 A84-10742	Accuracy of external personnel dosimetry systems in
exposure of animals	through 31 December 1979 p 16 A84-10742 Extension of the capability of army aircraft personnel	mixed neutron and gamma radiation fields [DE83-015712] p 28 N84-11751
[DE83-015388] p 10 N84-10727 The physiological effects of simultaneous exposures to	for conducting night operations, by means of	GAPS
heat and vibration	image-intensifying eyeglasses p 36 A84-11057 Integration and employment of night vision devices for	Controls of intracellular communication mediated by gap
[NASA-TM-84400] p 22 N84-10732	the conduction of a military mission under conditions of	junctions p 13 N84-11738
Recent advances in EPA's (Environmental Prog monitoring and methods development research	darkness by helicopter p 36 A84-11059	GAS ANALYSIS Single breath cardiac output - Enhanced sampling and
[PB83-231209] p 24 N84-10743	Vertical impact evaluation of the F/FB-111 crew restraint configuration, headrest position, and upper extremity	analysis techniques p 38 A84-12064
Personal exposure to volatile organics and other	bracing technique p 38 A84-12059	GAS TRANSPORT
compounds indoors and outdoors. The TEAM (Total Exposure Assessment Methodology) study	Preliminary investigation of variation in some dark adaptation aspects for possible relevance to military	Training-dependent changes of red cell density and erythrocytic oxygen transport p 21 A84-12653
[PB83-231357] p 24 N84-10744	helicopter aircrew	GEARS
Influence of nitrogen dioxide on xenobiotic metabolism in animals	[AD-A130231] p 22 N84-10733	Self-locking telescoping manipulator arm [NASA-CASE-MFS-25906-1] p 40 N84-11761
[PB83-239723] p 14 N84-11743	Aircraft crew diet in emergency situations p 39 N84-11696	[NASA-CASE-MFS-25906-1] p 40 N84-11761 GENETICS
EXTRAVEHICULAR ACTIVITY	FLIGHT INSTRUMENTS	The relevance of experimental animal studies to the
Absorbent product and articles made therefrom	The effects of cuing in time-shared tasks for aircraft	human experience
[NASA-CASE-MSC-18223-2] p 40 N84-11758	flight route-way-point information p 29 A84-10971	[DE83-014053] p 10 N84-10729

Local calcium entry and the guidance of growth

p 12 N84-11726

GEOTROPISM	
Gravitropic responses in the grass pulvinus Model system for asymmetric growth p 12 N84-11728	
Stability of rat brain glutamine synthetase to oxygen	
toxicity (oxygen at high pressure) [AD-A131049] p 9 N84-10725	
GLYCOGENS Effect of a 42 2-km footrace and subsequent rest or exercise on muscle glycogen and enzymes	
p 15 A84-10285 GRADIENTS	
The plasma membrane calcium pump p 13 N84-11734	
GRASSES Gravitropic responses in the grass pulvinus Model system for asymmetric growth p 12 N84-11728	
GRAVIRECEPTORS The Regulatory Functions of Calcium and the Potential Role of Calcium in Mediating Gravitational Responses in	
Cells and Tissues	
Calcium ions, stores, and modulators What is the gravity	
receptor connection? p 13 N84-11733 GRAVITATION	
Developing higher plant systems in space p 12 N84-11727	
Gravitropic responses in the grass pulvinus Model system for asymmetric growth p 12 N84-11728	
GRAVITATIONAL EFFECTS Respective role of microgravity and cosmic rays on	
paramecium tetraurelia cultured aboard Salyut 6 [IAF PAPER 83-186] p 6 A84-11759	
Diaphragmatic rupture during G-maneuvers in a T33 jet trainer p 20 A84-12069	
Developing higher plant systems in space p 12 N84-11727	
Gravitropic responses in the grass pulvinus Model	
Bone and calcium alterations during spaceflight	
p 12 N84-11729 Gravitational study of the central nervous system	
Polanty of the amphibian egg p 12 N84-11730 p 12 N84-11731	
Summary of study group session discussions p 13 N84-11739	
GROUP DYNAMICS Effects of behavioral objectives and instructions on	
earning a category task [AD-A130386] p 30 N84-10750 GROWTH	
The frog-statolith-experiment (STATEX) of the German Spacelab mission D1 - Scientific background and technical	
description [IAF PAPER 83-184] p 6 A84-11758	
Evidence for a regulatory role of calcium in gravitropism p 11 N84-11721	
н	
HARNESSES	
Aircrew restraint improvement program p 35 A84-10735	
Vertical impact evaluation of the F/FB-111 crew restraint configuration headrest position, and upper extremity	
bracing technique p 38 A84-12059 HEAD (ANATOMY)	
Effects of head impact acceleration on human performance Overview and preliminary battery identification	
[AD-A130286] p 31 N84-10754 Simulation of cerebrocranial trauma for evaluation and	
development of gear to protect pilots against impacts p 25 N84-11695	
HEALTH PHYSICS Evaluation of a draft standard on performance	
specifications for health physics instrumentation [DEB3-016169] p 28 N84-11749	
HEART DISEASES Biochemical criteria for evaluating cardiotoxic effects p 5 A84-11567	
p 5 A84-11567 HEART FUNCTION The cardiostimulating action of norepinephrine	
contained in the liposomes in conditions of adrenoreceptor blockade p 3 A84-10842	
An analysis of the mechanisms of the accelerating effect	
of the vagus nerve on the work of the heart p 4 A84-10848	

Level of arterial pressure and vegetative cardiac

p 16 A84-11327

p 16 A84-11329

regulation during the simulation of intense operator

Rhythmoinotropic phenomena in the human heart

activity

Single breath cardiac output - Enhanced sampling and analysis techniques p 38 A84-12064 Optimizing the exercise protocol for cardiopulmonary p 22 A84-12662 HEART MINUTE VOLUME Changes in cardiac output and orthostatic stability of p 25 N84-11697 cosmonauts **HEART RATE** Dependence of structures of heart rhythm on the physical work capacity of athletes p 16 A84-11328 Rhythmoinotropic phenomena in the human heart p 16 A84-11329 Parameters of the distribution of EKG R-R intervals in the prediction of the work capacity of human operators p 16 A84-11330 Heart-rhythm reaction to sensorimotor loads of varying complexity p 16 A84-11331 The effect of mechanical conditions on chronoinotropy p 8 A84-12572 of the myocardium Cardiorespiratory response to exercise in men repeatedly exposed to extreme altitude p 21 A84-12651 The energy cost and heart rate response of trained and untrained subjects walking and running in shoes and boots IAD-A1314201 p 23 N84-10735 A method of assessing cardiac function with bicycle ergometry in expert medical certification of pilots p 27 N84-11716 HEAT The physiological effects of simultaneous exposures to heat and vibration [NASA-TM-844001 D 22 N84-10732 HEAT ACCLIMATIZATION Hypohydration and exercise - Effects of heat acclimation gender, and environment p 15 A84-10281 the administration 8-arginine-vasopressin during a period of adaptation to p 17 A84-11340 hyperthermia **HEAT EXCHANGERS** Microbial fouling and its effect on power generation p 10 N84-10726 AD-A1310841 HEAT TOLERANCE Heat stress related to the operation of Canadian forces aircraft - A historical review and possible solution p 34 A84-10719 The influence of the neuropeptide arginine-vasopressin on human tolerance to a hot dry environment p 17 A84-11339 Thermoregulation in Erythrocebus patas - A thermal p 9 A84-12663 balance study HEAT TRANSFER Heat-transfer characteristics of port workers in the Arctic p 19 A84-11572 Microbial fouling and its effect on power generation [AD-A131084] p 10 N84-10726 **HELICOPTER DESIGN** Analysis and outlook concerning an employment of military helicopters in night operations p 36 A84-11058 **HELICOPTERS** Preliminary investigation of variation in some dark adaptation aspects for possible relevance to military helicopter aircrew [AD-A130231] p 22 N84-10733 HELMET MOUNTED DISPLAYS Integration and employment of night vision devices for the conduction of a military mission under conditions of darkness --- by helicopter p 36 A84-11059 **HELMETS**

Ballistic protective headgear for Navy/Marine Corps rotary wing aircrew p 33 A84-10708 Computer analysis in helmet design --- for biodynamic response of head to impact p 33 A84-10710 Simulation of cerebrocranial trauma for evaluation and development of gear to protect pilots against impacts p 25 N84-11695

Technique for measuring the sound pressure levels under flying helmets and headsets [IZF-1982-39] n 40 N84-11765

HEMATOLOGY

The fractionation of plasma proteins in targe scale preparations of blood --- Russian book p 3 A84-10492

HEMODYNAMIC RESPONSES

Influence of training on blood flow to different skeleti muscle fiber types p 1 A84-10278 Regional distribution of blood flow during mild dynamic leg exercise in the baboon p 2 A84-10283 Prediction of hemodynamic reactions to isometric p 17 A84-11333

Skin capillary bed under the prolonged limitation of human muscular activity in the antiorthostatic position

p 17 A84-11334

Indicators of catecholamine metabolism hemodynamics controllers neurocirculatory dystonia of the hypertension type p 19 A84-11568

Hemodynamic reactions to positive intrathoracic pressure at +G sub z accelerations p 25 N84-11698 HIGH FREQUENCIES

Efficiency of high-frequency ventilation as determined by nitrogen washouts. A model study [AD-A131331] p 27 N84-11745

HIGH GRAVITY ENVIRONMENTS

Gravitational study of the central nervous system

p 12 N84-11730

HIGH PRESSURE

Pharmacokinetics of pentobarbital under hyperbanc and hyperbanc hyperoxic conditions in the dog p 6 A84-12063

HIGH TEMPERATURE ENVIRONMENTS

The influence of the neuropeptide arginine-vasopressin on human tolerance to a hot dry environment p 17 A84-11339

HIGHWAYS

Direct comparison of intuitive, quasi-rational and analytical cognition FAD-A1302731 p 31 N84-10751

HOMEOSTASIS

Sufficient conditions for the asymptotic stability of a homeostat --- for operator group activity simulation

p 38 A84-12110

HOMEOTHERMS

Adrenergic activation of thodothyronine production in brown adipose tissue p 4 A84-11268

HORMONE METABOLISMS

Renin, angiotensin-converting enzyme, and aldosterone p 14 A84-10279 in humans on Mount Everest Endothelium-dependent relaxation of coronary arters by p 4 A84-11261 noradrenaline and scrotonin

The influence of the neuropeptide arginine-vasopressin on human tolerance to a hot dry environment

p 17 A84-11339 of administration effect the of 8-arginine-vasopressin during a period of adaptation to p 17 A84-11340 hyperthermia Indicators of catecholamine metabolism and hemodynamics in air traffic controllers with neurocirculatory dystonia of the hypertension type

p 19 A84-11568 The hormonal regulation of calcium channels of cardiac p 8 A84-12571 membranes

HUMAN BEINGS

The relevance of experimental animal studies to the p 10 N84-10729 [DE83-014053] Microwaves, hyperthermia, and human leukocyte

function [PB83-225375] p 24 N84-10746

HÚMAN BODY

Human body temperature - Its measurement and p 16 regulation Morphofunctional correlations as exemplified by the relationships between the cardiovascular system and the p 17 A84-11342 physique Motor units of human skeletal muscles --- Russian p 21 A84-12158 book Moment-method solutions and SAR calculations for inhomogeneous models of man with large number of cells

-- Specific Absorption Rate of human body p 38 A84-12293

HUMAN FACTORS ENGINEERING

Analysis and classification of human error

p 29 A84-10388 Theory and experiment in the analysis of the work of -- Russian book p 33 A84-10473 The USAFSAM advanced oxygen system concept

p 34 A84-10713 Heat stress related to the operation of Canadian forces

aircraft - A historical review and possible solution

p 34 A84-10719

Aircrew restraint improvement program p 35 A84-10735

1 January 1969 U.S. Navy ejectee anthropometry through 31 December 1979 p 16 A84-10742 Human factors in flight simulator development

p 37 A84-11921 Flying training R&D (Research and Development) at the

Air Force Human Resources Laboratory p 31 N84-10752 [AD-A130250] Integrated Cuing Requirements (ICR) study: Feasibility analysis and demonstration study

p 32 N84-10758 [AD-A131039] Results and interpretation of labor-hygienic studies in the paintshop of the jet engine depot of the Woensdrecht

p 40 N84-11759 [PML-1982-54]

HUMAN PATHOLOGY Exteriorization of the effect of hyperthermia by observing Effects of impact acceleration on somatosensory evoked the sympathoadrenal activity in subjects under Physical methods of treatment in neurology --- Russian potentials psychoemotional stress p 15 A84-10488 p 18 A84-11555 [AD-A130280] p 22 N84-10734 **HUMAN PERFORMANCE** Effects of head impact acceleration on human erformance. Overview and preliminary battery HYPERVENTILATION Problems in theory and methodology for the investigation Hyperventilation as a method for detecting disorders of performance of higher nervous activity in man - Selected works --atnoventncular conductivity in athletes . Identification p 21 A84-12154 [AD-A130286] p 31 N84-10754 Russian book p 18 A84-11562 Effects of behavioral objectives and instructions on IMPACT DAMAGE HYPOBARIC ATMOSPHERES earning a category task Computer analysis in helmet design --- for biodynamic Platelets and leukocytes in the lungs after acute p 30 N84-10750 [AD-A130386] response of head to impact hypobaric hypoxia p 9 A84-12661 p 33 A84-10710 Direct comparison of intuitive, quasi-rational and IMPACT TESTS HYPODYNAMIA analytical cognition Vertical impact evaluation of the F/FB-111 crew restraint Rat hindlimb muscle responses to suspension ypokinesia/hypodynamia p 6 A84-12065 [AD-A130273] p 31 N84-10751 configuration, headrest position, and upper extremity hypokinesia/hypodynamia Task validation for studies on fragmented sleep and bracing technique p 38 A84-12059 HYPOKINESIA Simulation of cerebrocranial trauma for evaluation and cognitive efficiency under stress Skin capillary bed under the prolonged limitation of -A130260] p 31 N84-10753 development of gear to protect pilots against impacts human muscular activity in the antiorthostatic position p 25 N84-11695 Effects of head impact acceleration on human p 17 A84-11334 IMPLANTATION Overview and preliminary battery performance Rat hindlimb muscle responses to suspension Prosthetic occlusive device for an internal hypokinesia/hypodynamia p 6 A84-12065 [AD-A130286] passageway [NASA-CASE-MFS-25740-1] p 31 N84-10754 A critical analysis of the uses of multiple regression in Age-related responses to mild restraint in the rat p 27 N84-11744 the study of human judgement p 8 A84-12654 INDOOR AIR POLLUTION [AD-A131224] p 31 N84-10755 Changes in blood urea content under hypokinetic An evaluation of the bacterial environment on motor An approach to modeling of human performance for p 26 N84-11703 huses p 6 A84-11575 purposes of probabilistic risk assessment Energy metalbolism enzymes in simulation of some Method for identifying trace contaminants in chamber [DE83-009292] p 40 N84-11764 p 26 N84-11704 spaceflight factors atmosphere at high pressure p 39 N84-11718 HUMAN RESOURCES Morphometric study of rat adrenal medulia during INDUSTRIAL SAFETY Flying training R&D (Research and Development) at the long-term hypokinesia p 10 N84-11705 Probabilistic model for assessing time-varying Air Force Human Resources Laboratory Effect of eleuterococcus extract on recovery processes contaminant levels p 31 N84-10752 [AD-A130250] ın rats following seven-day hypokinesia [PB83-232108] p 24 N84-10745 **HUMAN WASTES** p 11 N84-11706 Registry of toxic effects of chemical substances User's Absorbent product and articles made therefrom Effect of hypokinesia on amino acid metabolism in rats p 40 N84-11758 guide to the RTECS computer tape [NASA-CASE-MSC-18223-2] p 40 N84-11758 Composition and analysis of a model waste for a CELSS on diets differing in calcium and phosphorus content [PB83-223172] p 25 N84-10748 p 11 N84-11707 INDUSTRIAL WASTES (Controlled Ecological Life Support System) HYPOTHERMIA Probabilistic model for assessing [NASA-TM-84368] p 40 N84-11760 time-varying An analysis of the mechanism of the hypothermic action contaminant levels of neurotropic compounds p 3 A84-10845 [PB83-232108] p 24 N84-10745 Evaluation of a draft standard on performance specifications for health physics instrumentation Microwaves, hyperthermia, and human leukocyte INFORMATION THEORY function Proceedings of the 18th Annual Conference on Manual p 28 N84-11749 DE83-0161691 [PB83-2253751 p 24 N84-10746 Control HYBRID COMPUTERS HÝPOVIA Method for evaluating operator inputs to digital [AD-A131256] p 39 N84-10763 Ventilatory response of intact cats to carbon monoxide controllers INFRARED DETECTORS p 1 A84-10277 IDE83-0135211 p 40 N84-11763 Civil applications of infrared techniques [BMFT-FB-T-83-132] p. Renin, angiotensin-converting enzyme, and aldosterone HYDROCARBONS p 29 N84-11753 in humans on Mount Everest p 14 A84-10279 Personal exposure to volatile organics and other INFRARED SPECTROSCOPY Polycythemia and the acute hypoxic response in awake compounds indoors and outdoors The TEAM (Total An investigation of the interaction of poly A with rats following chronic hypoxia D 1 A84-10282 Exposure Assessment Methodology) study Cardiorespiratory response to exercise in men phospholipid membranes using an Ir spectroscopic p 24 N84-10744 [PB83-231357] repeatedly exposed to extreme altitude HYDROGEN IONS p 21 A84-12651 INJURIES Metabolic acids and H(+) regulation in brain tissue Inhibition of glycolysis potentiates hypoxic asoconstriction in rat lungs p 8 A84-12658 Cardiovascular injury from blunt thoracic impact of during acclimatization to chronic hypoxia epinephrine and isoproterenol injected rabbits vasoconstriction in rat lungs p 6 A84-12060 Metabolic acids and H(+) regulation in brain tissue **HYDROLYSIS** during acclimatization to chronic hypoxia Neurophysiological effects of -X impact acceleration Generation of electric potentials on mitochondrial p 9 A84-12659 p 7 A84-12066 membranes during the hydrolysis Platelets and leukocytes in the lungs after acute Diaphragmatic rupture during G-maneuvers in a T33 jet pyrophosphate p 5 A84-11366 hypobaric hypoxia p 9 A84-12661 p 20 A84-12069 trainer Cervical spline analysis for ejection injury prediction Results and interpretation of labor-hygienic studies in p 23 N84-10739 [AD-A131081] the paintshop of the jet engine depot of the Woensdrecht INSTRUMENTS Evaluation of a draft standard on performance [PML-1982-54] p 40 N84-11759 IMAGE INTENSIFIERS specifications for health physics instrumentation HYOSCINE Extension of the capability of army aircraft personnel [DE83-016169] p 28 N84-11749 Transdermal scopolamine in the prevention of motion for conducting night operations, by means of image-intensifying eyeglasses p 36 A84-11057 mage-intensifying eyeglasses Evaluation of a draft standard on performance specifications for health physics instrumentation sickness Evaluation of the time course of efficacy p 20 A84-12061 IMAGE MOTION COMPENSATION **HYPERCAPNIA** [DE83-016186] p 28 N84-11750 Computational studies in the interpretation of structure Effect of intravenous dopamine on hypercapnic and motion Summary and extension INTERACTIVE CONTROL p 21 A84-12655 ventilatory response in humans [AD-A131598] p 27 N84-11746 A voice interactive system for aiding and documentation of space-based tasks **HYPEROXIA** IMAGE PROCESSING The seasonal characteristics of the effect of low Founer-processed images of dynamic lung function from [AIAA PAPER 83-2355] p 33 A84-10025 temperature on the activity of brain monamine oxidase list-mode data INTERMITTENCY and the sensitivity of rats to hyperoxia p 4 A84-10846 [DE83-013276] p 24 N84-10741 A hygienic evaluation of several characteristics of Pharmacokinetics of pentobarbital under hyperbanc and Ultrasound tomography by Galerkin or moment intermittent noise p 19 A84-11566 methods INTRAVENOUS PROCEDURES hyperbanc hyperoxic conditions in the dog p 6 A84-12063 [AD-A131408] p 28 N84-11747 Effect of intravenous dopamine on hypercapnic ventilatory response in humans p 21 A84-12655 IMAGES Stability of rat brain glutamine synthetase to oxygen Representation in memory toxicity (oxygen at high pressure) [AD-A131049] INVESTIGATION [AD-A130662] p 9 N84-10725 p 32 N84-10757 Computational studies in the interpretation of structure and motion. Summary and extension IMAGING TECHNIQUES HYPERPNEA Development and construction of an apparatus based Control of breathing at the start of exercise as influenced [AD-A131598] p 27 N84-11746 on the principle of multidimensional nuclear magnetic resonance for the formation of images of organs and parts by posture p 21 A84-12657 ION EXCHANGING HYPERTENSION The plasma membrane calcium pump of the body [BMFT-FB-T-83-102] Prediction of hemodynamic reactions to isometric p 13 N84-11734 p 29 N84-11752 p 17 A84-11333 Carboxylic acid ionophores as probes of the role of IMMUNOLOGY Indicators of catecholamine hemodynamics in air traffic metabolism and p 13 N84-11735 calcium in biological systems The development and structure of the lymphoepithelial traffic controllers with pharyngeal ring of the Macacus rhesus neurocirculatory dystonia of the hypertension type The effect of an increased mechanical load on the p 5 A84-11559 p 19 A84-11568 dependence of the contraction of isolated heart muscle IMPACT **HYPERTHERMIA** on the concentration of Ca(2+) in the perfusate Impact and vibration testing of a modified UH-1 crew Ωf the effect The administration p 3 A84-10843

(AD-A1302791

IMPACT ACCELERATION

Neurophysiological effects of -X impact acceleration

p 38 N84-10760

p 7 A84-12066

IONIZATION

(DE83-0161691

Evaluation of a draft standard on performance

p 28 N84-11749

pecifications for health physics instrumentation

hyperthermia

ages in a hot climate

8-arginine-vasopressin during a period of adaptation to

Economical regimes of running for athletes of different

p 17 A84-11340

p 18 A84-11552

ISC	H	Ė	M	L	۵

The effect of ischemia and postischemic restoration of blood circulation on the ultrastructure of the neurons p 5 A84-11556

J

JUDGMENTS

Direct comparison of intuitive, quasi-rational and nalytical cognition [AD-A130273]

A critical analysis of the uses of multiple regression in the study of human judgement

[AD-A131224] p 31 N84-10755 Representations of perceptions of risks [AD-A131443] p 32 N84-10759

K

Aircraft crew diet in emergency situations

p 39 N84-11696

LACTATES

Lactate accumulation during incremental exercise with varied inspired oxyen fractions p 14 A84-10280 'Anaerobic threshold' - Problems of determination and alidation p 15 A84-10284

LASER APPLICATIONS Vacuum UV laser induced scission of Simian virus 40

DNA p 7 A84-12425

LEAKAGE Performance of a new 916 MHz direct contact applicator with reduced leakage, a detailed analysis

p 24 N84-10742 [PB83-226621] **LEAVES**

Photosynthesis in intact plants

[DE83-016045] p 13 N84-11740 LEG (ANATOMY)

Regional distribution of blood flow during mild dynamic leg exercise in the baboon p 2 A84-10283 The use of functional rheovasography for the examination of athletes with circulatory disorders in lower extremities p 18 A84-11551

Dynamics of rheographic parameters of cerebral circulation and circulation in the extremities during active orthostatic test p 26 N84-11700 LEUKOCYTES

Platelets and leukocytes in the lungs after acute p 9 A84-12661 hypobane hypoxia Microwaves, hyperthermia, and human leukocyte function

[PB83-225375] p 24 N84-10746 LIFE SCIENCES

p 13 N84-11732 Programmatic comments LIFE SUPPORT SYSTEMS

The F-16 on board oxygen generation system (OBOGS) p 34 A84-10712 The USAFSAM advanced oxygen system concept

p 34 A84-10713 Down in the Arctic - Equipment and training for p 35 A84-10726 U.S. Navy life support R&D programs

p 35 A84-10729 A cockpit and equipment integration laboratory p 35 A84-10734

Environmental control and life support (ECLS) system for space station - No single answer [IAF PAPER 83-173] p 37 A84-11754

Physiological and ecological characteristics of the water fern, azolla pinnata, and prospects of using it in biological life-support system for man p 39 N84-11709 Composition and analysis of a model waste for a CELSS

(Controlled Ecological Life Support System) [NASA-TM-84368] p 40 N84-11760

LIGHT (VISIBLE RADIATION) The eye and light --- Russian book p 38 A84-12127

LIPID METABOLISM The effect of a constant magnetic field on the processes

peroxide oxidation of lipids in phospholipid membranes p 8 A84-12570

Pseudo-critical heat capacity of single lipid bilayers

p 4 A84-11115 The destruction of a bilayer lipid membrane as a result p 7 A84-12568 of electrical breakdown

The microcirculatory bed of the liver according to data of scanning electron microscopy p 5 A84-11560 LOCKING

Self-locking telescoping manipulator arm

[NASA-CASE-MFS-25906-1] p 40 N84-11761 LOCOMOTION

Motor units of human skeletal muscles --- Russian p 21 A84-12158 book LONG DURATION SPACE FLIGHT

Study of cardiovascular system during long-term paceflights p 25 N84-11694 spaceflights Changes in cardiac output and orthostatic stability of p 25 N84-11697 cosmonauts

LONG TERM EFFECTS

Long-term retarded training effect of force loads p 18 A84-11554

LOUDNESS Distribution of individual indices of the subjective evaluation of loudness p 30 A84-11337

LOW TEMPERATURE ENVIRONMENTS

Development of passive diver thermal protection [AD-A130685] p 39 N84-10762

LOW TEMPERATURE TESTS

The seasonal characteristics of the effect of low temperature on the activity of brain monamine oxidase p 4 A84-10846 and the sensitivity of rats to hyperoxia LOWER BODY NEGATIVE PRESSURE

Changes in cardiac output and orthostatic stability of p 25 N84-11697 cosmonauts Normal human coronary circulation during postural tests and decompression of lower half of body

p 26 N84-11699 Effect of redistribution of blood on seventy of spatial p 26 N84-11701 position illusions in weightlessness

LUMINESCENCE Controls of intracellular communication mediated by gap

p 13 N84-11738 unctions LUNG MORPHOLOGY

Overall 'gain' of the respiratory control system in normoxic humans awake and asleep p 22 A84-12660

Platelets and leukocytes in the lungs after acute ypobanc hypoxia p 9 A84-12661 hypobaric hypoxia Measurement of lung function using the magnetometer system

[AD-A130841] p 23 N84-10738 Fourier-processed images of dynamic lung function from list-mode data [DE83-013276] p 24 N84-10741

LYMPH The development and structure of the lymphoepithelial pharyngeal ring of the Macacus rhesus

p 5 A84-11559

MAGNETIC EFFECTS

The effect of a constant magnetic field on the processes peroxide oxidation of in phospholipid p 8 A84-12570 lipids membranes MAGNETIC FIELDS

Condition of erythrocytes during long-term exposure to magnetic field p 11 N84-11711

MAGNETIC MEASUREMENT Measurement of lung function using the magnetometer system

p 23 N84-10738 [AD-A130841] MAGNETOMETERS

Measurement of lung function using the magnetometer system [AD-A130841] p 23 N84-10738 MALES

Prevention of acute mountain sickness by dexamethasone p 23 N84-10737 [AD-A131533]

MAN ENVIRONMENT INTERACTIONS

Integrator of climate data for assessing microclimate p 36 A84-11570

MAN MACHINE SYSTEMS

Analysis and classification of human error

A84-10388 p 29 Theory and experiment in the analysis of the work of operators --- Russian book p.33 A84-10473 Compatibility analysis of the MBU-14/P oxygen mask and U.S. Navy oxygen regulators p 34 A84-10721 The effects of cuing in time-shared tasks --- for aircraft flight route-way-point information p 29 A84-10971 Human factors in flight simulator development

p 37 A84-11921 Method for evaluating operator inputs to digital controlle

p 40 N84-11763 [DE83-013521] MANIPULATORS

Self-locking telescoping manipulator arm [NASA-CASE-MFS-25906-1] p 4 p 40 N84-11761

MANNED SPACE FLIGHT

Manned spaceflight activity planning with knowledge-based systems [AIAA PAPER 83-2374] p.33 A84-10035

General results of medical investigations in Salyut-6 manned space flights

[IAF PAPER 83-202] p 20 A84-11761

MANUAL CONTROL Proceedings of the 18th Annual Conference on Manual Control [AD-A131256] p 39 N84-10763

MARIJUANA The confirmation of 9-carboxy-THC in unne by gas chromatography/mass spectrometry p 20 A84-12068

MARINE ENVIRONMENTS A hygienic evaluation of the working environment of off-shore oil nas p 19 A84-11574

MARS SURFACE SAMPLES

Simulation of Viking biology experiments suggests smectites not palagonites, as martian soil analogues p 41 A84-10655

MATHEMATICAL MODELS

Mathematical modeling of ecological processes --p 7 A84-12151 Russian book

MAXIMUM LIKELIHOOD ESTIMATES

Nonparametric estimation of the distribution of time to onset for specific diseases in survival/sacrifice experiments

[DE83-013726] p 10 N84-10728

MEASURING INSTRUMENTS

Modern method and instrument for measuring psychic erformance --- of aircraft pilots p 30 A84-11756 [IAF PAPER 83-181]

MECHANICAL ENGINEERING

Industrial robots and their applications - Robotics for machine building (2nd revised and enlarged edition) Russian book p 38 A84-12181

MEDICAL SCIENCE Conference on Ultrasonics in Biology and Medicine, UBIOMED 6 Report summaries

[ISSN-0208-5658] p 9 N84-10723

MEMBRANE STRUCTURES

The plasma membrane calcium pump

p 13 N84-11734 Carboxylic acid ionophores as probes of the role of p 13 N84-11735 calcium in biological systems Measurement and control of free calcium inside small p 13 N84-11736 intact cells

MEMBRANES

Generation of electric potentials on mitochondrial membranes during the hydrolysis of inorganic pyrophosphate p 5 A84-11366

The destruction of a bilayer lipid membrane as a result p 7 A84-12568 of electrical breakdown

An investigation of the interaction of poly A with phospholipid membranes using an Ir spectroscopic method p 8 A84-12569 The effect of a constant magnetic field on the processes

of peroxide oxidation of lipids in phospholipid membranes p 8 A84-12570 The hormonal regulation of calcium channels of cardiac membranes p 8 A84-12571

Calcium modulation of plant plasma membrane-bound p 12 N84-11723 ATPase activities MEMORY

Representation in memory

[AD-A130662] p 32 N84-10757 MENSTRUATION

Assessment of the functional condition of the female p 17 A84-11341 organism in factories MENTAL PERFORMANCE

Level of arterial pressure and vegetative cardiac regulation during the simulation of intense operator p 16 A84-11327 The relationship between the operator performance

under maximum information loads and the individual parameters of the EEG alpha rhythm p 30 A84-11343 Modern method and instrument for measuring psychic performance --- of aircraft pilots

[IAF PAPER 83-181] p 30 A84-11756 Representation in memory

[AD-A130662] p 32 N84-10757 Experimental psychological methods used in expert evaluation of mental work capacity of flight personnel in the presence of functional disturbances and central p 26 N84-11712 nervous system diseases

Metaphor and common-sense reasoning [AD-A131423] p 32 N84-11756

MÈTABOLISM

Principles of the physiology of functional systems p 3 Á84-10487 Russian book Metabolism of certain trace elements and the prophylaxis of their deficit in athletes p 18 A84-11553 Biochemical criteria for evaluating cardiotoxic effects

p 5 A84-11567 Ozone toxicity effects consequent to prolonged, high intensity exercise [PB83-237388]

p 29 N84-11755

Personal exposure to volatile or		
compounds indoors and outdoors	The T	ream (To
Exposure Assessment Methodology) :	study	
[PB83-231357]		N84-107
METHOD OF MOMENTS		
Moment-method solutions and SAI	R cate	ulations
inhomogeneous models of man with la		
Specific Absorption Rate of human	hodu	ilbei ei ee
Specific Absorption Hate of human		A04 400
	p 38	
Ultrasound tomography by Gal	erkın	or mome
methods		
(AD-A131408)	p 28	N84-117
MICROCLIMATOLOGY	•	
Integrator of climate data for	asses	sing indo
microclimate		
	p 36	A84-115
MICROORGANISMS		
An evaluation of the bacterial env	ironme	
buses	р6	A84-115
The growth of paracoccus halodenit	nficans	ın a defin
medium		
[NASA-TM-84411]	р9	N84-107
MICROWAVES	ρ.	1101 101
Behavioral and autonomic thermo		
exposed to microwave radiation	p 2	A84-102
Microwaves, hyperthermia, and	humar	ı leukocy
function		
[PB83-225375]	p 24	N84-107
MILITARY AIRCRAFT	•	
The USAFSAM advanced oxygen s	vetom i	concont
THE OOM OMN advanced oxygen s	93161111	A94 107
	р 34	A84-107
In search of - An acceptable lap be		
	p 34	A84-107
U.S. Navy life support R&D program	ıs	
	p 35	A84-107
Naval aviation on-board oxygen gene		
- A status report	p 35	
	p 33	A04-107
MILITARY HELICOPTERS		
Ballistic protective headgear for f		
rotary wing aircrew	p 33	A84-107
Physiological testing of a helicopter	mobile	aircrewm
cooling system		
		A84-107
		A84-107
Extension of the capability of army	aircra	ft person
Extension of the capability of army for conducting night operations,	aircra by	ft personi means
Extension of the capability of army for conducting night operations, image-intensifying eyeglasses	aircra by p 36	ft personi means A84-110
Extension of the capability of army for conducting night operations, image-intensifying eyeglasses Analysis and outlook concerning a	aircra by p 36 n emp	ft personi means A84-110
Extension of the capability of army for conducting night operations, image-intensifying eyeglasses	aircra by p 36 in emp	ft personi means A84-110 loyment
Extension of the capability of army for conducting night operations, image-intensifying eyeglasses Analysis and outlook concerning a	aircra by p 36 in emp	ft personi means A84-110
Extension of the capability of army for conducting night operations, image-intensifying eyeglasses Analysis and outlook concerning a military helicopters in night operations	by p 36 n emp p 36	ft personi means A84-110 loyment A84-110
Extension of the capability of army for conducting night operations, image-intensifying eyeglasses Analysis and outlook concerning a military helicopters in night operations Integration and employment of nigh	p 36 p 36 p 36 p 36 t vision	ft personi means A84-110 loyment A84-110 devices
Extension of the capability of army for conducting night operations, image-intensifying eyeglasses Analysis and outlook concerning a military helicopters in night operations Integration and employment of night the conduction of a military mission in the conduction of the conduction o	p 36 p 36 n emp p 36 t vision	means A84-110 loyment A84-110 devices
Extension of the capability of army for conducting night operations, image-intensifying eyeglasses Analysis and outlook concerning a military helicopters in night operations. Integration and employment of night the conduction of a military mission is darkness by helicopter.	p 36 p 36 n emp p 36 t vision	ft personi means A84-110 loyment A84-110 devices
Extension of the capability of army for conducting night operations, image-intensifying eyeglasses. Analysis and outlook concerning a military helicopters in night operations. Integration and employment of night the conduction of a military mission is darkness — by helicopter. MINERAL METABOLISM	p 36 p 36 n emp p 36 t vision under o	rt personi means A84-110 loyment A84-110 devices conditions A84-110
Extension of the capability of army for conducting night operations, image-intensifying eyeglasses. Analysis and outlook concerning a military helicopters in night operations. Integration and employment of night the conduction of a military mission is darkness — by helicopter. MINERAL METABOLISM	p 36 p 36 n emp p 36 t vision under o	rt personi means A84-110 loyment A84-110 devices conditions A84-110
Extension of the capability of army for conducting night operations, image-intensifying eyeglasses. Analysis and outlook concerning a military helicopters in night operations. Integration and employment of night the conduction of a military mission is darkness by helicopter. MINERAL METABOLISM The role of metals in free radical of	p 36 t visior under c p 36	tt personi means A84-110 doyment A84-110 devices conditions A84-110 n process
Extension of the capability of army for conducting night operations, image-intensifying eyeglasses Analysis and outlook concerning a military helicopters in night operations Integration and employment of nighthe conduction of a military mission in darkness — by helicopter MINERAL METABOLISM The role of metals in free radical of in the tissues of organisms according to the conduction of the darkness in free radical of in the tissues of organisms according to the conduction of the darkness of organisms according to the conduction of the darkness of organisms according to the conduction of the darkness of organisms according to the conduction of the darkness of organisms according to the conduction of the darkness of organisms according to the conduction of th	p 36 t vision under c p 36 exidation	rt personi means A84-110 doyment A84-110 devices conditions A84-110 n process to data
Extension of the capability of army for conducting night operations, image-intensifying eyeglasses. Analysis and outlook concerning a military helicopters in night operations. Integration and employment of night the conduction of a military mission is darkness by helicopter. MINERAL METABOLISM The role of metals in free radical of	p 36 t vision under c p 36 exidation ording	tt personn means A84-110 Iloyment A84-110 devices conditions A84-110 n process to data
Extension of the capability of army for conducting night operations, image-intensifying eyeglasses. Analysis and outlook concerning a military helicopters in night operations. Integration and employment of night the conduction of a military mission is darkness by helicopter. MINERAL METABOLISM The role of metals in free radical of in the tissues of organisms accomponents.	p 36 t vision under c p 36 exidation	tt person means A84-110 lloyment A84-110 devices conditions A84-110 n process to data e
Extension of the capability of army for conducting night operations, image-intensifying eyeglasses. Analysis and outlook concerning a military helicopters in night operations. Integration and employment of nighthe conduction of a military mission of darkness by helicopter. MINERAL METABOLISM The role of metals in free radical of in the tissues of organisms accomponents and initiated chemiluming. MINERALOGY	p 36 t vision under c p 36 exidation ording escence p 2	tt personi means A84-110 dovices conditions A84-110 n process to data e A84-104
Extension of the capability of army for conducting night operations, image-intensifying eyeglasses Analysis and outlook concerning a military helicopters in night operations. Integration and employment of nighthe conduction of a military mission in darkness — by helicopter MINERAL METABOLISM The role of metals in free radical of in the tissues of organisms accomponents and initiated chemiliuming. MINERALOGY Simulation of Viking biology exp	p 36 t vision under o p 36 exidation ording escence p 2	tt personn means A84-110 cloyment A84-110 devices conditions A84-110 n process to data e A84-104
Extension of the capability of army for conducting night operations, image-intensifying eyeglasses. Analysis and outlook concerning a military helicopters in night operations. Integration and employment of nighthe conduction of a military mission of darkness by helicopter. MINERAL METABOLISM The role of metals in free radical of in the tissues of organisms accomponents and initiated chemiluming. MINERALOGY	p 36 t vision under o p 36 exidation ording escence p 2	tt personi means A84-110 Idoyment A84-110 devices conditions A84-110 n process to data e A84-104 ats sugges alogues
Extension of the capability of army for conducting night operations, image-intensifying eyeglasses Analysis and outlook concerning a military helicopters in night operations. Integration and employment of nighthe conduction of a military mission in darkness — by helicopter MINERAL METABOLISM The role of metals in free radical of in the tissues of organisms accomponents and initiated chemiliuming. MINERALOGY Simulation of Viking biology exp	p 36 t vision under o p 36 exidation ording escence p 2	tt personn means A84-110 cloyment A84-110 devices conditions A84-110 n process to data e A84-104
Extension of the capability of army for conducting night operations, image-intensifying eyeglasses. Analysis and outlook concerning a military helicopters in night operations. Integration and employment of night the conduction of a military mission is darkness.— by helicopter. MINERAL METABOLISM The role of metals in free radical of in the tissues of organisms accomponition of the miliminal mineral of the properties of the miliminal mineral of Viking biology expenditudes on the palagonites, as martian.	p 36 t vision under c p 36 exidation rding escenc p 2 erimer soil an	tt personi means A84-110 Idoyment A84-110 devices conditions A84-110 n process to data e A84-104 ats sugges alogues
Extension of the capability of army for conducting night operations, image-intensifying eyeglasses. Analysis and outlook concerning a military helicopters in night operations. Integration and employment of nighthe conduction of a military mission of darkness — by helicopter. MINERAL METABOLISM The role of metals in free radical of in the tissues of organisms accomposition of the properties of the content of the properties of the content of the properties	p 36 n emp p 36 t vision under c p 36 exidation rding escenc p 2 erimer soil an p 41	ft personi means A84-110 loyment A84-110 devices conditions A84-110 n process to data e A84-104 diss sugges A84-106
Extension of the capability of army for conducting night operations, image-intensifying eyeglasses. Analysis and outlook concerning a military helicopters in night operations. Integration and employment of night the conduction of a military mission is darkness — by helicopter. MINERAL METABOLISM The role of metals in free radical of in the tissues of organisms accesspontaneous and initiated chemilluming. MINERALOGY Simulation of Viking biology expending the particular of the properties of the palagonites, as martian. MISSION PLANNING Manned spaceflight activity	p 36 t vision under c p 36 exidation rding escenc p 2 erimer soil an	ft personi means A84-110 loyment A84-110 devices conditions A84-110 n process to data e A84-104 diss sugges A84-106
Extension of the capability of army for conducting night operations, image-intensifying eyeglasses. Analysis and outlook concerning a military helicopters in night operations. Integration and employment of night the conduction of a military mission is darkness.— by helicopter. MINERAL METABOLISM The role of metals in free radical of in the tissues of organisms accespontaneous and initiated chemiliuming. MINERALOGY Simulation of Viking biology expercities not palagonites, as martian. MISSION PLANNING Manned spaceflight activity knowledge-based systems	p 36 t vision under c p 36 exidation ording escenc p 2 erimer soil an p 41 plan	ft personi means A84-110 doyment A84-110 devices conditions A84-110 n process to data e A84-104 atts sugges allogues A84-106
Extension of the capability of army for conducting night operations, image-intensifying eyeglasses Analysis and outlook concerning a military helicopters in night operations integration and employment of nighthe conduction of a military mission is darkness — by helicopter MINERAL METABOLISM The role of metals in free radical of in the tissues of organisms accessiontaneous and initiated chemiliumine MINERALOGY Simulation of Viking biology expisions not palagonites, as martian MISSION PLANNING Manned spaceflight activity knowledge-based systems [AIAA PAPER 83-2374]	p 36 t vision under c p 36 exidation ording escenc p 2 erimer soil an p 41 plan	ft personi means A84-110 loyment A84-110 devices conditions A84-110 n process to data e A84-104 diss sugges A84-106
Extension of the capability of army for conducting night operations, image-intensifying eyeglasses. Analysis and outlook concerning a military helicopters in night operations. Integration and employment of night the conduction of a military mission is darkness.— by helicopter. MINERAL METABOLISM The role of metals in free radical of in the tissues of organisms accespontaneous and initiated chemiliuming. MINERALOGY Simulation of Viking biology expercities not palagonites, as martian. MISSION PLANNING Manned spaceflight activity knowledge-based systems	p 36 t vision under c p 36 exidation ording escenc p 2 erimer soil an p 41 plan	ft personi means A84-110 doyment A84-110 devices conditions A84-110 n process to data e A84-104 atts sugges allogues A84-106
Extension of the capability of army for conducting night operations, image-intensifying eyeglasses. Analysis and outlook concerning a military helicopters in night operations. Integration and employment of night the conduction of a military mission is darkness — by helicopter. MINERAL METABOLISM The role of metals in free radical of in the tissues of organisms accesspontaneous and initiated chemillumination. MINERALOGY Simulation of Viking biology expendites not palagonites, as martian. MISSION PLANNING Manned spaceflight activity knowledge-based systems [AIAA PAPER 83-2374] MITOCHONDRIA	p 36 t visior under c p 36 t visior under c p 36 escence p 2 estimates p 41 plan p 33	tt personi means A84-110 A84-110 devices conditions A84-110 n process to data e A84-104 ats sugges A84-106 hning w
Extension of the capability of army for conducting night operations, image-intensifying eyeglasses. Analysis and outlook concerning a military helicopters in night operations. Integration and employment of night the conduction of a military mission is darkness by helicopter. MINERAL METABOLISM The role of metals in free radical of in the tissues of organisms accesspontaneous and initiated chemiliuming. MINERALOGY Simulation of Viking biology expectites not palagonites, as martian. MISSION PLANNING Manned spaceflight activity knowledge-based systems [AIAA PAPER 83-2374] MITOCHONDRIA Spontaneous biochemiliuminescence	p 36 n emp p 36 t vision or under c p 36 excent p 36 excent p 36 excent p 2 e	tt personi means Mad-110 AB4-110 AB4-110 Mevices conditions AB4-110 m process to data e AB4-104 Mexica sugges AB4-106 Ming w AB4-100 ochondria
Extension of the capability of army for conducting night operations, image-intensifying eyeglasses. Analysis and outlook concerning a military helicopters in night operations. Integration and employment of night the conduction of a military mission is darkness.— by helicopter. MINERAL METABOLISM The role of metals in free radical of in the tissues of organisms accomposition and initiated chemiliuminal mineral mission. It is simply that the properties of the properties of the military simulation of Viking biology expenditudes of Viking biology expen	p 36 n emp p 37 n emp	tt personi means Ma4-110 doyment A84-110 devices conditions A84-110 in process to data e A84-104 its sugges allogues A84-106 in many was A84-100 ochondria ig the actif
Extension of the capability of army for conducting night operations, image-intensifying eyeglasses. Analysis and outlook concerning a military helicopters in night operations. Integration and employment of night the conduction of a military mission is darkness — by helicopter. MINERAL METABOLISM The role of metals in free radical or in the tissues of organisms accomposition of Viking biology expenditudes of the provided of	p 36 n emp p 36 n emp p 36 xxidation ording escence p 2 enimer soil an p 41 plan p 33 e of mit dd durir p 2	th personing means A84-110 A94-110 devices conditions A84-110 n process to data e A84-104 ats sugges alogues A84-106 cochondria go the activate act
Extension of the capability of army for conducting night operations, image-intensifying eyeglasses. Analysis and outlook concerning a military helicopters in night operations. Integration and employment of night the conduction of a military mission is darkness—by helicopter. MINERAL METABOLISM The role of metals in free radical of in the tissues of organisms accesspontaneous and initiated chemilluminal mineral conduction of Viking biology expectites not palagonites, as martian. MISSION PLANNING Manned spaceflight activity knowledge-based systems [AIAA PAPER 83-2374] MITOCHONDRIA Spontaneous biochemilluminescence several tissues in normal conditions are of physical factors.	p 36 n emp p 36 t vision under c p 36 xidatio rding escence p 2 enimer soil an p 41 plan p 33	th personing means A84-110 A84-110 A84-110 A84-110 A84-110 A84-104
Extension of the capability of army for conducting night operations, image-intensifying eyeglasses. Analysis and outlook concerning a military helicopters in night operations. Integration and employment of night the conduction of a military mission is darkness — by helicopter. MINERAL METABOLISM The role of metals in free radical or in the tissues of organisms accomposition of Viking biology expenditudes of the provided of	p 36 n emp p 36 t vision under c p 36 xidatio rding escence p 2 enimer soil an p 41 plan p 33	th personing means A84-110 A84-110 A84-110 A84-110 A84-110 A84-104
Extension of the capability of army for conducting night operations, image-intensifying eyeglasses. Analysis and outlook concerning a military helicopters in night operations. Integration and employment of night the conduction of a military mission is darkness—by helicopter. MINERAL METABOLISM The role of metals in free radical of in the tissues of organisms accesspontaneous and initiated chemilluminal mineral conduction of Viking biology expectites not palagonites, as martian. MISSION PLANNING Manned spaceflight activity knowledge-based systems [AIAA PAPER 83-2374] MITOCHONDRIA Spontaneous biochemilluminescence several tissues in normal conditions are of physical factors.	p 36 n emp p 36 t vision under c p 36 xidatio rding escence p 2 enimer soil an p 41 plan p 33	th personing means A84-110 A84-110 A84-110 A84-110 A84-110 A84-104
Extension of the capability of army for conducting night operations, image-intensifying eyeglasses. Analysis and outlook concerning a military helicopters in night operations. Integration and employment of night the conduction of a military mission is darkness — by helicopter. MINERAL METABOLISM The role of metals in free radical of in the tissues of organisms accespontaneous and initiated chemiliuming. MINERALOGY Simulation of Viking biology expending the palagonites, as martian. MISSION PLANNING Manned spaceflight activity knowledge-based systems [AIAA PAPER 83-2374] MITOCHONDRIA Spontaneous biochemiliuminescence several tissues in normal conditions at of physical factors. Generation of electric potentials membranes during the hydrolyspyrophosphate	p 36 n emp p 36 t vision p 36 t vision p 36 xidation rding p 41 plan p 33 e of mit d durir p 2 on mit p 5	tt personi means Mad-110 A84-110 Idoyment A84-110 Idoyment A84-110 Idoyment A84-110 Idoyment A84-110 Idoyment A84-104 Idoyment A84-100 Idoyment A84-104 Idoyment A84-104 Idoyment A84-104 Idoyment A84-104 Idoyment A84-104
Extension of the capability of army for conducting night operations, image-intensifying eyeglasses. Analysis and outlook concerning a military helicopters in night operations. Integration and employment of night the conduction of a military mission is darkness — by helicopter. MINERAL METABOLISM The role of metals in free radical of in the tissues of organisms acceptanceous and initiated chemilluming. MINERALOGY Simulation of Viking biology expirates not palagonites, as martian. MISSION PLANNING Manned spaceflight activity knowledge-based systems [AIAA PAPER 83-2374] MITOCHONDRIA Spontaneous biochemiluminescence several tissues in normal conditions are of physical factors Generation of electric potentials membranes during the hydrolys pyrophosphate Carboxylic acid ionophores as pro-	p 36 t visior p 37 t visior p 41 t visior p 37 t visior p 37 t visior p 37 t visior p 41 t visior p 41 t visior p 37 t visior p 41 t visior p 51 t visior p 61 t visior p 71 t visior p	th personing means A84-110 doyment A84-110 devices conditions A84-110 In process to data e A84-104 A84-104 A84-104 A84-104 A84-104 A84-104 A84-105 A84-105 A84-106 A84-107 A84
Extension of the capability of army for conducting night operations, image-intensifying eyeglasses. Analysis and outlook concerning a military helicopters in night operations. Integration and employment of night the conduction of a military mission is darkness by helicopter. MINERAL METABOLISM The role of metals in free radical of in the tissues of organisms accomposition and initiated chemiliuming. MINERALOGY Simulation of Viking biology expended to the properties of palagonities, as martian. MISSION PLANNING Manned spaceflight activity knowledge-based systems [AIAA PAPER 83-2374] MITOCHONDRIA Spontaneous biochemiliuminescence several tissues in normal conditions and of physical factors. Generation of electric potentials membranes during the hydrolys pyrophosphate Carboxylic acid ionophores as procalcium in biological systems	p 36 n emp p 36 t vision p 36 t vision p 36 xidation rding p 41 plan p 33 e of mit d durir p 2 on mit p 5	th personing means A84-110 doyment A84-110 devices conditions A84-110 mprocess to e A84-104 diss suggeralogues A84-100 ochondria ig the active A84-104 tochondring in the role
Extension of the capability of army for conducting night operations, image-intensifying eyeglasses. Analysis and outlook concerning a military helicopters in night operations. Integration and employment of nighthe conduction of a military mission is darkness.— by helicopter. MINERAL METABOLISM The role of metals in free radical of in the tissues of organisms accesspontaneous and initiated chemiliumine. MINERALOGY Simulation of Viking biology expendences and initiated chemiliumine. MINERALOGY Simulation of Viking biology expendences not palagonites, as martian. MISSION PLANNING Manned spaceflight activity knowledge-based systems [AIAA PAPER 83-2374] MITOCHONDRIA Spontaneous biochemiliuminescence several tissues in normal conditions at of physical factors. Generation of electric potentials membranes during the hydrolys pyrophosphate Carboxylic acid ionophores as procalcium in biological systems MITOSIS	p 36 n emp p 36 t vision p 36 t vision p 36 xidation rding p 30 p 41 plan p 33 e of mit dd durir p 2 ons mi p 5 p 5 p 13	tr personi means Ma4-110 doyment A84-110 devices conditions A84-110 mr process to data e A84-104 dats sugges A84-106 cohondriang the actic A84-104 cohondrianorga A84-113 the role N84-117
Extension of the capability of army for conducting night operations, image-intensifying eyeglasses. Analysis and outlook concerning a military helicopters in night operations. Integration and employment of night the conduction of a military mission is darkness by helicopter. MINERAL METABOLISM The role of metals in free radical of in the tissues of organisms accomposition and initiated chemiliuming. MINERALOGY Simulation of Viking biology expended to the properties of palagonities, as martian. MISSION PLANNING Manned spaceflight activity knowledge-based systems [AIAA PAPER 83-2374] MITOCHONDRIA Spontaneous biochemiliuminescence several tissues in normal conditions and of physical factors. Generation of electric potentials membranes during the hydrolys pyrophosphate Carboxylic acid ionophores as procalcium in biological systems	p 36 n emp p 36 t vision p 36 t vision p 36 xidation rding p 30 p 41 plan p 33 e of mit dd durir p 2 ons mi p 5 p 5 p 13	th personing means A84-110 doyment A84-110 devices conditions A84-110 In process to data e A84-104 A84-104 A84-104 A84-104 A84-104 A84-104 A84-105 A84-105 A84-106 A84-107 A84
Extension of the capability of army for conducting night operations, image-intensifying eyeglasses. Analysis and outlook concerning a military helicopters in night operations. Integration and employment of night the conduction of a military mission is darkness — by helicopter. MINERAL METABOLISM The role of metals in free radical of in the tissues of organisms accesspontaneous and initiated chemillumine. MINERALOGY Simulation of Viking biology expanded to the particular of the properties of the capability of the properties	p 36 t visior p 37 t visior p 38 t visior p 48 t visior p	tr personi means Ma4-110 doyment A84-110 devices conditions A84-110 mr process to data e A84-104 dats sugges A84-106 cohondriang the actic A84-104 cohondrianorga A84-113 the role N84-117
Extension of the capability of army for conducting night operations, image-intensifying eyeglasses. Analysis and outlook concerning a military helicopters in night operations. Integration and employment of nighthe conduction of a military mission is darkness.— by helicopter. MINERAL METABOLISM The role of metals in free radical of in the tissues of organisms accesspontaneous and initiated chemiliumine. MINERALOGY Simulation of Viking biology expendences and initiated chemiliumine. MINERALOGY Simulation of Viking biology expendences not palagonites, as martian. MISSION PLANNING Manned spaceflight activity knowledge-based systems [AIAA PAPER 83-2374] MITOCHONDRIA Spontaneous biochemiliuminescence several tissues in normal conditions at of physical factors. Generation of electric potentials membranes during the hydrolys pyrophosphate Carboxylic acid ionophores as procalcium in biological systems MITOSIS	p 36 t visior p 37 t visior p 38 t visior p 48 t visior p	th personing means A84-110 A84-110 A84-110 A84-110 A84-110 A84-104 A84-104 A84-106 A84-104 A84-106 A84-107
Extension of the capability of army for conducting night operations, image-intensifying eyeglasses. Analysis and outlook concerning a military helicopters in night operations. Integration and employment of night the conduction of a military mission is darkness by helicopter. MINERAL METABOLISM The role of metals in free radical of in the tissues of organisms accessontaneous and initiated chemiliuming. MINERALOGY Simulation of Viking biology expectites not palagonites, as martian. MISSION PLANNING Manned spaceflight activity knowledge-based systems [AIAA PAPER 83-2374] MITOCHONDRIA Spontaneous biochemiliuminescence several tissues in normal conditions and of physical factors. Generation of electric potentials membranes during the hydrolys pyrophosphate. Carboxylic acid ionophores as procalcium in biological systems. MITOSIS Calcium and mitosis. Role of calmodulin in cell proliferation.	p 36 t visior p 37 t visior p 38 t visior p 48 t visior p	th personing means A84-110 A84-110 A84-110 A84-110 A84-110 A84-104 A84-104 A84-106 A84-104 A84-106 A84-107
Extension of the capability of army for conducting night operations, image-intensifying eyeglasses. Analysis and outlook concerning a military helicopters in night operations. Integration and employment of night the conduction of a military mission is darkness — by helicopter. MINERAL METABOLISM The role of metals in free radical or in the tissues of organisms accessiontaneous and initiated chemiluming. MINERALOGY Simulation of Viking biology expirates not palagonites, as martian. MISSION PLANNING Manned spaceflight activity knowledge-based systems [AIAA PAPER 83-2374] MITOCHONDRIA Spontaneous biochemiluminescence several tissues in normal conditions at of physical factors. Generation of electric potentials membranes during the hydrolys pyrophosphate Carboxylic acid ionophores as procalcium in biological systems. MITOSIS Calcium and mitosis. Role of calmodulin in cell proliferation.	p 36 t visior p 37 t visior p 38 t visior p 37 t visior p 38 t visior p 48 t visior p	th personi means A84-110 A94-110 devices conditions A84-110 n process to data e A84-104 ats suggeralogues A84-106 cochondra inorgal A84-103 the role N84-117 N84-117
Extension of the capability of army for conducting night operations, image-intensifying eyeglasses. Analysis and outlook concerning a military helicopters in night operations. Integration and employment of night the conduction of a military mission is darkness.— by helicopter. MINERAL METABOLISM The role of metals in free radical of in the tissues of organisms acceptanceous and initiated chemilluming. MINERALOGY Simulation of Viking biology exponenceous and initiated chemilluming. MINERALOGY Simulation of Viking biology exponenceous and initiated chemilluming. MINERALOGY Simulation of Viking biology exponenceous and initiated chemilluming. MINERALOGY Simulation of Viking biology exponenceous exponenceous biochemilluminescence (alical paper). MINOCHONDRIA Spontaneous biochemiluminescence several tissues in normal conditions are of physical factors. Generation of electric potentials membranes during the hydrolys pyrophosphate. Carboxylic acid ionophores as procalcium in biological systems. MITOSIS Calcium and mitosis Role of calmodulin in cell proliferation. MOLECULAR BIOLOGY Intracellular calcium receptors. Calif	p 36 t vision p 37 t vision p 38 t vision p 48 t vision p	th personing means A84-110 A84-110 A84-110 A84-110 A84-110 A84-104 A84-104 A84-104 A84-104 A84-104 A84-104 A84-104 A84-107 A84-117
Extension of the capability of army for conducting night operations, image-intensifying eyeglasses. Analysis and outlook concerning a military helicopters in night operations. Integration and employment of night the conduction of a military mission is darkness — by helicopter. MINERAL METABOLISM The role of metals in free radical or in the tissues of organisms accessiontaneous and initiated chemiluming. MINERALOGY Simulation of Viking biology expirates not palagonites, as martian. MISSION PLANNING Manned spaceflight activity knowledge-based systems [AIAA PAPER 83-2374] MITOCHONDRIA Spontaneous biochemiluminescence several tissues in normal conditions at of physical factors. Generation of electric potentials membranes during the hydrolys pyrophosphate Carboxylic acid ionophores as procalcium in biological systems. MITOSIS Calcium and mitosis. Role of calmodulin in cell proliferation.	p 36 t visior p 37 t visior p 38 t visior p 37 t visior p 38 t visior p 48 t visior p	th personi means A84-110 A94-110 devices conditions A84-110 n process to data e A84-104 ats suggeralogues A84-106 cochondra inorgal A84-103 the role N84-117 N84-117
Extension of the capability of army for conducting night operations, image-intensifying eyeglasses. Analysis and outlook concerning a military helicopters in night operations. Integration and employment of night the conduction of a military mission is darkness.— by helicopter. MINERAL METABOLISM The role of metals in free radical of in the tissues of organisms accomposition of the solid programment of the symmetries of organisms accomposition of Viking biology expenditions and initiated chemilluminal mineral conditions. MINERALOGY Simulation of Viking biology expenditions in the tissues of organisms accomposition of planging in the symmetries of planging in the programment of planging in the programment of planging in the hydrolys pyrophosphate. Carboxylic acid ionophores as procalcium in biological systems. MITOSIS Calcium and mitosis Role of calmodulin in cell proliferation.	p 36 t visior p 37 t visior p 17 t visior p 18 t visior p 19 t visior p	th personing means A84-110 doyment A84-110 devices conditions A84-110 n process to data e A84-104 diss sugges A84-106 n process A84-106 n process A84-107 n
Extension of the capability of army for conducting night operations, image-intensifying eyeglasses. Analysis and outlook concerning a military helicopters in night operations. Integration and employment of night the conduction of a military mission is darkness.— by helicopter. MINERAL METABOLISM The role of metals in free radical of in the tissues of organisms acceptanceous and initiated chemilluming. MINERALOGY Simulation of Viking biology exponenceous and initiated chemilluming. MINERALOGY Simulation of Viking biology exponenceous and initiated chemilluming. MINERALOGY Simulation of Viking biology exponenceous and initiated chemilluming. MINERALOGY Simulation of Viking biology exponenceous exponenceous biochemilluminescence (alical paper). MINOCHONDRIA Spontaneous biochemiluminescence several tissues in normal conditions are of physical factors. Generation of electric potentials membranes during the hydrolys pyrophosphate. Carboxylic acid ionophores as procalcium in biological systems. MITOSIS Calcium and mitosis Role of calmodulin in cell proliferation. MOLECULAR BIOLOGY Intracellular calcium receptors. Calif	p 36 n emp p 36 t visior p 37 t visior p 10 p 11 p 12	th personing means A84-110 doyment A84-110 devices conditions A84-110 n process to data e A84-104 A84-104 A84-104 A84-106 Cochondria githe active A84-13 the role N84-117 N84-117 N84-117 If regulator
Extension of the capability of army for conducting night operations, image-intensifying eyeglasses. Analysis and outlook concerning a military helicopters in night operations. Integration and employment of night the conduction of a military mission is darkness.— by helicopter MINERAL METABOLISM The role of metals in free radical or in the tissues of organisms accomposition and initiated chemillumination. MINERALOGY Simulation of Viking biology expositions and initiated chemillumination. MISSION PLANNING Manned spaceflight activity knowledge-based systems [AIAA PAPER 83-2374] MITOCHONDRIA Spontaneous biochemilluminescence several tissues in normal conditions at of physical factors Generation of electric potentials membranes during the hydrolys pyrophosphate Carboxylic acid ionophores as procalcium in biological systems MITOSIS Calcium and mitosis Role of calmodulin in cell proliferation. MOLECULAR BIOLOGY Intracellular calcium receptors Caliproteins Role of calcium and calmodulin in processions.	p 36 n emp p 36 t visior p 37 t visior p 10 p 11 p 12	th personing means A84-110 doyment A84-110 devices conditions A84-110 n process to data e A84-104 diss sugges A84-106 n process A84-106 n process A84-107 n
Extension of the capability of army for conducting night operations, image-intensifying eyeglasses. Analysis and outlook concerning a military helicopters in night operations. Integration and employment of night the conduction of a military mission is darkness — by helicopter. MINERAL METABOLISM The role of metals in free radical of in the tissues of organisms accesspontaneous and initiated chemilluming. MINERALOGY Simulation of Viking biology expisites not palagonites, as martian. MISSION PLANNING Manned spaceflight activity knowledge-based systems. [AIAA PAPER 83-2374] MITOCHONDRIA Spontaneous biochemilluminescence several tissues in normal conditions at of physical factors. Generation of electric potentials membranes during the hydrolys pyrophosphate. Carboxylic acid ionophores as procalcium in biological systems. MITOSIS Calcium and mitosis. Role of calmodulin in cell proliferation. Role of calcium and calmodulin in photosynthesis in intact plants.	p 36 t visior p 37 t visior p 37 t visior p 37 t visior p 12 t visior p 17 t visior p 18 t visior p 19 t visior p	th persons means A84-110 devices conditions A84-110 mprocess to data e A84-104 dists suggeralogues A84-106 cochondria githe active A84-107 N84-117 N84-117 N84-117 Il regulation N84-117 Il regulation N84-117 Il regulation N84-117 N84-117
Extension of the capability of army for conducting night operations, image-intensifying eyeglasses. Analysis and outlook concerning a military helicopters in night operations. Integration and employment of night the conduction of a military mission is darkness.— by helicopter MINERAL METABOLISM The role of metals in free radical or in the tissues of organisms accomposition and initiated chemillumination. MINERALOGY Simulation of Viking biology expositions and initiated chemillumination. MISSION PLANNING Manned spaceflight activity knowledge-based systems [AIAA PAPER 83-2374] MITOCHONDRIA Spontaneous biochemilluminescence several tissues in normal conditions at of physical factors Generation of electric potentials membranes during the hydrolys pyrophosphate Carboxylic acid ionophores as procalcium in biological systems MITOSIS Calcium and mitosis Role of calmodulin in cell proliferation. MOLECULAR BIOLOGY Intracellular calcium receptors Caliproteins Role of calcium and calmodulin in processions.	p 36 t visior p 37 t visior p 37 t visior p 37 t visior p 12 t visior p 17 t visior p 18 t visior p 19 t visior p	th personing means A84-110 doyment A84-110 devices conditions A84-110 n process to data e A84-104 A84-104 A84-104 A84-106 Cochondria githe active A84-13 the role N84-117 N84-117 N84-117 If regulator

a er ntal 44 for ells 293 ent 47 570 tor 75 red 724 ice 87 /te 46 13 16 729 736 '08 nan 725 nel 157 of 158 for of 159 es of 183 sts 355 nth 35 αf ion nal 66

of 35 722 37 724 40 Biofeedback monitoring-devices for astronauts in space p 37 A84-12025 Effects of impact acceleration on somatosensory evoked p 22 N84-10734 A quantitative evaluation of various cardiac regions in p 5 A84-11558

The development and structure of the lymphoepithelial pharyngeal ring of the Macacus rhesus p 5 A84-11559 The microcirculatory bed of the liver according to data of scanning electron microscopy p 5 A84-11560 MOTION PERCEPTION An effect of speed on induced motion p 30 A84-12786 MOTION SICKNESS Transdermal scopolamine in the prevention of motion sickness Evaluation of the time course of efficacy p 20 A84-12061 MOTOR VEHICLES An evaluation of the bacterial environment on motor p 6 A84-11575 Evaluation of motor vehicle and other combustion emissions using short-term genetic bioassays p 10 N84-10731 [PB83-233270] MOUNTAINS Prevention of acute mountain sickness by dexamethasone [AD-A131533] n 23 N84-10737 MUSCLES Influence of training on blood flow to different skeletal p 1 A84-10278 to suspension p 6 A84-12065 muscle fiber types Rat hindlimb muscle responses hypokinesia/hypodynamia Summary of study group session discussions p 13 N84-11739 MUSCULAR FATIGUE Effect of a 42 2-km footrace and subsequent rest or exercise on muscle glycogen and enzymes p 15 A84-10285 MUSCULAR FUNCTION Rhythmoinotropic phenomena in the human heart Regulatory functions of actin in the cell

p 16 A84-11329 p 5 A84-11349 Long-term retarded training effect of force loads p 18 A84-11554

The effect of mechanical conditions on chronoinotropy p 8 A84-12572 MUSCULAR TONUS

Evaluation of skeletal muscle tone by recording lateral p 27 N84-11717 MUSCULOSKELETAL SYSTEM

Motor units of human skeletal muscles --- Russian p 21 A84-12158 book Exercise training and glucose uptake by skeletal muscle p 8 A84-12652 MUTAGENS

Evaluation of motor vehicle and other combustion emissions using short-term genetic bioassays
[PRR3-233270] p 10 N84-10731 Bioassay of particulate organic matter from ambient

[PB83-239731] p 29 N84-11754 MYOCARDIAL INFARCTION

Predicting ventricular arrythmia of the heart in patients A84-11564 with myocardial infarction p 18 Comparative evaluation of changes in MB CPK activity and indicators of precardial mapping --- for myocardial p 19 A84-11565 necrosis diagnosis MYOCARDILIM

Effect of physical training on myocardial enzyme activities in aging rats p 2 A84-10288
The cardiostimulating action of norepinephrine contained in the liposomes in conditions of adrenoreceptor p 3 A84-10842

The effect of an increased mechanical load on the dependence of the contraction of isolated heart muscle on the concentration of Ca(2+) in the perfusate p 3 A84-10843

Rhythmoinotropic phenomena in the human heart p 16 A84-11329 A quantitative evaluation of various cardiac regions in p 5 A84-11558 young and old white rats

Biochemical criteria for evaluating cardiotoxic effects p 5 A84-11567 The effect of mechanical conditions on chronoinotropy

of the myocardium p8 A84-12572

NASA PROGRAMS

p 13 N84-11732 Programmatic comments NECK (ANATOMY) Cervical spline analysis for ejection injury prediction [AD-A131081] p 23 N84-10739

An analysis of the mechanisms of the accelerating effect of the vagus nerve on the work of the heart p 4 A84-10848 Summary of study group session discussions

p 13 N84-11739

NERVOUS SYSTEM

Problems in theory and methodology for the investigation of higher nervous activity in man - Selected works -Russian book NEUROLOGY p 21 A84-12154

Physical methods of treatment in neurology --- Russian ook p 15 A84-10488 Functions of the frontal lobes of the brain --- Russian p 20 A84-11962 **NEURONS**

The spatial organization of neurons of the brain visual cortex during the stimulation by light spots

p.4 A84-10847 The role of temporal parameters of the interspike interval in the coding of temperature --- for river crayfish neurons p 4 A84-10849

The effect of ischemia and postischemic restoration of blood circulation on the ultrastructure of the neurons p 5 A84-11556

NEUROPHYSIOLOGY

Principles of the physiology of functional systems --ussian book p 3 A84-10487 Russian book The physiology of the vegetative nervous system p 3 A84-10489 Russian book An analysis of the mechanisms of the accelerating effect of the vagus nerve on the work of the heart

Protein phosphorylation in the brain p 4 A84-10848 Protein phosphorylation in the brain p 4 A84-11253 Neuron correlates of the recognition of visual stimuli. I Dynamics of the means and variances of the current discharge frequency of neuron populations of the human brain in tests involving visual-stimulus recognition. II -Investigation of space-time correlations between current frequencies of the impulse activity of neuron populations of the human brain during the recognition of visual p 17 A84-11335 The effect of ischemia and postischemic restoration of

blood circulation on the ultrastructure of the neurons p 5 A84-11556 A comparative study of dendritic spines in the principal cortical regions of the turtle forebrain p 5 A84-11557

Functions of the frontal lobes of the brain --- Russian p 20 A84-11962 book Neurophysiological effects of -X impact acceleration

p 7 A84-12066 Functional asymmetry of the cerebral hemispheres and unconscious perception --- Russian book

n 20 A84-12131 Problems in theory and methodology for the investigation of higher nervous activity in man - Selected works -p 21 A84-12154 Russian book

The Golgi-Hortega-Lavilla technique, with a useful additional step for application to brain tissue after prolonged fixation p 7 A84-12274

Neurocognitive pattern analysis p 24 N84-10740 [AD-A131302] NEUROTROPISM

An analysis of the mechanism of the hypothermic action of neurotropic compounds p 3 A84-10845 NEUTRON IRRADIATION

Calculations of radiation fields and monkey mid-head and mid-thorax responses in AFRRI TRIGA reactor facility p 13 N84-11741 [DE83-015483]

NEUTRONS Accuracy of external personnel dosimetry systems in mixed neutron and gamma radiation fields

p 28 N84-11751

NIGHT FLIGHTS (AIRCRAFT)

Extension of the capability of army aircraft personnel for conducting night operations, by means of image-intensifying eyeglasses p 36 A84-11057 ımage-intensifying eyeglasses p 36 A84-11057 Analysis and outlook concerning an employment of military helicopters in night operations

p 36 A84-11058

Extension of the capability of army aircraft personnel for conducting night operations, by means of image-intensifying eyeglasses p 36 A84-11057 Analysis and outlook concerning an employment of military helicopters in night operations

p 36 A84-11058 Integration and employment of night vision devices for the conduction of a military mission under conditions of p 36 A84-11059 darkness --- by helicopter Preliminary investigation of variation in some dark adaptation aspects for possible relevance to military

helicopter aircrew [AD-A130231] p 22 N84-10733

NITROGEN DIOXIDE

Influence of nitrogen dioxide on xenobiotic metabolism in animals [PB83-239723] p 14 N84-11743

NOISE INTENSITY

A hygienic evaluation of several characteristics of p 19 A84-11566 intermittent noise

environment

[AD-A1302801

young and old white rats

MORPHOLOGY

MONKEYS

potentials

p 40 N84-11759

NORADRENALINE

The cardiostimulating action of noreptnephrine contained in the liposomes in conditions of adrenoreceptor p 3 A84-10842

Adrenergic activation of triodothyronine production in brown adipose tissue p 4 A84-11268

NUCLEAR MAGNETIC RESONANCE

Development and construction of an apparatus based on the principle of multidimensional nuclear magnetic resonance for the formation of images of organs and parts of the body

[BMFT-FB-T-83-102]

p 29 N84-11752

NUCLEAR POWER PLANTS

An approach to modeling of human performance for purposes of probabilistic risk assessment DE83-0092921 p 40 N84-11764

NUCLEIC ACIDS

An investigation of the interaction of poly A with phospholipid membranes using an Ir spectroscopi method p 8 A84-12569

NUTRITIONAL REQUIREMENTS

The role of metals in free radical oxidation processes in the tissues of organisms according to data of spontaneous and initiated chemiluminescence

p 2 A84-10483 The growth of paracoccus halodenitnficans in a defined medium p 9 N84-10724

[NASA-TM-84411] Aircraft crew diet in emergency situations

p 39 N84-11696

0

OCCLUSION

Prosthetic occlusive device for an internal [NASA-CASE-MFS-25740-1] p 27 N84-11744

OHIO

Proceedings of the 18th Annual Conference on Manual Control p 39 N84-10763

[AD-A131256]

OIL EXPLORATION

Changes in the amino acid contents of saliva and unne in oil and gas drillers p 19 A84-11573

A hygienic evaluation of the working environment of off-shore oil nas p 19 A84-11574

ONBOARD DATA PROCESSING

Manned spaceflight activity planning with knowledge-based systems [AIAA PAPER 83-2374] p 33 A84-10035

OPERATOR PERFORMANCE

Analysis and classification of human error

p 29 A84-10388

Theory and experiment in the analysis of the work of operators --- Russian book p 33 A84-10473 Level of arterial pressure and vegetative cardiac regulation during the simulation of intense operator activity p 16 A84-11327

Parameters of the distribution of EKG R-R intervals in the prediction of the work capacity of human operators p 16 A84-11330

The role of adrenalin in the genesis of disorders of motor skills in conditions of emotional stress

p 30 A84-11338 Assessment of the functional condition of the female rganism in factories p 17 A84-11341 organism in factories

The relationship between the operator performance under maximum information loads and the individual parameters of the EEG alpha rhythm p 30 A84-11343

External respiration in electric welders p 19 A84-11571

Changes in the amino acid contents of saliva and unne in oil and gas drillers p 19 A84-11573 A hygienic evaluation of the working environment of

p 19 A84-11574 off-shore oil rigs p 19 A84-11574 Sufficient conditions for the asymptotic stability of a homeostat --- for operator group activity simulation

p 38 A84-12110 Proceedings of the 18th Annual Conference on Manual Control

[AD-A131256] p 39 N84-10763

Method for assessing mental stress in operators

p 32 N84-11715 OPERATORS (PERSONNEL)

An approach to modeling of human performance for purposes of probabilistic risk assessment DE83-009292] p 40 N84-11764

OPTOMETRY The eye and light --- Russian book p 38 A84-12127

ORBITAL ASSEMBLY A voice interactive system for aiding and documentation

of space-based tasks [AIAA PAPER 83-2355] p 33 A84-10025 **ORBITAL SERVICING**

A voice interactive system for aiding and documentation of space-based tasks

[AIAA PAPER 83-2355] p 33 A84-10025 ORBITAL SPACE STATIONS

Biological life support system

° p 37 A84-11755 [IAF PAPER 83-174]

ORBITING FROG OTOLITH

The frog-statolith-experiment (STATEX) of the German Spacelab mission D1 - Scientific background and technical description

[IAF PAPER 83-184]

ORGAN WEIGHT

A quantitative evaluation of various cardiac regions in p 5 A84-11558 ORGANIC COMPOUNDS

Recent advances in EPA's (Environmental Prog monitoring and methods development research p 24 N84-10743 [PB83-2312091

Personal exposure to volatile organics and other The TEAM (Total compounds indoors and outdoors Exposure Assessment Methodology) study [PB83-231357] p 24 N84-10744

ORTHOSTATIC TOLERANCE

Changes in cardiac output and orthostatic stability of p 25 N84-11697 cosmonaute Normal human coronary circulation during postural tests and decompression of lower half of body

p 26 N84-11699 Dynamics of rheographic parameters of cerebral circulation and circulation in the extremities during active

orthostatic test p 26 N84-11700 Effect of redistribution of blood on seventy of spatial position illusions in weightlessness p 26 N84-11701

Energy metalbolism enzymes in simulation of some p 26 N84-11704 spaceflight factors OSTEOPOROSIS

Bone and calcium alterations during spaceflight p 12 N84-11729

OXIDASE

The seasonal characteristics of the effect of low temperature on the activity of brain monamine oxidase and the sensitivity of rats to hyperoxia p 4 A84-10846 OXYGEN BREATHING

Single breath cardiac output Enhanced sampling and analysis techniques p 38 A84-12064 Control of breathing at the start of exercise as influenced p 21 A84-12657

OXYGEN CONSUMPTION

Lactate accumulation during incremental exercise with p 14 A84-10280 varied inspired oxyen fractions Oxygen regimen in the human peripheral tissue during space flights p 19 A84-11760 [IAF PAPER 83-197]

Overall 'gain' of the respiratory control system in normoxic humans awake and asleep p 22 A84-12660

Optimizing the exercise protocol for cardiopulmonary p 22 A84-12662

OXYGEN MASKS

Compatibility analysis of the MBU-14/P oxygen mask and U.S. Navy oxygen regulators p 34 A84-10721

OXYGEN METABOLISM In vivo companson of cytochrome aa3 redox state and tissue PO2 in transient anoxia p 1 A84-10276 The role of metals in free radical oxidation processes

the tissues of organisms according to data of spontaneous and initiated chemiluminescence p 2 A84-10483

Spontaneous biochemiluminescence of mitochondria of several tissues in normal conditions and during the action of physical factors p 2 A84-10484

Oxygen regimen in the human peripheral tissue during space flights [IAF PAPER 83-197] p 19 A84-11760

OXYGEN PRODUCTION

Naval aviation solid chemical oxygen emergency system p 36 A84-10737 program

OXYGEN REGULATORS

Compatibility analysis of the MBU-14/P oxygen mask and U S Navy oxygen regulators p 34 A84-10721

OXYGEN SUPPLY EQUIPMENT

The F-16 on board oxygen generation system (BOGS) p 34 A84-10712 (OBOGS)

The USAFSAM advanced oxygen system concept p 34 A84-10713

U.S. Navy life support R&D programs p 35 A84-10729

Naval aviation on-board oxygen generation system 1982 A status report p 35 A84-10736 Naval aviation solid chemical oxygen emergency system

p 36 A84-10737

orogram OXYHEMOGLOBIN

Training-dependent changes of red cell density and p 21 A84-12653 erythrocytic oxygen transport

OZONE

Time course of airway hyperresponsiveness induced by ozone in dogs p 2 A84-10286 Influence of nitrogen dioxide on xenobiotic metabolism

p 14 N84-11743 (PB83-2397231

Ozone toxicity effects consequent to prolonged, high intensity exercise [PB83-237388] p 29 N84-11755

PAINTS

Results and interpretation of labor-hygienic studies in the paintshop of the jet engine depot of the Woensdrecht airbase

[PML-1982-54] PARACHUTES

U.S. Navy life support R&D programs

p 35 A84-10729

PARAMECIA Respective role of microgravity and cosmic rays on

paramecium tetraurelia cultured aboard Salyut 6 IIAF PAPER 83-186] p 6 A84-11759

PARAMETER IDENTIFICATION The physiological effects of simultaneous exposures to

heat and vibration NASA-TM-844001 p 22 N84-10732

PARTICULATE SAMPLING

Bioassay of particulate organic matter from ambient [PB83-239731] p 29 N84-11754

PASSENGER AIRCRAFT

Companion trainer aircraft Concept test

AD-A1313781 p 32 N84-11757

PATHOLOGICAL EFFECTS The effect of ischemia and postischemic restoration of

blood circulation on the ultrastructure of the neurons p.5 A84-11556

PATTERN RECOGNITION

Neurocognitive pattern analysis [AD-A131302] p 24 N84-10740

PENTOBARBITAL

Pharmacokinetics of pentobarbital under hyperbanc and hyperbanc hyperoxic conditions in the dog

p 6 A84-12063

PERCEPTION Functional asymmetry of the cerebral hemispheres and

unconscious perception --- Russian book p 20 A84-12131 Integrated Cuing Requirements (ICR) study: Feasibility

analysis and demonstration study [AD-A131039] p 32 N84-10758 Representations of perceptions of risks

[AD-A131443] p 32 N84-10759

PERCEPTUAL ERRORS

An effect of speed on induced motion

p 30 A84-12786

PERFORMANCE TESTS

Flying performance on the advanced simulator for pilot aining and laboratory tests of vision p 30 A84-10973 PERSONNEL

Heat-transfer characteristics of port workers in the p 19 A84-11572 Preliminary investigation of variation in some dark adaptation aspects for possible relevance to military

helicopter aircrew [AD-A130231] p 22 N84-10733

PERSPIRATION Thermoregulation in Erythrocebus patas - A thermal

balance study PESTICIDES Personal exposure to volatile organics and other The TEAM (Total

compounds indoors and outdoors Exposure Assessment Methodology) study p 24 N84-10744 [PB83-231357]

PHARMACOLOGY

An analysis of the mechanism of the hypothermic action p 3 A84-10845 of neurotropic compounds PHARYNX

The development and structure of the lymphoepithelial pharyngeal ring of the Macacus rhesus

PHOSPHATES

Generation of electric potentials on mitochondrial membranes during the hydrolysis of inorganic pyrophosphate p 5 A84-11366

PHOSPHORUS METABOLISM

The effect of a constant magnetic field on the processes peroxide oxidation of lipids in phospholipid embranes p 8 A84-12570 membranes

PHOSPHORYLATION Protein phosphorylation in the brain p 4 A84-11253 PHOTOSENSITIVITY

The eye and light --- Russian book p 38 A84-12127

p 5 A84-11559

PHOTOSYNTHESIS	The physiological effects of simultaneous exposures to	PILOT TRAINING
Photosynthesis in intact plants	heat and vibration	Down in the Arctic - Equipment and training for
[DE83-016045] p 13 N84-11740	[NASA-TM-84400] p 22 N84-10732	survival p 35 A84-10726
PHYSICAL EXERCISE	Condition of erythrocytes during long-term exposure to	An application of signal detection theory to air combat
Influence of training on blood flow to different skeletal	magnetic field p 11 N84-11711	training p 29 A84-10972
muscle fiber types p 1 A84-10278 Renin, angiotensin-converting enzyme, and aldosterone	Gravitational study of the central nervous system	Flying performance on the advanced simulator for pilot training and laboratory tests of vision p 30 A84-10973
in humans on Mount Everest p 14 A84-10279	p 12 N84-11730 PHYSIOLOGICAL RESPONSES	Flying training R&D (Research and Development) at the
Lactate accumulation during incremental exercise with	Renin, angiotensin-converting enzyme, and aldosterone	Air Force Human Resources Laboratory
varied inspired oxyen fractions p 14 A84-10280	in humans on Mount Everest p 14 A84-10279	[AD-A130250] p 31 N84-10752
Hypohydration and exercise - Effects of heat acclimation,	Time course of airway hyperresponsiveness induced by	Companion trainer aircraft Concept test
gender, and environment p 15 A84-10281	ozone in dogs p 2 A84-10286	[AD-A131378] p 32 N84-11757
Regional distribution of blood flow during mild dynamic	The pattern of local vascular responses in conditions	PIVOTS
leg exercise in the baboon p 2 A84-10283 Effect of physical training on myocardial enzyme	of an increased activity of the cerebral cortex	Self-locking telescoping manipulator arm [NASA-CASE-MFS-25906-1] p 40 N84-11761
activities in aging rats p 2 A84-10288	p 3 A84-10844 Heart-rhythm reaction to sensonmotor loads of varying	PLANTS (BOTANY)
Physical methods of treatment in neurology Russian	complexity p 16 A84-11331	Physiological and ecological characteristics of the water
book p 15 A84-10488	Circadian fluctuations of certain indicators of the	fern, azolla pinnata, and prospects of using it in biological
Circadian fluctuations of certain indicators of the	condition of the cardiovascular system and skin electrical	life-support system for man p 39 N84-11709
condition of the cardiovascular system and skin electrical	characteristics in young female athletes engaged in	Evidence for a regulatory role of calcium in
characteristics in young female athletes engaged in	academic rowing p 17 A84-11332	gravitropism p 11 N84-11721 Calcium modulation of plant plasma membrane-bound
academic rowing p 17 A84-11332 Prediction of hemodynamic reactions to isometric	Neuron correlates of the recognition of visual stimuli	ATPase activities p.12 N84-11723
exercise p 17 A84-11333	Dynamics of the means and variances of the current discharge frequency of neuron populations of the human	Role of calcium and calmodutin in plant cell regulation
Training-dependent changes of red cell density and	brain in tests involving visual-stimulus recognition il -	p 12 N84-11725
erythrocytic oxygen transport p 21 A84-12653	Investigation of space-time correlations between current	Local calcium entry and the guidance of growth
Energy metalbolism enzymes in simulation of some	frequencies of the impulse activity of neuron populations	p 12 N84-11726
spaceflight factors p 26 N84-11704	of the human brain during the recognition of visual	Developing higher plant systems in space
PHYSICAL FITNESS	stimuli p 17 A84-11335	p 12 N84-11727
Optimizing the exercise protocol for cardiopulmonary	Assessment of the functional condition of the female	Summary of study group session discussions
assessment p 22 A84-12662 PHYSICAL WORK	organism in factories p 17 A84-11341	ρ 13 N84-11739 PLATELETS
The effect of an increased mechanical load on the	General results of medical investigations in Salyut-6 manned space flights	Platelets and leukocytes in the lungs after acute
dependence of the contraction of isolated heart muscle	[IAF PAPER 83-202] p 20 A84-11761	hypobanc hypoxia p 9 A84-12661
on the concentration of Ca(2+) in the perfusate	Cardiovascular injury from blunt thoracic impact of	POLARITY
p 3 A84-10843	epinephrine and isoproterenol injected rabbits	Polanty of the amphibian egg p 12 N84-11731
Dependence of structures of heart rhythm on the	p 6 A84-12060	POLARIZATION (WAVES)
physical work capacity of athletes p 16 A84-11328	Rat hindlimb muscle responses to suspension	Performance of a new 916 MHz direct contact applicator
Long-term retarded training effect of force loads	hypokinesia/hypodynamia p 6 A84-12065	with reduced leakage, a detailed analysis [PB83-226621] p 24 N84-10742
p 18 A84-11554 Heat-transfer characteristics of port workers in the	Cardiorespiratory response to exercise in men	POLLUTION MONITORING
Arctic p 19 A84-11572	repeatedly exposed to extreme altitude p 21 A84-12651	Recent advances in EPA's (Environmental Prog
PHYSIOCHEMISTRY	Age-related responses to mild restraint in the rat	monitoring and methods development research
Protein phosphorylation in the brain p 4 A84-11253	p 8 A84-12654	[PB83-231209] p 24 N84-10743
The influence of the neuropeptide arginine-vasopressin	Effect of intravenous dopamine on hypercapnic	Probabilistic model for assessing time-varying
on human tolerance to a hot dry environment	ventilatory response in humans p 21 A84-12655	contaminant levels [PB83-232108] p 24 N84-10745
p 17 A84-11339 The effect of the administration of	Plasma adrenocorticotropin and cortisol responses to	[PB83-232108] p 24 N84-10745 Method for identifying trace contaminants in chamber
8-arginine-vasopressin during a period of adaptation to	submaximal and exhaustive exercise p 21 A84-12656 USSR report Space Biology and Aerospace Medicine,	atmosphere at high pressure p 39 N84-11718
hyperthermia p 17 A84-11340	volume 17, no 5, September - October 1983	POLYCYTHEMIA
Metabolism of certain trace elements and the	[JPRS-84655] p 10 N84-11693	Polycythemia and the acute hypoxic response in awake
prophylaxis of their deficit in athletes p 18 A84-11553	Study of cardiovascular system during long-term	rats following chronic hypoxia p 1 A84-10282
Changes in the amino acid contents of saliva and urine	spaceflights p 25 N84-11694	POSTURE
in oil and gas drillers p 19 A84-11573	The Regulatory Functions of Calcium and the Potential	Control of breathing at the start of exercise as influenced by posture p 21 A84-12657
An investigation of the interaction of poly A with phospholipid membranes using an Ir spectroscopic	Role of Calcium in Mediating Gravitational Responses in	by posture p 21 A84-12657 PREDICTIONS
method p 8 A84-12569	Cells and Tissues [NASA-CP-2286] p 11 N84-11720	Cervical spline analysis for ejection injury prediction
Effect of intravenous dopamine on hypercapnic	PHYSIOLOGICAL TESTS	' [AD-A131081] p 23 N84-10739
ventilatory response in humans p 21 A84-12655	'Anaerobic threshold' - Problems of determination and	PRESSURE EFFECTS
Plasma adrenocorticotropin and cortisol responses to	validation p 15 A84-10284	Pharmacokinetics of pentobarbital under hyperbaric and
submaximal and exhaustive exercise p 21 A84-12656	Human physiology research under microgravity	hyperbaric hyperoxic conditions in the dog
Inhibition of glycolysis potentiates hypoxic vasoconstriction in rat lungs p 8 A84-12658	conditions and the proposed 'anthrorack' facility	p 6 A84-12063 PRESSURE REGULATORS
vasoconstriction in rat lungs p 8 A84-12658 Metabolic acids and H(+) regulation in brain tissue	p 15 A84-10397 Physiological testing of a helicopter mobile aircrewman	A servo controlled rapid response anti-G valve
during acclimatization to chronic hypoxia	cooling system p 34 A84-10725	p 35 A84-10732
p 9 A84-12659	Single breath cardiac output - Enhanced sampling and	PRESSURE SUITS
Calcium and mitosis p 12 N84-11722	analysis techniques p 38 A84-12064	A servo controlled rapid response anti-G valve
PHYSIOLOGICAL EFFECTS	The confirmation of 9-carboxy-THC in urine by gas	p 35 A84-10732
The effect of the administration of	chromatography/mass spectrometry p 20 A84-12068	PREVENTION
8-arginine-vasopressin during a period of adaptation to hyperthermia p 17 A84-11340	Optimizing the exercise protocol for cardiopulmonary	Prevention of acute mountain sickness by dexamethasone
Economical regimes of running for athletes of different	assessment p 22 A84-12662 PHYSIOLOGY	[AD-A131533] p 23 N84-10737
ages in a hot climate p 18 A84-11552	Principles of the physiology of functional systems	PROCESS CONTROL (INDUSTRY)
Long-term retarded training effect of force loads	Russian book p 3 A84-10487	Industrial robots and their applications - Robotics for
p 18 A84-11554	Summary of study group session discussions	machine building (2nd revised and enlarged edition)
Extenorization of the effect of hyperthermia by observing	p 13 N84-11739	Russian book p 38 A84-12181
the sympathoadrenal activity in subjects under	PILOT PERFORMANCE	Report on development, installation of industrial
psychoemotional stress p 18 A84-11555	The effects of cuing in time-shared tasks for aircraft	robots p 39 N84-11339 PRODUCTION ENGINEERING
The effect of diuretics on the concentration of calcium	flight route-way-point information p 29 A64-10971 Modern method and instrument for measuring psychic	Civil applications of infrared techniques
in blood serum and its excretion with the unne p 18 A84-11563	performance of aircraft pilots	[BMFT-FB-T-83-132] p 29 N84-11753
A hygienic evaluation of several characteristics of	[IAF PAPER 83-181] p 30 A84-11756	PRODUCTION MANAGEMENT
intermittent noise p 19 A84-11566	Flying training R&D (Research and Development) at the	Aquaculture techniques A production forecasting model
A hygienic evaluation of elevated dynamic loads on	Air Force Human Resources Laboratory	for aquaculture systems
passengers in urban transport vehicles	[AD-A130250] p 31 N84-10752	[PB83-221713] p 10 N84-10730
p 19 A84-11569	PILOT SELECTION USSE report. Space Biology and Agreeman Moderns	PROGNOSIS Predicting ventricular arrythmia of the heart in patients
External respiration in electric welders	USSR report Space Biology and Aerospace Medicine, volume 17, no 5, September - October 1983	with myocardial infarction p 18 A84-11564
p 19 A84-11571	[JPRS-84655] p 10 N84-11693	PROSTHETIC DEVICES
A hygienic evaluation of the working environment of	Experimental psychological methods used in expert	Prosthetic occlusive device for an internal
off-shore oil rigs p 19 A84-11574	evaluation of mental work capacity of flight personnel in	passageway
Pharmacokinetics of pentobarbital under hyperbaric and	the presence of functional disturbances and central	[NASA-CASE-MFS-25740-1] p 27 N84-11744
hyperbanc hyperoxic conditions in the dog p 6 A84-12063	nervous system diseases p 26 N84-11712	PROTECTIVE CLOTHING
Training-dependent changes of red cell density and	A method of assessing cardiac function with bicycle ergometry in expert medical certification of pilots	Heat stress related to the operation of Canadian forces aircraft - A historical review and possible solution
erythrocytic oxygen transport p 21 A84-12653	p 27 N84-11716	p 34 A84-10719
· · · · · · · · · · · · · · · · · · ·	F =:	•

PROTEIN METABOLISM

Regulatory functions of actin in the cell

p 5 A84-11349 Free arrano acids of blood before and after short-term p 26 N84-11702 spaceflights

Effect of hypokinesia on amino acid metabolism in rats on diets differing in calcium and phosphorus content p 11 N84-11707

The fractionation of plasma proteins in large scale preparations of blood --- Russian book

p 3 A84-10492 Protein phosphorylation in the brain p 4 A84-11253 Intracellular calcium receptors Calmodulin and related p 12 N84-11724 Role of calcium and calmodulin in plant cell regulation

p 12 N84-11725 Role of calmodulin in cell proliferation

p 13 N84-11737 PSYCHOACOUSTICS

Distribution of individual indices of the subjective evaluation of loudness p 30 A84-11337

PSYCHOLOGICAL FACTORS

Theory and experiment in the analysis of the work of operators --- Russian book p 33 A84-10473 Direct comparison of intuitive, guasi-rational and analytical cognition

[AD-A130273] p 31 N84-10751 A critical analysis of the uses of multiple regression in the study of human judgement

p 31 N84-10755 [AD-A131224]

Representations of perceptions of risks p 32 N84-10759 AD-A1314431

PSYCHOLOGICAL TESTS

Effects of head impact acceleration on human Overview and preliminary battery identification p 31 N84-10754 [AD-A130286]

PSYCHOMOTOR PERFORMANCE

The influence of the neuropeptide arginine-vasopressin on human tolerance to a hot dry environment

p 17 A84-11339 Modern method and instrument for measuring psychic

performance --- of aircraft pilots [IAF PAPER 83-181] p 30 A84-11756

PSYCHOPHYSICS

The relationship between the operator performance under maximum information loads and the individual parameters of the EEG alpha rhythm p 30 A84-11343 **PSYCHOPHYSIOLOGY**

The role of adrenalin in the genesis of disorders of motor skills in conditions of emotional stress

p 30 A84-11338 Functions of the frontal lobes of the brain --- Russian

ook p 20 A84-11962 Functional asymmetry of the cerebral hemispheres and unconscious perception --- Russian book

p 20 A84-12131

PUBLIC HEALTH

A survey of body fat content of U.S. Navy male personnel p 23 N84-10736 AD-A1315001

PULMONARY FUNCTIONS

Polycythemia and the acute hypoxic response in awake rats following chronic hypoxia p 1 A84-10282 Optimizing the exercise protocol for cardiopulmonary p 22 A84-12662 Influence of nitrogen dioxide on xonobiotic metabolism in animals D 14 N84-11743

[PB83-2397231 PYROMETERS

Civil applications of infrared techniques [BMFT-F8-T-83-132] p.: p 29 N84-11753

R

RADIATION DOSAGE

Radiofrequency radiation exposure for bio-effects research at the Health Effects Research Laboratory, Research Triangle Park, North Carolina

[PB83-229591] p 25 N84-10747 Concepts of dose to soft tissue at the cellular level [DE83-013830] DE83-013830] p 28 N84-11748 Accuracy of external personnel dosimetry systems in

mixed neutron and gamma radiation fields p 28 N84-11751 (DE83-0157121

RADIATION EFFECTS

Behavioral and autonomic thermoregulation in mice exposed to microwave radiation

sposed to microwave radiation p 2 A84-10287 Spontaneous biochemiluminescence of mitochondria of several tissues in normal conditions and during the action p 2 A84-10484 of physical factors

Respective role of microgravity and cosmic rays on paramecium tetraurelia cultured aboard Salyut 6 [IAF PAPER 83-186] p 6 A84-11759

Calculations of radiation fields and monkey mid-head and mid-thorax responses in AFRRI-TRIGA reactor facility expenments

[DE83-015483] p 13 N84-11741 Concepts of dose to soft tissue at the cellular level [DE83-013830] p 28 N84-11748

RADIATION SHIELDING

Prediction of vomiting in dogs exposed to radiation with shielding of midabdomen p 11 N84-11710

RADIATION SICKNESS Prediction of vomiting in dogs exposed to radiation with

shielding of midabdomen p 11 N84-11710 RADIO FREQUENCIES Radiofrequency radiation exposure for bio-effects

research at the Health Effects Research Laboratory, Research Triangle Park, North Carolina p 25 N84-10747

RADIOGRAPHY

Fourier-processed images of dynamic lung function from

p 24 N84-10741 [DE83-013276] RATIONS

Aircraft crew diet in emergency situations

p 39 N84-11696

Stability of rat brain glutamine synthetase to oxygen toxicity (oxygen at high pressure) [AD-A131049] p 9 N84-10725

REACTION TIME

Modern method and instrument for measuring psychic performance --- of aircraft pilots

[IAF PAPER 83-181] p 30 A84-11756 Effects of head impact acceleration on human performance Overview and preliminary battery identification

p 31 N84-10754 (AD-A1302861 REACTOR SAFETY

An approach to modeling of human performance for purposes of probabilistic risk assessment

[DE83-009292] p 40 N84-11764

REAL TIME OPERATION Design strategies for computer-based information

isplays in real-time control systems p 36 A84-10970 REDUCED GRAVITY Utilisation of the European retneval carner EURECA for

life science research p 6 A84-11753
Respective role of microgravity and cosmic rays on paramecium tetraurelia cultured aboard Salyut 6

p 6 A84-11759 TIAE PAPER 83.1861

REGRESSION ANALYSIS

Effects of impact acceleration on somatosensory evoked potentials

[AD-A130280] p 22 N84-10734 A critical analysis of the uses of multiple regression in the study of human judgement

[AD-A131224] p 31 N84-10755

REMOTE MANIPULATOR SYSTEM

A system for intelligent teleoperation research

[AIAA PAPER 83-2376] p 33 A84-10070 Simulation of the motion of a Shuttle-attached flexible

manipulator arm p 37 A84-11935 RESEARCH AND DEVELOPMENT

A system for intelligent teleoperation research

[AIAA PAPER 83-2376] p 33 A84-10070

Study and development activities of Dornier System on space biology/medicine equipment and payloads for Spacelab and freeflying platform application [IAF PAPER 83-183] p 37 p 37 A84-11757

RESPIRATION

Spontaneous biochemiluminescence of mitochondria of Spontaneous procriering interesting the action several tissues in normal conditions and during the action of physical factors p 2 A84-10484

The design and operation of systems for inhalation exposure of animals

p 10 N84-10727 [DE83-015388] Measurement of lung function using the magnetometer

system [AD-A130841] p 23 N84-10738

Efficiency of high-frequency ventilation as determined by nitrogen washouts A model study [AD-A131331] p 27 N84-11745

RESPIRATORY PHYSIOLOGY

Ventilatory response of intact cats to carbon monoxide hypoxia p 1 A84-10277

Lactate accumulation during incremental exercise with vaned inspired oxyen fractions p 14 A84-10280 'Anaerobic threshold' - Problems of determination and

validation p 15 A84-10284 Time course of airway hyperresponsiveness induced by

ozone in dogs p 2 A84-10286 Hyperventilation as a method for detecting disorders of atrioventricular conductivity in athletes

p 18 A84-11562 External respiration in electric welders

p 19 A84-11571

Control of breathing at the start of exercise as influenced p 21 A84-12657

glycolysis potentiates Inhibition hypoxic p 8 A84-12658 vasoconstriction in rat lungs

Overall 'gain' of the respiratory control system in normoxic humans awake and asleep . p 22 A84-12660 RESPIRATORY RATE

Behavioral and autonomic thermoregulation in mice exposed to microwave radiation p 2 A84-10287
Cardiorespiratory response to exercise in men repeatedly exposed to extreme allitude p 21 A84-12651

Effect of intravenous dopamine on hypercapnic ventilatory response in humans p 21 A84-12655 RESPIRATORY REFLEXES

Time course of airway hyperresponsiveness induced by ozone in dogs p 2 A84-10286 RHEOENCEPHALOGRAPHY

Rheoencephalography - Biophysical foundations. information content, and limits of application p 5 A84-11326

RHEOLOGY

The use of functional rheovasography for the examination of athletes with circulatory disorders in lower extremities p 18 A84-11551

RHYTHM (BIOLOGY) A hygienic evaluation of several characteristics of

intermittent noise p 19 A84-11566

RISK The relevance of experimental animal studies to the

human experience [DE83-014053] p 10 N84-10729

Representations of perceptions of risks [AD-A131443] p 32 N84-10759

An approach to modeling of human performance for purposes of probabilistic risk assessment [DE83-009292] p p 40 N84-11764

ROBOTICS

A system for intelligent teleoperation research
[AIAA PAPER 83-2376] p 33 A8

AIAA PAPER 83-2376] p 33 A84-10070 Industrial robots and their applications - Robotics for machine building (2nd revised and enlarged edition) -p 38 A84-12181 Russian book

ROBOTS Report on development, installation of industrial p 39 N84-11339

A survey of robotic technology

[AD-A130999] RÜNNING

Effect of a 42 2-km footrace and subsequent rest or exercise on muscle glycogen and enzymes

p 15 A84-10285 Economical regimes of running for athletes of different ages in a hot climate

p 18 A84-11552

p 40 N84-11762

S

SAFETY

Direct companson of intuitive, quasi-rational and analytical cognition [AD-A130273]

p 31 N84-10751 SAFETY FACTORS Microwaves, hyperthermia, and human leukocyte

function p 24 N84-10746 [PB83-225375]

SALIVA Changes in the amino acid contents of saliva and unne

p 19 A84-11573 in oil and oas drillers SALYUT SPACE STATION General results of medical investigations in Salyut-6

manned space flights [IAF PAPER 83-202] p 20 A84-11761 SCALING LAWS

Representations of perceptions of risks

[AD-A131443] p 32 N84-10759 SCIENTISTS

Direct companson of intuitive, quasi-rational and analytical cognition

[AD-A130273] p 31 N84-10751

SCRUBBERS Design guidelines for carbon dioxide scrubbers [AD-A130459] p 39 N84

p 39 N84-10761 SEAT BELTS

In search of - An acceptable lap belt p 34 A84-10716 Improving restraint systems capabilities in older egress p 34 A84-10717

systems

Impact and vibration testing of a modified UH-1 crew seat p 38 N84-10760

[AD-A130279] SEMICIRCULAR CANALS

Displacement of liquid in a model of semicircular canals under the effect of angular accelerations p 18 A84-11350 weightlessness

SENSORIMOTOR PERFORMANCE

Heart-rhythm reaction to sensorimotor loads of varying p 16 A84-11331 complexity The role of adrenalin in the genesis of disorders of motor skills in conditions of emotional stress

p 30 A84-11338

Free amino acids of blood before and after short-term spaceflights p 26 N84-11702 SERVOCONTROL

A servo controlled rapid response anti-G valve

p 35 A84-10732 SEX FACTOR

Hypohydration and exercise - Effects of heat acclimation, p 15 A84-10281 ender, and environment SHIVERING

An analysis of the mechanism of the hypothermic action p 3 A84-10845 of neurotropic compounds
SHOCK RESISTANCE

Simulation of cerebrocranial trauma for evaluation and development of gear to protect pilots against impacts

SHOES

The energy cost and heart rate response of trained and untrained subjects walking and running in shoes and boots

[AD-A131420] SIGNAL DETECTION

p 23 N84-10735

An application of signal detection theory to air combat p 29 A84-10972 SIZE DISTRIBUTION

Condition of erythrocytes during long-term exposure to

magnetic field p 11 N84-11711 SIZE SEPARATION

Measurement of lung function using the magnetometer system

[AD-A130841] p 23 N84-10738

SKIN (ANATOMY) Skin capillary bed under the prolonged limitation of human muscular activity in the antiorthostatic position p 17 A84-11334

Oxygen regimen in the human penpheral tissue during

space flights [IAF PAPER 83-197] p 19 A84-11760

Overall 'gain' of the respiratory control system in

normoxic humans awake and asleep p 22 A84-12660 SLEEP DEPRIVATION

Task validation for studies on fragmented sleep and cognitive efficiency under stress

[AD-A130260] p 31 N84-10753 SOILS

Simulation of Viking biology experiments suggests smectites not palagonites, as martian soil analogue

p 41 A84-10655

SOLIDIFIED GASES

Naval aviation solid chemical oxygen emergency system p 36 A84-10737 SOUND PRESSURE

Technique for measuring the sound pressure levels under flying helmets and headsets p 40 N84-11765

FIZE-1982-391

SPACE ENVIRONMENT SIMULATION Simulation of Viking biology experiments suggests smectites not palagonites, as martian soil analogues

p 41 A84-10655

SPACE FLIGHT STRESS

Human physiology research under microgravity conditions and the proposed 'anthrorack' facility
p 15 A84-10397

General results of medical investigations in Salyut-6

ed space flights **IIAF PAPER 83-2021** p 20 A84-11761

USSR report Space Biology and Aerospace Medicine, volume 17, no 5, September - October 1983

p 10 N84-11693 (JPRS-846551 Free amino acids of blood before and after short-term spaceflights p 26 N84-11702

SPACE SHUTTLE PAYLOADS

Utilisation of the European retneval carner EURECA for life science research p 6 A84-11753

SPACE STATIONS

Environmental control and life support (ECLS) system for space station - No single answer [IAF PAPER 83-173] p 37 A84-11754

SPACEBORNE EXPERIMENTS

Human physiology research under microgravity conditions and the proposed 'anthrorack' facility

D 15 A84-10397 Utilisation of the European retneval carner EURECA for p 6 A84-11753 Study and development activities of Dornier System on

space biology/medicine equipment and payloads for Spacelab and freeflying platform application p 37 A84-11757 [IAF PAPER 83-183]

The frog-statolith-experiment (STATEX) of the German Spacelab mission D1 - Scientific background and technical description

[IAF PAPER 83-184] p 6 A84-11758 Oxygen regimen in the human peripheral tissue during

space flights [IAF PAPER 83-197] p 19 A84-11760

SPACECRAFT CONTROL

Simulation of the motion of a Shuttle-attached flexible manipulator arm p 37 A84-11935

SPACECRAFT DESIGN

Utilisation of the European retrieval carrier EURECA for p 6 A84-11753 life science research

SPACECRAFT MODELS

Simulation of the motion of a Shuttle-attached flexible manipulator arm p 37 A84-11935

SPACECRAFT MOTION

Simulation of the motion of a Shuttle-attached flexible manipulator arm p 37 A84-11935

SPACECREWS

Biological life support system [IAF PAPER 83-174]

p 37 A84-11755

SPACELAB PAYLOADS

Study and development activities of Dornier System on space biology/medicine equipment and payloads for Spacelab and freeflying platform application

p 37 A84-11757 (IAF PAPER 83-1831 SPECIFIC HEAT

Pseudo-critical heat capacity of single lipid bilayers

SPECIFICATIONS

Evaluation of a draft standard on performance specifications for health physics instrumentation

[DE83-016169] p 28 N84-11749 Evaluation of a draft standard on performance specifications for health physics instrumentation

[DE83-016186] p 28 N84-11750

SPECTRAL CORRELATION

Dependence of the time of recognition of significant optical stimuli on the features characterizing the space-time organization of brain bipotentials

p 17 A84-11336

SPEECH RECOGNITION Determination of a subjects condition according to pitch p 27 N84-11714 of the vocal vowel 'A'

SPLINES Cervical spline analysis for ejection injury prediction

[AD-A131081] N84-10739

STAINING

The Golgi-Hortega-Lavilla technique, with a useful additional step for application to brain tissue after prolonged fixation p 7 A84-12274

STANDARDS Microwaves, hyperthermia, and human leukocyte

p 24 N84-10746 [PB83-225375] Evaluation of a draft standard on performance specifications for health physics instrumentation DE83-0161691

p 28 N84-11749 Evaluation of a draft standard on performance specifications for health physics instrumentation [DE83-016186] p 28 N84-11750

STATISTICAL ANALYSIS

Intercompanson of stable-element content of foods by tatistical methods p 39 N84-10764 IDE83-0140291

STRESS (PHYSIOLOGY)

Dependence of structures of heart rhythm on the physical work capacity of athletes p 16 A84-11328 Circadian fluctuations of certain indicators of the condition of the cardiovascular system and skin electrical characteristics in young female athletes engaged in

p 17 A84-11332 academic rowing Economical regimes of running for athletes of different ages in a hot climate p 18 A84-11552 Long-term retarded training effect of force loads

p 18 A84-11554 Biochemical mechanisms of stress --- Russian book

p 7 A84-12156 Age-related responses to mild restraint in the rat p 8 A84-12654

STRESS (PSYCHOLOGY)

Level of arterial pressure and vegetative cardiac regulation during the simulation of intense operator activity p 16 A84-11327 Parameters of the distribution of EKG R-R intervals in the prediction of the work capacity of human operators p 16 A84-11330

The role of adrenalin in the genesis of disorders of motor skills in conditions of emotional stress

p 30 A84-11338 Extenorization of the effect of hyperthermia by observing sympathoadrenal activity in subjects under psychoemotional stress

Indicators of catecholamine metabolism and ın aır hemodynamics traffic controllers neurocirculatory dystonia of the hypertension type

D 19 Á84-11568 Modern method and instrument for measuring psychic performance --- of aircraft pilots

[IAF PAPER 83-181] p 30 A84-11756 Method for assessing mental stress in operators p 32 N84-11715

SUBSTITUTES

Companion trainer aircraft Concept test p 32 N84-11757 [AD-A131378] SUITS

Development of passive diver thermal protection evetom (AD-A1306851 p 39 N84-10762

SURVEYS A survey of body fat content of US Navy male personnel

AD-A131500] p 23 N84-10736 SURVIVAL Nonparametric estimation of the distribution of time to

for specific diseases in survival/sacrifice onset experiments

(DE83-013726) p 10 N84-10728

SURVIVAL EQUIPMENT

Down in the Arctic - Equipment and training for p 35 A84-10726 Naval aviation solid chemical oxygen emergency system p 36 A84-10737

SYMPATHETIC NERVOUS SYSTEM

Adrenergic activation of thodothyronine production in p 4 A84-11268

SYSTEMS COMPATIBILITY

Compatibility analysis of the MBU-14/P oxygen mask and U.S. Navy oxygen regulators SYSTEMS ENGINEERING p 34 A84-10721

Environmental control and life support (ECLS) system

for space station - No single answer p 37 A84-11754 [IAF PAPER 83-173] SYSTEMS INTEGRATION

A cockpit and equipment integration laboratory

p 35 A84-10734

SYSTEMS SIMULATION

Simulation of the motion of a Shuttle-attached flexible manipulator arm p 37 A84-11935 SYSTEMS STABILITY

Sufficient conditions for the asymptotic stability of a homeostat --- for operator group activity simulation

p 38 A84-12110

TABLES (DATA)

Intercomparison of stable-element content of foods by statistical methods p 39 N84-10764

[DE83-014029] TASK COMPLEXITY

The effects of cuing in time-shared tasks --- for aircraft

flight route-way-point information p 29 A84-10971 TECHNOLOGY ASSESSMENT Environmental control and life support (ECLS) system

for space station - No single answer p 37 A84-11754 [IAF PAPER 83-173]

TELEOPERATORS A system for intelligent teleoperation research p 33 A84-10070 [AIAA PAPER 83-2376]

TEMPERATURE EFFECTS The seasonal characteristics of the effect of low temperature on the activity of brain monamine oxidase and the sensitivity of rats to hyperoxia p 4 A84-10846 The role of temporal parameters of the interspike interval

in the coding of temperature --- for river crayfish neurons p 4 A84-10849 TEMPERATURE MEASUREMENT

Human body temperature - Its measurement and regulation

p 16 A84-11017 TEMPORAL DISTRIBUTION The role of temporal parameters of the interspike interval

in the coding of temperature --- for river crayfish neurons p 4 A84-10849 Nonparametric estimation of the distribution of time to

onset for specific diseases in survival/sacrifice experiments p 10 N84-10728 I DE83-0137261

TEST CHAMBERS

The design and operation of systems for inhalation exposure of animals [DE83-015388] p 10 N84-10727

THERAPY

Physical methods of treatment in neurology p 15 A84-10488

The application of an electromagnetic field in patients following disorders of brain blood circulation

p 18 A84-11561

tomography by Galerkin or moment

p 28 N84-11747

p 29 N84-11752

p 35 A84-10735

p 5 A84-11567

D 24 N84-10744

p 25 N84-10748

p.9 N84-10725

SUBJECT INDEX
THERMAL COMFORT
Heat stress related to the operation of Canadian forces
aircraft - A historical review and possible solution p 34 A84-10719
Integrator of climate data for assessing indoor
microclimate p 36 A84-11570
THERMAL ENVIRONMENTS
Extenorization of the effect of hyperthermia by observing the sympathoadrenal activity in subjects under
psychoemotional stress p 18 A84-11555
THERMAL INSULATION
Development of passive diver thermal protection system
[AD-A130685] p 39 N84-10762
THERMORECEPTORS
The role of temporal parameters of the interspike interval
in the coding of temperature for river crayfish neurons p 4 A84-10849
THERMOREGULATION
Behavioral and autonomic thermoregulation in mice
exposed to microwave radiation p 2 A84-10287
Human body temperature - its measurement and regulation p 16 A84-11017
Heat-transfer characteristics of port workers in the
Arctic p 19 A84-11572
Thermoregulation in Erythrocebus patas - A thermal
balance study p 9 A84-12663
Gravitational study of the central nervous system
Gravitational study of the central nervous system p 12 N84-41730
p 12 N84-41730
p 12 N84-41730 THORAX Cardiovascular injury from blunt thoracic impact of
p 12 N84-11730 THORAX Cardiovascular injury from blunt thoracic impact of epinephrine and isoproterenol injected rabbits p 6 A84-12060
p 12 N84-11730 THORAX Cardiovascular injury from blunt thoracic impact of epinephrine and isoproterenol injected rabbits p 6 A84-12060 THREE DIMENSIONAL MOTION
p 12 N84-41730 THORAX Cardiovascular injury from blunt thoracic impact of epinephrine and isoproterenol injected rabbits p 6 A84-12060 THREE DIMENSIONAL MOTION Computational studies in the interpretation of structure
p 12 N84-11730 THORAX Cardiovascular injury from blunt thoracic impact of epinephrine and isoproterenol injected rabbits p 6 A84-12060 THREE DIMENSIONAL MOTION
THORAX Cardiovascular injury from blunt thoracic impact of epinephrine and isoproterenol injected rabbits p 6 A84-12060 THREE DIMENSIONAL MOTION Computational studies in the interpretation of structure and motion Summary and extension [AD-A131598] p 27 N84-11746 THYROID GLAND
p 12 N84-41730 THORAX Cardiovascular injury from blunt thoracic impact of epinephrine and isoproterenol injected rabbits p 6 A84-12060 THREE DIMENSIONAL MOTION Computational studies in the interpretation of structure and motion Summary and extension [AD-A131598] p 27 N84-11746 THYROID GLAND Adrenergic activation of tnodothyronine production in
p 12 N84-41730 THORAX Cardiovascular injury from blunt thoracic impact of epinephrine and isoproterenol injected rabbits p 6 A84-12060 THREE DIMENSIONAL MOTION Computational studies in the interpretation of structure and motion Summary and extension [AD-A131598] p 27 N84-11746 THYROID GLAND Adrenergic activation of tnodothyronine production in brown adipose tissue p 4 A84-11268 TIME DEPENDENCE
p 12 N84-41730 THORAX Cardiovascular injury from blunt thoracic impact of epinephrine and isoproterenol injected rabbits p 6 A84-12060 THREE DIMENSIONAL MOTION Computational studies in the interpretation of structure and motion Summary and extension [AD-A131598] p 27 N84-11746 THYROID GLAND Adrenergic activation of tnodothyronine production in brown adipose tissue p 4 A84-11268 TIME DEPENDENCE Dependence of the time of recognition of significant
p 12 N84-41730 THORAX Cardiovascular injury from blunt thoracic impact of epinephrine and isoproterenol injected rabbits p 6 A84-12060 THREE DIMENSIONAL MOTION Computational studies in the interpretation of structure and motion Summary and extension [AD-A131598] p 27 N84-11746 THYROID GLAND Adrenergic activation of tnodothyronine production in brown adipose tissue p 4 A84-11268 TIME DEPENDENCE Dependence of the time of recognition of significant optical stimuli on the features characterizing the
p 12 N84-41730 THORAX Cardiovascular injury from blunt thoracic impact of epinephrine and isoproterenol injected rabbits p 6 A84-12060 THREE DIMENSIONAL MOTION Computational studies in the interpretation of structure and motion Summary and extension [AD-A131598] p 27 N84-11746 THYROID GLAND Adrenergic activation of tnodothyronine production in brown adipose tissue p 4 A84-11268 TIME DEPENDENCE Dependence of the time of recognition of significant optical stimuli on the features characterizing the space-time organization of brain bipotentials
THORAX Cardiovascular injury from blunt thoracic impact of epinephrine and isoproterenol injected rabbits p 6 A84-12060 THREE DIMENSIONAL MOTION Computational studies in the interpretation of structure and motion Summary and extension [AD-A131598] p 27 N84-11746 THYROID GLAND Adrenergic activation of tnodothyronine production in brown adipose tissue p 4 A84-11268 TIME DEPENDENCE Dependence of the time of recognition of significant optical stimuli on the features characterizing the space-time organization of brain bipotentials p 17 A84-11336 TIME SHARING
p 12 N84-41730 THORAX Cardiovascular injury from blunt thoracic impact of epinephrine and isoproterenol injected rabbits p 6 A84-12060 THREE DIMENSIONAL MOTION Computational studies in the interpretation of structure and motion Summary and extension [AD-A131598] THYROID GLAND Adrenergic activation of thodothyronine production in brown adipose tissue p 4 A84-11268 TIME DEPENDENCE Dependence of the time of recognition of significant optical stimuli on the features characterizing the space-time organization of brain bipotentials p 17 A84-11336 TIME SHARING The effects of cuing in time-shared tasks — for aircraft
THORAX Cardiovascular injury from blunt thoracic impact of epinephrine and isoproterenol injected rabbits p 6 A84-12060 THREE DIMENSIONAL MOTION Computational studies in the interpretation of structure and motion Summary and extension [AD-A131598] p 27 N84-11746 THYROID GLAND Adrenergic activation of tnodothyronine production in brown adipose tissue p 4 A84-11268 TIME DEPENDENCE Dependence of the time of recognition of significant optical stimuli on the features characterizing the space-time organization of brain bipotentials p 17 A84-11336 TIME SHARING
p 12 N84-41730 THORAX Cardiovascular injury from blunt thoracic impact of epinephrine and isoproterenol injected rabbits p 6 A84-12060 THREE DIMENSIONAL MOTION Computational studies in the interpretation of structure and motion Summary and extension [AD-A131598] THYROID GLAND Adrenergic activation of tnodothyronine production in brown adipose tissue p 4 A84-11268 TIME DEPENDENCE Dependence of the time of recognition of significant optical stimuli on the features characterizing the space-time organization of brain bipotentials p 17 A84-11336 TIME SHARING The effects of cuing in time-shared tasks — for aircraft flight route-way-point information p 29 A84-10971 TISSUES (BIOLOGY) The Golg-Hortega-Lavilla technique, with a useful
THORAX Cardiovascular injury from blunt thoracic impact of epinephrine and isoproterenol injected rabbits p 6 A84-12060 THREE DIMENSIONAL MOTION Computational studies in the interpretation of structure and motion Summary and extension [AD-A131598] p 27 N84-11746 THYROID GLAND Adrenergic activation of tnodothyronine production in brown adripose tissue p 4 A84-11268 TIME DEPENDENCE Dependence of the time of recognition of significant optical stimuli on the features characterizing the space-time organization of brain bipotentials p 17 A84-11336 TIME SHARING The effects of cuing in time-shared tasks — for aircraft flight route-way-point information p 29 A84-10971 TISSUES (BIOLOGY) The Golgi-Hortega-Lavilla technique, with a useful additional step for application to brain tissue after
p 12 N84-41730 THORAX Cardiovascular injury from blunt thoracic impact of epinephrine and isoproterenol injected rabbits p 6 A84-12060 THREE DIMENSIONAL MOTION Computational studies in the interpretation of structure and motion Summary and extension [AD-A131598] THYROID GLAND Adrenergic activation of tnodothyronine production in brown adipose tissue p 4 A84-11268 TIME DEPENDENCE Dependence of the time of recognition of significant optical stimuli on the features characterizing the space-time organization of brain bipotentials p 17 A84-11336 TIME SHARING The effects of cuing in time-shared tasks — for aircraft flight route-way-point information p 29 A84-10971 TISSUES (BIOLOGY) The Golg-Hortega-Lavilla technique, with a useful
THORAX Cardiovascular injury from blunt thoracic impact of epinephrine and isoproterenol injected rabbits p 6 A84-12060 THREE DIMENSIONAL MOTION Computational studies in the interpretation of structure and motion Summary and extension [AD-A131598] p 27 N84-11746 THYROID GLAND Adrenergic activation of tnodothyronine production in brown adipose tissue p 4 A84-11268 TIME DEPENDENCE Dependence of the time of recognition of significant optical stimuli on the features characterizing the space-time organization of brain bipotentials p 17 A84-11336 TIME SHARING The effects of cuing in time-shared tasks — for aircraft flight route-way-point information p 29 A84-10971 TISSUES (BIOLOGY) The Golgi-Hortega-Lavilla technique, with a useful additional step for application to brain tissue after prolonged fixation p 7 A84-12274 The Regulatory Functions of Calcium and the Potential Role of Calcium in Mediating Gravitational Responses in
THORAX Cardiovascular injury from blunt thoracic impact of epinephrine and isoproterenol injected rabbits p 6 A84-12060 THREE DIMENSIONAL MOTION Computational studies in the interpretation of structure and motion Summary and extension [AD-A131598] p 27 N84-11746 THYROID GLAND Adrenergic activation of thodothyronine production in brown adipose tissue p 4 A84-11268 TIME DEPENDENCE Dependence of the time of recognition of significant optical stimuli on the features characterizing the space-time organization of brain bipotentials p 17 A84-11336 TIME SHARING The Effects of cuing in time-shared tasks — for aircraft flight route-way-point information p 29 A84-10971 TISSUES (BIOLOGY) The Golgi-Hortega-Lavilla technique, with a useful additional step for application to brain tissue after prolonged fixation p 7 A84-12274 The Regulatory Functions of Calcium and the Potential Role of Calcium in Mediating Gravitational Responses in Cells and Tissues
THORAX Cardiovascular injury from blunt thoracic impact of epinephrine and isoproterenol injected rabbits p 6 A84-12060 THREE DIMENSIONAL MOTION Computational studies in the interpretation of structure and motion Summary and extension [AD-A131598] p 27 N84-11746 THYROID GLAND Adrenergic activation of tnodothyronine production in brown adipose tissue p 4 A84-11268 TIME DEPENDENCE Dependence of the time of recognition of significant optical stimuli on the features characterizing the space-time organization of brain bipotentials p 17 A84-11336 TIME SHARING The effects of cuing in time-shared tasks — for aircraft flight route-way-point information p 29 A84-10971 TISSUES (BIOLOGY) The Golgi-Hortega-Lavilla technique, with a useful additional step for application to brain tissue after prolonged fixation p 7 A84-12274 The Regulatory Functions of Calcium and the Potential Role of Calcium in Mediating Gravitational Responses in
THORAX Cardiovascular injury from blunt thoracic impact of epinephrine and isoproterenol injected rabbits p 6 A84-12060 THREE DIMENSIONAL MOTION Computational studies in the interpretation of structure and motion Summary and extension [AD-A131598] p 27 N84-11746 THYROID GLAND Adrenergic activation of triodothyronine production in brown adipose tissue p 4 A84-11268 TIME DEPENDENCE Dependence of the time of recognition of significant optical stimuli on the features characterizing the space-time organization of brain bipotentials p 17 A84-11336 TIME SHARING The effects of cuing in time-shared tasks — for aircraft flight route-way-point information p 29 A84-10971 TISSUES (BIOLOGY) The Golgi-Hortega-Lavilla technique, with a useful additional step for application to brain tissue after prolonged fixation p 7 A84-12274 The Regulatory Functions of Calcium and the Potential Role of Calcium in Mediating Gravitational Responses in Cells and Tissues [NASA-CP-2286] p 11 N84-11720 TOLERANCES (PHYSIOLOGY) Age-related responses to mild restraint in the rat
THORAX Cardiovascular injury from blunt thoracic impact of epinephrine and isoproterenol injected rabbits p 6 A84-12060 THREE DIMENSIONAL MOTION Computational studies in the interpretation of structure and motion Summary and extension [AD-A131598] p 27 N84-11746 THYROID GLAND Adrenergic activation of tnodothyronine production in brown adipose tissue p 4 A84-11268 TIME DEPENDENCE Dependence of the time of recognition of significant optical stimuli on the features characterizing the space-time organization of brain bipotentials p 17 A84-11336 TIME SHARING The effects of cuing in time-shared tasks — for aircraft flight route-way-point information p 29 A84-10971 TISSUES (BIOLOGY) The Golgi-Hortega-Lavilla technique, with a useful additional step for application to brain tissue after prolonged fixation p 7 A84-12274 The Regulatory Functions of Calcium and the Potential Role of Calcium in Mediating Gravitational Responses in Cells and Tissues [NASA-CP-2286] p 11 N84-11720 TOLERANCES (PHYSIOLOGY)

mathode [AD-A131408] of the body [BMFT-FB-T-83-102] TORSO Exposure Assessment Methodology) study

Development and construction of an apparatus based on the principle of multidimensional nuclear magnetic resonance for the formation of images of organs and parts

Aircrew restraint improvement program

TOXIC DISEASES Biochemical criteria for evaluating cardiotoxic effects

TOXIC HAZARDS

Personal exposure to volatile organics and other ompounds indoors and outdoors. The TEAM (Total

[PB83-231357] Registry of toxic effects of chemical substances User's guide to the RTECS computer tape [PB83-223172]

TOXICITY Stability of rat brain glutamine synthetase to oxygen toxicity (oxygen at high pressure) [AD-A131049]

Ozone toxicity effects consequent to prolonged, high [PB83-2373881 p 29 N84-11755 TRACE CONTAMINANTS

Method for identifying trace contaminants in chamber atmosphere at high pressure p 39 N84-11718

Metabolism of certain trace elements and the prophylaxis of their deficit in athletes p 18 A84-11553

Intercompanson of stable-element content of foods by statistical methods IDE83-0140291 p 39 N84-10764 TRACKING (POSITION) An effect of speed on induced motion p 30 A84-12786

TRAINING ANALYSIS Companion trainer aircraft. Concept test [AD-A131378] p 32 N84-11757 TRAINING DEVICES

Effects of behavioral objectives and instructions on earning a category task [AD-A130386] o 30 N84-10750 Extended development procedure EDeP user's [AD-A131381] n 31 N84-10756 Integrated Cuing Requirements (ICR) study: Feasibility

analysis and demonstration study [AD-A131039] p 32 N84-10758 TRANSPORT PROPERTIES Carboxylic acid ionophores as probes of the role of p 13 N84-11735 calcium in biological systems TROPISM

Evidence for a regulatory role of calcium in ravitropism p 11 N84-11721 gravitropism

ULTRASONICS Conference on Ultrasonics in Biology and Medicine, UBIOMED 6 Report summanes [ISSN-0208-5658] p 9 N84-10723 Ultrasound tomography by Galerkin or moment

methods [AD-A131408] n 28 N84-11747 **ULTRAVIOLET LASERS** Vacuum UV laser induced scission of Simian virus 40 p 7 A84-12425

UNCONSCIOUSNESS Inflight loss of consciousness p 15 A84-10739 Functional asymmetry of the cerebral hemispheres and unconscious perception --- Russian book

p 20 A84-12131 UNDERWATER BREATHING APPARATUS Development of passive diver thermal protection

[AD-A130685] p 39 N84-10762 URBAN TRANSPORTATION A hygienic evaluation of elevated dynamic loads on

passengers in urban transport vehicles p 19 A84-11569 An evaluation of the bacterial environment on motor buses p 6 A84-11575

UREAS Changes in blood urea content under hypokinetic p 26 N84-11703 URINALYSIS

The confirmation of 9-carboxy-THC in urine by das chromatography/mass spectrometry p 20 A84-12068 URINE

The effect of diuretics on the concentration of calcium in blood serum and its excretion with the unne p 18 A84-11563

Changes in the amino acid contents of saliva and urine p 19 A84-11573 in oil and gas drillers Changes in blood urea content under hypokinetic conditions

VALVES Prosthetic an internal passageway [NASA-CASE-MFS-25740-1] p 27 N84-11744 VASOCONSTRICTION

Polycythemia and the acute hypoxic response in awake rats following chronic hypoxia p 1 A84-10282 Inhibition of glycolysis potentiates hypoxic vasoconstriction in rat lungs p 8 A84-12658

VASODILATION The pattern of local vascular responses in conditions of an increased activity of the cerebral cortex

p 3 A84-10844 Endothelium-dependent relaxation of coronary arters by noradrenaline and scrotonin p 4 A84-11261 VELOCITY

An effect of speed on induced motion p 30 A84-12786

VENTILATION Ventilatory response of intact cats to carbon monoxide hypoxia p 1 A84-10277 Efficiency of high-frequency ventilation as determined by nitrogen washouts A model study [AD-A131331] p 27 N84-11745

Ozone toxicity effects consequent to prolonged, high [PB83-237388] p 29 N84-11755

VERBAL COMMUNICATION

Determination of a subjects condition according to pitch p 27 N84-11714 of the vocal vowel 'A'

VERTEBRAL COLUMN

Cervical spline analysis for ejection injury prediction [AD-A131081] VERTICAL MOTION

Vertical impact evaluation of the F/FB-111 crew restraint configuration, headrest position, and upper extremity p 38 A84-12059 bracing technique VIBRATION

The physiological effects of simultaneous exposures to

[NASA-TM-84400] p 22 N84-10732

VIRRATION TESTS

Impact and vibration testing of a modified UH-1 crew

[AD-A130279] p 38 N84-10760 VIRUSES

Vacuum UV laser induced scission of Simian virus 40 p 7 A84-12425 DNA Hygienic microbiological/virological examination of an airwasher concerning the emission of airborne p 14 N84-11742 [BMFT-FR-T-83-130]

VISUAL ACUITY

Preliminary investigation of variation in some dark adaptation aspects for possible relevance to military helicopter aircrew p 22 N84-10733

VISUAL FLIGHT

Flying performance on the advanced simulator for pilot training and laboratory tests of vision p 30 A84-10973 VISUAL PERCEPTION

Dependence of the time of recognition of significant optical stimuli on the features characterizing the space-time organization of brain bipotentials p 17 A84-11336

The eye and light --- Russian book p 38 A84-12127 VISUAL STIMULI

The spatial organization of neurons of the brain visual cortex during the stimulation by light spots

p 4 A84-10847 Neuron correlates of the recognition of visual stimuli I Dynamics of the means and variances of the current discharge frequency of neuron populations of the human brain in tests involving visual-stimulus recognition II -Investigation of space-time correlations between current frequencies of the impulse activity of neuron populations of the human brain during the recognition of visual

p 17 A84-11335 Dependence of the time of recognition of significant optical stimuli on the features characterizing the space-time organization of brain bipotentials

p 17 A84-11336

VOICE CONTROL

A voice interactive system for aiding and documentation [AIAA PAPER 83-2355] n 33 A84-10025

VOLATILITY

Personal exposure to volatile organics and other compounds indoors and outdoors. The TEAM (Total Exposure Assessment Methodology) study p 24 N84-10744

Prediction of vomiting in dogs exposed to radiation with p 11 N84-11710 shielding of midabdomen

Determination of a subjects condition according to pitch of the vocal vowel 'A' p 27 N84-11714

WAKEFULNESS

Overall 'gain' of the respiratory control system in normoxic humans awake and asteep p 22 A84-12660 WALKING

The energy cost and heart rate response of trained and untrained subjects walking and running in shoes and boots

[AD-A131420] p 23 N84-10735

WASHERS (CLEANERS)

Hygienic microbiological/virological examination of an airwasher concerning the emission of airborne microorganisms (BMFT-FB-T-83-130) p 14 N84-11742

WASTE DISPOSAL

Absorbent product and articles made therefrom [NASA-CASE-MSC-18223-2] p 40 N84 p 40 N84-11758

SUBJECT INDEX **WASTE TREATMENT**

WASTE TREATMENT

Composition and analysis of a model waste for a CELSS (Controlled Ecological Life Support System) [NASA-TM-84368]

WAVEGUIDES

Performance of a new 916 MHz direct contact applicator with reduced leakage, a detailed analysis p 24 N84-10742 [PB83-226621]

WEAPON SYSTEMS

Analysis and outlook concerning an employment of military helicopters in night operations

p 36 A84-11058

WEIGHTLESSNESS

Human physiology research under microgravity conditions and the proposed 'anthrorack' facility

p 15 A84-10397 Displacement of liquid in a model of semicircular canals the effect of angular accelerations under the e weightlessness veightlessness Study of cardiovascular system paceflights

Effect of redistribution of blood on sevently of spatial position illusions in weightlessness sevently of spatial position illusions in weightlessness and sevently of spatial position illusions in weightlessness and sevently of spatial position illusions in weightlessness and sevently of spatial position illusions in page 12 to 1 spaceflights

position illusions in weightlessness p 26 N84-11701 Changes in blood urea content under hypokinetic onditions p 26 N84-11703 conditions Energy metalbolism enzymes in simulation of some p 26 N84-11704

spaceflight factors Evaluation of skeletal muscle tone by recording lateral p 27 N84-11717 Bone and calcium alterations during spaceflight

WEIGHTLESSNESS SIMULATION

Skin capillary bed under the prolonged limitation of human muscular activity in the antiorthostatic position

p 17 A84-11334 The frog-statolith-experiment (STATEX) of the German Spacelab mission D1 - Scientific background and technical

[IAF PAPER 83-184]

WORK CAPACITY

description

'Anaerobic threshold' - Problems of determination and validation p 15 A84-10284

Dependence of structures of heart rhythm on the physical work capacity of athletes p 16 A84-11328
Parameters of the distribution of EKG R-R intervals in

Parameters of the distribution of EAG n-n intervals in the prediction of the work capacity of human operators

p 16 A84-11330

Assessment of the functional condition of the female organism in factories p 17 A84-11341

A hygienic evaluation of several characteristics of Intermittent noise p 19 A84-11566
WORKLOADS (PSYCHOPHYSIOLOGY)

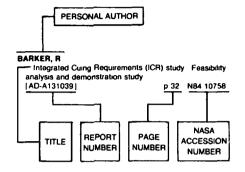
Theory and experiment in the analysis of the work of operators --- Russian book p 33 A84-10473 The relationship between the operator performance under maximum information loads and the individual parameters of the EEG alpha rhythm p 30 A84-11343

PERSONAL AUTHOR INDEX

AEROSPACE MEDICINE AND BIOLOGY / A Continuing Bibliography (Supplement 255)

FEBRUARY 1984

Typical Personal Author Index Listing



Listings in this index are arranged alphabetically by personal author. The title of the document provides the user with a brief description of the subject matter. The report number helps to indicate the type of document listed (e.g., NASA report, translation, NASA contractor report) The page and accession numbers are located beneath and to the right of the title. Under any one author's name the accession numbers are arranged in sequence with the AIAA accession numbers appearing first

ABEL. K

Civil applications of infrared techniques (BMFT-FB-T-83-132)

p 29 N84-11753 ABIDOR, I G

The destruction of a bilayer lipid membrane as a result of electrical breakdown

ADAMS, T D

'Anaerobic threshold' - Problems of determination and validation p 15 A84-10284

ADAMS, W C

Ozone toxicity effects consequent to prolonged, high intensity exercise [PB83-237388] p 29 N84-11755

AFANASEVA, R F

Integrator of climate data for assessing indoor p 36 A84-11570 microclimate

AGAFONOV, S V

Normal human coronary circulation during postural tests and decompression of lower half of body

p 26 N84-11699

AGOSTON, M

Modern method and instrument for measuring psychic performance [IAF PAPER 83-181] p 30 A84-11756

AIZAWA. H

Time course of airway hyperresponsiveness induced by ozone in dogs p 2 A84-10286

AKINSHCHIKOVA, G. I

Determination of a subjects condition according to pitch of the vocal vowel 'A' p 27 N84-11714

ALEKSPEROV, I I

A hygienic evaluation of the working environment of off-shore oil rigs p 19 A84-11574

ALI, J S.

Radiofrequency radiation exposure for bio-effects research at the Health Effects Research Laboratory, Research Tnangle Park, North Carolina

[PB83-229591] p 25 N84-10747

Heat stress related to the operation of Canadian forces aircraft - A historical review and possible solution p 34 A84-10719

ALTLAND, P. D.

Age-related responses to mild restraint in the rat p 8 A84-12654

ANANIAN, A. A.

The seasonal characteristics of the effect of low temperature on the activity of brain monamine oxidase and the sensitivity of rats to hyperoxia p 4 A84-10846

Endothelium-dependent relaxation of coronary arteris by noradrenaline and scrotonin p 4 A84-11261

ANTIUFEV, V F

Rhythmoinotropic phenomena in the human heart

p 16 A84-11329

ANTONIK, I. M The role of metals in free radical oxidation processes in the tissues of organisms according to data of spontaneous and initiated chemiluminescence

p 2 A84-10483

Physiological and ecological characteristics of the water fern, azolla pinnata, and prospects of using it in biological life-support system for man p 39 N84-11709

ARAKELIAN, V B

The destruction of a bilaver lipid membrane as a result of electrical breakdown p 7 A84-12568

ARISTARKHOV, V M

The effect of a constant magnetic field on the processes peroxide oxidation of lipids in phospholipid р8 membranes A84-12570

ARKHANGELSKIY, D Y

Hemodynamic reactions to positive intrathoracic pressure at +G sub z accelerations p 25 N84-11698 ARMSTRONG, L. E

Effect of a 42 2-km footrace and subsequent rest or exercise on muscle glycogen and enzymes p 15 A84-10285

ARUTIUNOV, G. P. Comparative evaluation of changes in MB CPK activity and indicators of precardial mapping p 19 A84-11565

AVETISYANTS, B L.

Method for identifying trace contaminants in chamber p 39 N84-11718 atmosphere at high pressure

B

BABENKO, G A

The role of metals in free radical oxidation processes in the tissues of organisms according to data of spontaneous and initiated chemiluminescence

p 2 A84-10483

Level of arterial pressure and vegetative cardiac regulation during the simulation of intense operator p 16 A84-11327

BAKHAREV, V D.

The influence of the neuropeptide arginine-vasopressin on human tolerance to a hot dry environment

p 17 A84-11339 the administration effect 8-arginine-vasopressin during a period of adaptation to hyperthermia p 17 A84-11340

BALAKHOVSKIY, I. S Changes in blood urea content under hypokinetic

BALFY H C

p 26 N84-11703 Direct biological effects of increased atmospheric

carbon dioxide levels p 25 N84-10749 [PB83-224360]

Simulation of Viking biology experiments suggests smectites not palagonites, as martian soil analogues

Simulation of cerebrocranial trauma for evaluation and development of gear to protect pilots against impacts p 25 N84-11695

Integrated Cuing Requirements (ICR) study: Feasibility analysis and demonstration study [AD-A131039] p 32 N84-10758

BARSUKOVA, ZH V

Level of arterial pressure and vegetative cardiac regulation during the simulation of intense operator p 16 A84-11327

BATEMAN, N T

Metabolic acids and H(+) regulation in brain tissue during acclimatization to chronic hypoxia

n 9 A84-12659

p 30 A84-12786

BECKLEN, R

An effect of speed on induced motion

BELIANIN, P. N.

Industrial robots and their applications - Robotics for

machine building (2nd revised and enlarged edition) p 38 A84-12181

BELLVILLE, J W

Effect of intravenous dopamine hypercapnic p 21 A84-12655 ventilatory response in humans

BENNETT, G. W

Fourier-processed images of dynamic lung function from list-mode data p 24 N84-10741

[DE83-013276] BENNETT, M V L.

Controls of intracellular communication mediated by gap nctions p 13 N84-11738 iunctions

BENTLEY, C F, JR. Naval aviation on-board oxygen generation system 1982

p 35 A84-10736 A status report Naval aviation solid chemical oxygen emergency system p 36 A84-10737

BERGER M D

Neurophysiological effects of -X impact acceleration

p 7 A84-12066 Effects of impact acceleration on somatosensory evoked notentials

[AD-A130280] p 22 N84-10734

BERSHADSKII, B G

Prediction of hemodynamic reactions to isometric exercise p 17 A84-11333

BEVERLEY, K 1

Flying performance on the advanced simulator for pilot training and laboratory tests of vision p 30 A84-10973 BICHENKOV, E.E.

An investigation of the interaction of poly A with phospholipid membranes using an Ir spectroscopic method p 8 A84-12569

BISHOP, B

Programmatic comments p 13 N84-11732 BITTNER, A C, JR

Effects of head impact acceleration on human Overview and preliminary battery performance dentification p 31 N84-10754 [AD-A130286]

BIZAIS I

Fourier-processed images of dynamic lung function from

list-mode data

[DE83-013276] p 24 N84-10741 BLAND, M. K

Direct biological effects of increased atmospheric carbon dioxide levels p 25 N84-10749 [PB83-224360]

BLUME, F D

Renin, angiotensin-converting enzyme, and aldosterone p 14 A84-10279 in humans on Mount Everest

BOBROVNITSKII, M. P.

Oxygen regimen in the human peripheral tissue during space flights [IAF PAPER 83-197] p 19 A84-11760

BOEHM, H.-D V

Analysis and outlook concerning an employment of military helicopters in night operations

p.36 A84-11058

BOGNAR, L.

Modern method and instrument for measuring psychic performance (IAF PAPER 83-181) p 30 A84-11756

BOGOLEPOV, N N

The effect of ischemia and postischemic restoration of blood circulation on the ultrastructure of the neurons

p 5 A84-11556

Control of breathing at the start of exercise as influenced

Single breath cardiac output - Enhanced sampling and

analysis techniques

p 38 A84-12064

COOPER, D M

BOIKO, V I		
		repinephrine
contained in the liposomes in condition		enoreceptor A84-10842
blockade	рз	A04-10042
BONHAM, B H Neurocognitive pattern analysis		
[AD-A131302]	p 24	N84-10740
BONIFAS, S J	•	
Computer analysis in helmet design	ŀ	
	p 33	A84-10710
BONORA, M		
Ventilatory response of intact cats t	o carbo	
hypoxia	р 1	A84-10277
BORISENOK, I T		
Sufficient conditions for the asymp		
homeostat	p 38	A84-12110
BOYKO, M I Evaluation of skeletal muscle tone	hy reco	rdina lateral
ngidity		N84-11717
BRADLEY, M E	F	
Fetal development - Effects of deco	mpress	ion sickness
and treatment	p 7	A84-12070
BRARAMIDZE, D G		
The pattern of local vascular response		
of an increased activity of the cerebra		
PDAIINCTEIN U M	рЗ	A84-10844
BRAUNSTEIN, H M Intercomparison of stable-element	content	of foods by
statistical methods	COINCIN	01 10003 09
[DE83-014029]	р 39	N84-10764
BREEDING, R E		
Environmental control and life supp	ort (EC	CLS) system
for space station - No single answer		
[IAF PAPER 83-173]	p 37	A84-11754
BREKHMAN, I I		
Effect of eleuterococcus extract on		y processes
in rats following seven-day hypokinesi		N84-11706
BRESSLER, S L.	p 11	1404-11700
Neurocognitive pattern analysis		
[AD-A131302]	p 24	N84-10740
BRIEGLEB, W		
The frog-statolith-experiment (STAT	FX) of	the German
Spacelab mission D1 - Scientific backg	round a	nd technical
description	round a	ind technical
description [IAF PAPER 83-184]	round a	nd technical A84-11758
description [IAF PAPER 83-184] BRIGANTI, J F	round a	nd technical A84-11758
description [IAF PAPER 83-184] BRIGANTI, J F Improving restraint systems capabili	round a p 6 ities in i	A84-11758 older egress
description [IAF PAPER 83-184] BRIGANTI, J F Improving restraint systems capabili systems	round a p 6 ities in i	nd technical A84-11758
description [IAF PAPER 83-184] BRIGANTI, J F Improving restraint systems capabilisystems BRILL, A B	p 6 ties in p 34	A84-11758 bilder egress A84-10717
description [IAF PAPER 83-184] BRIGANTI, J F Improving restraint systems capabilisystems BRILL, A B Founer-processed images of dynamic	p 6 ties in p 34	A84-11758 bilder egress A84-10717
description [IAF PAPER 83-184] BRIGANTI, J F Improving restraint systems capabilisystems BRILL, A B	p 6 ities in p 34 ic lung f	A84-11758 bilder egress A84-10717
description [IAF PAPER 83-184] BRIGANTI, J F Improving restraint systems capability systems BRILL, A B Founer-processed images of dynamical strength of the strength of the systems [IDEB3-013276] BRINKLEY, J W	p 6 ities in a p 34 ic lung f	A84-11758 Dider egress A84-10717 unction from N84-10741
description [IAF PAPER 83-184] BRIGANTI, J F Improving restraint systems capabilisystems BRILL, A B Fourier-processed images of dynamilist-mode data [DE83-013276] BRINKLEY, J W Vertical impact evaluation of the F/FI	p 6 titles in c p 34 c lung f p 24 B-111 c	A84-11758 blder egress A84-10717 unction from N84-10741 rew restraint
description [IAF PAPER 83-184] BRIGANTI, J F Improving restraint systems capabilisystems BRILL, A B Fourier-processed images of dynamilist-mode data [DE83-013276] BRINKLEY, J W Vertical impact evaluation of the F/Fi configuration, headrest position, a	p 6 titles in a p 34 clung f p 24 B-111 c nd upp	A84-11758 blder egress A84-10717 unction from N84-10741 rew restraint er extremity
description [IAF PAPER 83-184] BRIGANTI, J F Improving restraint systems capabilities systems BRILL, A B Fourier-processed images of dynamilist-mode data [DE83-013276] BRINKLEY, J W Vertical impact evaluation of the F/Fi configuration, headrest position, a bracing technique	p 6 titles in a p 34 clung f p 24 B-111 c nd upp	A84-11758 blder egress A84-10717 unction from N84-10741 rew restraint
description [IAF PAPER 83-184] BRIGANTI, J F Improving restraint systems capabilisystems BRILL, A B Fourier-processed images of dynamilist-mode data [DE83-013276] BRINKLEY, J W Vertical impact evaluation of the F/Ficonfiguration, headrest position, a bracing technique BROOKS, C J	p 6 titles in a p 34 c lung f p 24 B-111 c nd upp p 38	A84-11758 blder egress A84-10717 unction from N84-10741 rew restraint er extremity A84-12059
description [IAF PAPER 83-184] BRIGANTI, J F Improving restraint systems capabilisystems BRILL, A B Fourier-processed images of dynamilist-mode data [DE83-013276] BRINKLEY, J W Vertical impact evaluation of the F/Fi configuration, headrest position, a bracing technique BROOKS, C J Heat stress related to the operation	p 6 tities in a p 34 tic lung f p 24 B-111 c nd upp p 38 of Can	A84-11758 Didder egress A84-10717 unction from N84-10741 rew restraint er extremity A84-12059 adian forces
description [IAF PAPER 83-184] BRIGANTI, J F Improving restraint systems capabilisystems BRILL, A B Fourier-processed images of dynamilist-mode data [DE83-013276] BRINKLEY, J W Vertical impact evaluation of the F/Ficonfiguration, headrest position, a bracing technique BROOKS, C J	p 6 titles in a p 34 tic lung f p 24 B-111 c nd upp p 38 of Can ble solu	A84-11758 blder egress A84-10717 unction from N84-10741 rew restraint er extremity A84-12059 adian forces
description [IAF PAPER 83-184] BRIGANTI, J F Improving restraint systems capability systems BRILL, A B Founer-processed images of dynamilist-mode data [DE83-013276] BRINKLEY, J W Vertical impact evaluation of the F/Ficonfiguration, headrest position, a bracing technique BROOKS, C J Heat stress related to the operation aircraft - A historical review and possi	p 6 titles in a p 34 tic lung f p 24 B-111 c nd upp p 38 of Can ble solu	A84-11758 Didder egress A84-10717 unction from N84-10741 rew restraint er extremity A84-12059 adian forces
description [IAF PAPER 83-184] BRIGANTI, J F Improving restraint systems capabilisystems BRILL, A B Fourier-processed images of dynamilist-mode data [DE83-013276] BRINKLEY, J W Vertical impact evaluation of the F/FI configuration, headrest position, a bracing technique BROOKS, C J Heat stress related to the operation aircraft - A historical review and possi	p 6 ities in a p 34 c lung f p 24 B-111 c nd upp p 38 of Can ble solu p 34	A84-11758 bilder egress A84-10717 unction from N84-10741 rew restraint er extremity A84-12059 adian forces ation A84-10719
description [IAF PAPER 83-184] BRIGANTI, J F Improving restraint systems capability systems BRILL, A B Founer-processed images of dynamilist-mode data [DE83-013276] BRINKLEY, J W Vertical impact evaluation of the F/Ficonfiguration, headrest position, a bracing technique BROOKS, C J Heat stress related to the operation aircraft - A historical review and possi	p 6 ities in a p 34 c lung f p 24 B-111 c nd upp p 38 of Can ble solu p 34	A84-11758 bilder egress A84-10717 unction from N84-10741 rew restraint er extremity A84-12059 adian forces ation A84-10719
description [IAF PAPER 83-184] BRIGANTI, J F Improving restraint systems capabilisystems BRILL, A B Fourier-processed images of dynamilist-mode data [DE83-013276] BRINKLEY, J W Vertical impact evaluation of the F/Ficonfiguration, headrest position, a bracing technique BROOKS, C J Heat stress related to the operation aircraft - A historical review and possi BROSE, H F Environmental control and life supp for space station - No single answer [IAF PAPER 83-173]	p 6 tites in a p 34 tic lung f p 24 B-111 c nd upp p 38 of Can ble solu p 34 poort (EC	A84-11758 bilder egress A84-10717 unction from N84-10741 rew restraint er extremity A84-12059 adian forces ation A84-10719
description [IAF PAPER 83-184] BRIGANTI, J F Improving restraint systems capabilisystems BRILL, A B Fourier-processed images of dynamilist-mode data [DE83-013276] BRINKLEY, J W Vertical impact evaluation of the F/Fi configuration, headrest position, a bracing technique BROOKS, C J Heat stress related to the operation aircraft - A historical review and possi BROSE, H F Environmental control and life supp for space station - No single answer [IAF PAPER 83-173] BROUILLET, A O	p 6 tites in a p 34 tic lung f p 24 B-111 c nd upp p 38 of Can ble solu p 34 poort (EC	A84-11758 colder egress A84-10717 unction from N84-10741 rew restraint er extremity A84-12059 adian forces ation A84-10719 CLS) system
description [IAF PAPER 83-184] BRIGANTI, J F Improving restraint systems capability systems BRILL, A B Fourier-processed images of dynamilist-mode data [DE83-013276] BRINKLEY, J W Vertical impact evaluation of the F/Ficonfiguration, headrest position, a bracing technique BROOKS, C J Heat stress related to the operation aircraft - A historical review and possi BROSE, H F Environmental control and life supp for space station - No single answer [IAF PAPER 83-173] BROUILLET, A O Biological life support system	p 6 titles in a p 34 tic lung f p 24 B-111 c nd upp p 38 of Can ble solu p 34 cort (EC	A84-11758 Didder egress A84-10717 unction from N84-10741 rew restraint er extremity A84-12059 adian forces ation A84-10719 CLS) system A84-11754
description [IAF PAPER 83-184] BRIGANTI, J F Improving restraint systems capability systems BRILL, A B Founer-processed images of dynamilist-mode data [DE83-013276] BRINKLEY, J W Vertical impact evaluation of the F/Ficonfiguration, headrest position, a bracing technique BROOKS, C J Heat stress related to the operation aircraft - A historical review and possi BROSE, H F Environmental control and life supp for space station - No single answer [IAF PAPER 83-173] BROUILLET, A O Biological life support system [IAF PAPER 83-174]	p 6 titles in a p 34 tic lung f p 24 B-111 c nd upp p 38 of Can ble solu p 34 cort (EC	A84-11758 colder egress A84-10717 unction from N84-10741 rew restraint er extremity A84-12059 adian forces ation A84-10719 CLS) system
description [IAF PAPER 83-184] BRIGANTI, J F Improving restraint systems capabilisystems BRILL, A B Fourier-processed images of dynamilist-mode data [DE83-013276] BRINKLEY, J W Vertical impact evaluation of the F/Fi configuration, headrest position, a bracing technique BROOKS, C J Heat stress related to the operation aircraft - A historical review and possi BROSE, H F Environmental control and life supp for space station - No single answer [IAF PAPER 83-173] BROUILLET, A O Biological life support system [IAF PAPER 83-174] BUCHFUHRER, M J	p 6 titles in in p 34 titles in in p 34 titles in in p 34 titles in in p 24 titles in in p 24 titles in in p 38 titles in p 34 titles in p 34 titles in p 37 p 37	A84-11754 A84-11755 A84-11755 A84-11755
description [IAF PAPER 83-184] BRIGANTI, J F Improving restraint systems capabilisystems BRILL, A B Fourier-processed images of dynamilist-mode data [DE83-013276] BRINKLEY, J W Vertical impact evaluation of the F/Fi configuration, headrest position, a bracing technique BROOKS, C J Heat stress related to the operation aircraft - A historical review and possi BROSE, H F Environmental control and life supp for space station - No single answer [IAF PAPER 83-173] BROUILLET, A O Biological life support system [IAF PAPER 83-174] BUCHFUHRER, M J Optimizing the exercise protocol for	p 6 p 34 c lung f p 24 c lung f p 38 d lung f p 29 p 38 of Cannol upp p 38 of Can p 34 p 37 p 37 p 37 p 37 p 37 p 37	A84-11754 A84-11755 A84-10717 A84-10741 A84-12059 A84-10719 CLS) system A84-11754 A84-11755 A84-11755
description [IAF PAPER 83-184] BRIGANTI, J F Improving restraint systems capability systems BRILL, A B Founer-processed images of dynamilist-mode data [DE83-013276] BRINKLEY, J W Vertical impact evaluation of the F/Ficonfiguration, headrest position, a bracing technique BROOKS, C J Heat stress related to the operation aircraft - A historical review and possi BROSE, H F Environmental control and life supp for space station - No single answer [IAF PAPER 83-173] BROUILLET, A O Biological life support system [IAF PAPER 83-174] BUCHFUHRER, M J Optimizing the exercise protocol for assessment	p 6 p 34 c lung f p 24 c lung f p 38 d lung f p 29 p 38 of Cannol upp p 38 of Can p 34 p 37 p 37 p 37 p 37 p 37 p 37	A84-11754 A84-11755 A84-11755 A84-11755
description [IAF PAPER 83-184] BRIGANTI, J F Improving restraint systems capabilisystems BRILL, A B Fourier-processed images of dynamilist-mode data [DE83-013276] BRINKLEY, J W Vertical impact evaluation of the F/FI configuration, headrest position, a bracing technique BROOKS, C J Heat stress related to the operation aircraft - A historical review and possi BROSE, H F Environmental control and life supp for space station - No single answer [IAF PAPER 83-173] BROUILLET, A O Biological life support system [IAF PAPER 83-174] BUCHFUHRER, M J Optimizing the exercise protocol for assessment BUDKER, V G	p 6 p 34 c lung f p 24 B-111 c nd upp p 38 of Can ble solt p 34 p 37 p 37 p 37 p 37	A84-10719 CLS) system A84-11755 A84-11755 A84-11755 A94-11755 A94-12662
description [IAF PAPER 83-184] BRIGANTI, J F Improving restraint systems capabilisystems BRILL, A B Fourier-processed images of dynamilist-mode data [DE83-013276] BRINKLEY, J W Vertical impact evaluation of the F/Fi configuration, headrest position, a bracing technique BROOKS, C J Heat stress related to the operation aircraft - A historical review and possi BROSE, H F Environmental control and life supp for space station - No single answer [IAF PAPER 83-173] BROUILLET, A O Biological life support system [IAF PAPER 83-174] BUCHFURHER, M J Optimizing the exercise protocol for assessment BUDKER, V G An investigation of the interactic	p 6 p 34 c lung f p 24 p 38 of Cannol e solution p 34 och (EC p 37 p 37 p 37 p 37 p 22 on of f	A84-11754 A84-11755 A84-10717 unction from N84-10741 rew restraint er extremity A84-12059 adian forces ation A84-10719 CLS) system A84-11754 A84-11755 topulmonary A84-12662 poly A with
description [IAF PAPER 83-184] BRIGANTI, J F Improving restraint systems capabilisystems BRILL, A B Fourier-processed images of dynamilist-mode data [DE83-013276] BRINKLEY, J W Vertical impact evaluation of the F/FI configuration, headrest position, a bracing technique BROOKS, C J Heat stress related to the operation aircraft - A historical review and possi BROSE, H F Environmental control and life supp for space station - No single answer [IAF PAPER 83-173] BROUILLET, A O Biological life support system [IAF PAPER 83-174] BUCHFUHRER, M J Optimizing the exercise protocol for assessment BUDKER, V G	p 6 p 34 p	A84-11754 A84-11755 A84-10717 unction from N84-10741 rew restraint er extremity A84-12059 adian forces ation A84-10719 CLS) system A84-11754 A84-11755 topulmonary A84-12662 poly A with
description [IAF PAPER 83-184] BRIGANTI, J F Improving restraint systems capabilisystems BRILL, A B Fourier-processed images of dynamilist-mode data [DE83-013276] BRINKLEY, J W Vertical impact evaluation of the F/Ficonfiguration, headrest position, a bracing technique BROOKS, C J Heat stress related to the operation aircraft - A historical review and possi BROSE, H F Environmental control and life supp for space station - No single answer [IAF PAPER 83-173] BROUILLET, A O Biological life support system [IAF PAPER 83-174] BUCHFUHRER, M J Optimizing the exercise protocol for assessment BUDKER, V G An investigation of the interactiophospholipid membranes using an	p 6 p 34 p	A84-10741 rew restraint er extremity A84-12059 adian forces atton A84-11754 A84-11755 sopulmonary A84-12662 poly A with actroscopic
description [IAF PAPER 83-184] BRIGANTI, J F Improving restraint systems capabilisystems BRILL, A B Fourer-processed images of dynamilist-mode data [DE83-013276] BRINKLEY, J W Vertical impact evaluation of the F/Ficonfiguration, headrest position, a bracing technique BROOKS, C J Heat stress related to the operation aircraft - A historical review and possi BROSE, H F Environmental control and life supp for space station - No single answer [IAF PAPER 83-173] BROUILLET, A O Biological life support system [IAF PAPER 83-174] BUCHFUHRER, M J Optimizing the exercise protocol for assessment BUDKER, V G An investigation of the interactic phospholipid membranes using an method BUNGO, M W Cardiovascular examinations an	p 6 p 34 p	A84-10741 rew restraint er extremity A84-12059 adian forces atton A84-11754 A84-11754 A84-11755 copulmonary A84-12662 cooly A with actroscopic A84-12569 ervations of
description [IAF PAPER 83-184] BRIGANTI, J F Improving restraint systems capabilisystems BRILL, A B Fourier-processed images of dynamilist-mode data [DE83-013276] BRINKLEY, J W Vertical impact evaluation of the F/FI configuration, headrest position, a bracing technique BROOKS, C J Heat stress related to the operation aircraft - A historical review and possi BROSE, H F Environmental control and life supp for space station - No single answer [IAF PAPER 83-174] BUCHFUHRER, M J Optimizing the exercise protocol for assessment BUDKER, V G An investigation of the interactic phospholipid membranes using an method BUNGO, M W Cardiovascular examinations and deconditioning during the Space Shut	p 6 p 6 p 34 B-111 c lung f p 24 B-111 c nd upp p 38 of Can ble solu p 37	A84-10717 unction from N84-10741 rew restraint er extremity A84-12059 adian forces ation A84-11754 A84-11754 A84-12662 copulmonary A84-12662 copuly A with extroscopic A84-12569 ervations of tail flight test
description [IAF PAPER 83-184] BRIGANTI, J F Improving restraint systems capabilisystems BRILL, A B Fourier-processed images of dynamilist-mode data [DE83-013276] BRINKLEY, J W Vertical impact evaluation of the F/Fi configuration, headrest position, a bracing technique BROOKS, C J Heat stress related to the operation aircraft - A historical review and possi BROSE, H F Environmental control and life supp for space station - No single answer [IAF PAPER 83-173] BROUILLET, A O Biological life support system [IAF PAPER 83-174] BUCHFUHRER, M J Optimizing the exercise protocol for assessment BUDKER, V G An investigation of the interactic phospholipid membranes using an method BUNGO, M W Cardiovascular examinations and deconditioning during the Space Shut program	p 6 p 6 p 34 B-111 c lung f p 24 B-111 c nd upp p 38 of Can ble solu p 37	A84-10741 rew restraint er extremity A84-12059 adian forces atton A84-11754 A84-11754 A84-11755 copulmonary A84-12662 cooly A with actroscopic A84-12569 ervations of
description [IAF PAPER 83-184] BRIGANTI, J F Improving restraint systems capability systems BRILL, A B Fourier-processed images of dynamilist-mode data [DE83-013276] BRINKLEY, J W Vertical impact evaluation of the F/Ficonfiguration, headrest position, a bracing technique BROOKS, C J Heat stress related to the operation aircraft - A historical review and possi BROSE, H F Environmental control and life supp for space station - No single answer [IAF PAPER 83-173] BROUILLET, A O Biological life support system [IAF PAPER 83-174] BUCHFUHRER, M J Optimizing the exercise protocol for assessment BUDKER, V G An investigation of the interaction phospholipid membranes using an method BUNGO, M W Cardiovascular examinations and deconditioning during the Space Shut program BUTCHENKO, L. A	p 6 p 34 p	A84-10741 rew restraint er extremity A84-12059 adian forces attom A84-10719 CLS) system A84-11754 A84-11755 copulmonary A84-12662 cooly A with actroscopic A84-12569 ervations of tall flight test A84-12062
description [IAF PAPER 83-184] BRIGANTI, J F Improving restraint systems capabilisystems BRILL, A B Fourier-processed images of dynamilist-mode data [DE83-013276] BRINKLEY, J W Vertical impact evaluation of the F/FI configuration, headrest position, a bracing technique BROOKS, C J Heat stress related to the operation aircraft - A historical review and possi BROSE, H F Environmental control and life supp for space station - No single answer [IAF PAPER 83-173] BROUILLET, A O Biological life support system [IAF PAPER 83-174] BUCHFUHRER, M J Optimizing the exercise protocol for assessment BUDKER, V G An investigation of the interactic phospholipid membranes using an method BUNGO, M W Cardiovascular examinations ar deconditioning during the Space Shut program BUTCHENKO, L. A A hygienic evaluation of elevated	p 6 p 34 B-111 c lung f p 24 B-111 c lung f p 28 Grand upp p 38 of Can ble solu p 37	A84-10741 rew restraint er extremity A84-12059 adian forces attom A84-10719 CLS) system A84-11754 A84-11755 copulmonary A84-12662 cooly A with actroscopic A84-12569 ervations of tall flight test A84-12062
description [IAF PAPER 83-184] BRIGANTI, J F Improving restraint systems capability systems BRILL, A B Fourier-processed images of dynamilist-mode data [DE83-013276] BRINKLEY, J W Vertical impact evaluation of the F/Ficonfiguration, headrest position, a bracing technique BROOKS, C J Heat stress related to the operation aircraft - A historical review and possi BROSE, H F Environmental control and life supp for space station - No single answer [IAF PAPER 83-173] BROUILLET, A O Biological life support system [IAF PAPER 83-174] BUCHFUHRER, M J Optimizing the exercise protocol for assessment BUDKER, V G An investigation of the interaction phospholipid membranes using an method BUNGO, M W Cardiovascular examinations and deconditioning during the Space Shut program BUTCHENKO, L. A	p 6 p 34 c lung f p 24 B-111 c nd upp p 38 of Can ble solt p 34 coort (EC p 37 p 37 cor card p 22 on of f p 1 ir spe p 8 id lobsi t de orbi p 20 dynamis	A84-10717 unction from N84-10741 rew restraint er extremity A84-12059 adian forces siton A84-11754 A84-11755 copulmonary A84-12662 poly A with ectroscopic A84-12569 etal flight test A84-12062 c loads on
description [IAF PAPER 83-184] BRIGANTI, J F Improving restraint systems capabilisystems BRILL, A B Fourier-processed images of dynamilist-mode data [DE83-013276] BRINKLEY, J W Vertical impact evaluation of the F/FI configuration, headrest position, a bracing technique BROOKS, C J Heat stress related to the operation aircraft - A historical review and possi BROSE, H F Environmental control and life supp for space station - No single answer [IAF PAPER 83-173] BROUILLET, A O Biological life support system [IAF PAPER 83-174] BUCHFUHRER, M J Optimizing the exercise protocol for assessment BUDKER, V G An investigation of the interactic phospholipid membranes using an method BUNGO, M W Cardiovascular examinations ar deconditioning during the Space Shut program BUTCHENKO, L. A A hygienic evaluation of elevated	p 6 p 34 c lung f p 24 B-111 c nd upp p 38 of Can ble solt p 34 coort (EC p 37 p 37 cor card p 22 on of f p 1 ir spe p 8 id lobsi t de orbi p 20 dynamis	A84-10741 rew restraint er extremity A84-12059 adian forces attom A84-10719 CLS) system A84-11754 A84-11755 copulmonary A84-12662 cooly A with actroscopic A84-12569 ervations of tall flight test A84-12062
description [IAF PAPER 83-184] BRIGANTI, J F Improving restraint systems capabilisystems BRILL, A B Fourier-processed images of dynamilist-mode data [DE83-013276] BRINKLEY, J W Vertical impact evaluation of the F/Fi configuration, headrest position, a bracing technique BROOKS, C J Heat stress related to the operation aircraft - A historical review and possi BROSE, H F Environmental control and life supp for space station - No single answer [IAF PAPER 83-173] BROUILLET, A O Biological life support system [IAF PAPER 83-174] BUCHFUHRER, M J Optimizing the exercise protocol for assessment BUDKER, V G An investigation of the interactic phospholipid membranes using an method BUNGO, M W Cardiovascular examinations and deconditioning during the Space Shut program BUTCHENKO, L A A hygienic evaluation of elevated passengers in urban transport vehicle	p 6 p 34 B-111 c lung f p 24 B-111 c lung f p 24 B-111 c lung f p 38 of Can ble solu p 34 p 37	A84-11758 A84-10717 unction from N84-10741 rew restraint er extremity A84-12059 adian forces ation A84-11754 A84-11754 A84-11755 copulmonary A84-12662 coly A with extroscopic A84-12569 ervations of tal flight test A84-12062 c loads on A84-11569

C

Metaphor and common-sense reasoning

Calcium modulation of plant plasma membrane-bound

p 12 N84-11723

p 32 N84-11756

cognitive efficiency under stress

p 31 N84-10753

[AD-A130260]

CASTINE, J W

Compatibility analysis of the MBU-14/P oxygen mask and U.S. Navy oxygen regulators p.34 A84-10721 by posture p 21 A84-12657 CASTORE, G CORMIER, M J A survey of robotic technology [AD-A130999] Role of calcium and calmodulin in plant cell regulation p 40 N84-11762 p 12 N84-11725 CATLEY, D M CORREALE, J. V. Renin, angiotensin-converting enzyme, and aldosterone Absorbent product and articles made therefrom in humans on Mount Everest p 14 A84-10279 p 40 N84-11758 [NASA-CASE-MSC-18223-2] CHAFOULEAS, J COSTILL, D L. Role of calmodulin in cell proliferation Effect of a 42 2-km footrace and subsequent rest or p 13 N84-11737 exercise on muscle glycogen and enzymes CHAIKIN, B N p 15 A84-10285 Pharmacokinetics of pentobarbital under hyperbaric and COX, R H hyperbaric hyperoxic conditions in the dog Lactate accumulation during incremental exercise p 6 A84-12063 p 14 A84-10280 vaned inspired oxyen fractions CHAPAEV, A. V CRAMER, R L. Displacement of liquid in a model of semicircular canals nder the effect of angular accelerations in The F-16 on board oxygen generation (OBOGS) p 34 A84-10712 weightlessness p 18 A84-11350 CRAPO, R O CHAPAYEV. A V 'Anaerobic threshold' - Problems of determination and Effect of redistribution of blood on seventy of spatial validation p 15 A84-10284 position illusions in weightlessness p 26 N84-11701 CROFTS, A R CHARACKLIS, W G Photosynthesis in intact plants Microbial fouling and its effect on power generation [DE83-016045] p 13 N84-11740 [AD-A1310841 p 10 N84-10726 CROSBIE, R J CHEBKASOV, S A A servo controlled rapid response anti-G valve The spatial organization of neurons of the brain visual p 35 A84-10732 cortex during the stimulation by light spots CUTILLO, B A p 4 A84-10847 Neurocognitive pattern analysis CHECHILE, R A [AD-A131302] p 24 N84-10740 The effects of cuing in time-shared tasks p 29 A84-10971 D CHEKUNOVA, M P Biochemical criteria for evaluating cardiotoxic effects p 5 A84-11567 DALTON, R E CHERKASOV, G V Manned spaceflight planning activity Condition of erythrocytes during long-term exposure to knowledge-based systems magnetic field p 11 N84-11711 [AIAA PAPER 83-2374] p 33 A84-10035 CHERNOMORDIK, L. V DÀMELIO, F E The destruction of a bilayer lipid membrane as a result The Golgi-Hortega-Lavilla technique, with a useful additional step for application to brain tissue after of electrical breakdown p 7 A84-12568 CHESKY, J A prolonged fixation DANIELS, W L. p 7 A84-12274 Effect of physical training on myocardial enzyme activities in aging rats CHESTUKHIN, V V p 2 A84-10288 The energy cost and heart rate response of trained and untrained subjects walking and running in shoes and Normal human coronary circulation during postural tests boots [AD-A131420] p 23 N84-10735 and decompression of lower half of body p 26 N84-11699 DANNEBERG, É CHIBISOV, S M Integration and employment of night vision devices for Circadian fluctuations of certain indicators of the the conduction of a military mission under conditions of condition of the cardiovascular system and skin electrical p 36 A84-11059 darkness characteristics in young female athletes engaged in DARDYMOV, I V academic rowing CHICHAGOV, P K p 17 A84-11332 Effect of eleuterococcus extract on recovery processes in rats following seven-day hypokinesia p 11 N84-11706 Demonstration of gas bubbles in canine pulmonary artery and aorta by means of ultrasonic echography with DATSENKO, I I p 11 N84-11708 intravenous air infusion An evaluation of the bacterial environment on motor CHIPENS, G I p 6 A84-11575 huses The influence of the neuropeptide arginine-vasopressin DAVYDOV, B I on human tolerance to a hot dry environment Prediction of vomiting in dogs exposed to radiation with p 17 A84-11339 shielding of midabdomen DAVYDOVA, T V p 11 N84-11710 CHUGUNOV, V S Extenorization of the effect of hyperthermia by observing A comparative study of dendritic spines in the principal sympathoadrenal activity in subjects cortical regions of the turtle forebrain p 5 A84-11557 p 18 A84-11555 psychoemotional stress CINTRON-TREVINO, N M Absorbent product and articles made therefrom Transdermal scopolamine in the prevention of motion [NASA-CASE-MSC-18223-2] p 40 N84-11758 sickness Evaluation of the time course of efficacy DEASON, G A p 20 A84-12061 Design guidelines for carbon dioxide scrubbers [AD-A130459] p 39 N8-CLARK, H J p 39 N84-10761 Flying training R&D (Research and Development) at the DEAVERS, D R Air Force Human Resources Laboratory Rat hindlimb muscle responses to suspension p 31 N84-10752 [AD-A130250] hypokinesia/hypodynamia p 6 A84-12065 CLARKE, C R A DEDENKO, I I Cardiorespiratory response to exercise in men Heat-transfer characteristics of port workers in the repeatedly exposed to extreme altitude Arctic p 19 A84-11572 p 21 A84-12651 DEEV. A I CLARKE, J R The effect of a constant magnetic field on the processes Efficiency of high-frequency ventilation as determined of peroxide oxidation of lipids in n phospholipid p 8 A84-12570 by nitrogen washouts A model study membranes [AD-A131331] p 27 N84-11745 CLAXTON, L. Moment-method solutions and SAR calculations for Bioassay of particulate organic matter from ambient inhomogeneous models of man with large number of p 38 A84-12293 [PB83-239731] p 29 N84-11754 DEGIOANNI, J COATES, G Transdermal scopolamine in the prevention of motion Platelets and leukocytes in the lungs after acute sickness Evaluation of the time course of efficacy hypobaric hypoxia p 9 A84-12661 p 20 A84-12061 COCKS, T. M. DEMPSEY, J A Endothelium-dependent relaxation of coronary arteris by Metabolic acids and H(+) regulation in brain tissue noradrenaline and scrotonin p 4 A84-11261 during acclimatization to chronic hypoxia COHEN, H D p 9 A84-12659 Task validation for studies on fragmented sleep and DENO, N. S.

CALDWELL, C

ATPase activities

CARBONELL J G

[AD-A131423]

DEPASCALIS, V

Biofeedback monitoring-devices for astronauts in space p 37 A84-12025 DESIMONE D N

U.S. Navy life support R&D programs

p 35 A84-10729

DIJULIO, M. A. Diaphragmatic rupture during G-maneuvers in a T33 jet p 20 A84-12069 DMITRIEVA, A. V

The cardiostimulating action of norepinephrine contained in the liposomes in conditions of adrenoreceptor

DOMALCHUK, N E.

of the The effect administration 8-arginine-vasopressin during a period of adaptation to hyperthermia D 17 A84-11340

Preliminary investigation of variation in some dark adaptation aspects for possible relevance to military helicopter aircrew

[AD-A130231] p 22 N84-10733 DORINOVSKAIÁ, A. P

Assessment of the functional condition of the female p 17 A84-11341 organism in factories DORONINA, T D

Demonstration of gas bubbles in canine pulmonary artery and aorta by means of ultrasonic echography with intravenous air infusion p 11 N84-11708 DOROSHEV, V G.

Changes in cardiac output and orthostatic stability of cosmonauts p 25 N84-11697 DOUGHTY, P

Extended development procedure EDeP user's manual

[AD-A131381] p 31 N84-10756 DOWNEY, P C

Aquaculture techniques A production forecasting model for aquaculture systems [PB83-221713] p 10 N84-10730

DOYLE, J C

Neurocognitive pattern analysis [AD-A131302] p 24 N84-10740

The design and operation of systems for inhalation xposure of animals

[DE83-015388] p 10 N84-10727 DRONEN, S C

Diaphragmatic rupture during G-maneuvers in a T33 jet p 20 A84-12069 trainer

DUBALSKIY, G N Simulation of cerebrocranial trauma for evaluation and

development of gear to protect pilots against impacts

DUKHOVICH, V F

Generation of electric potentials on mitochondrial membranes during the hydrolysis of inorganic pyrophosphate p 5 A84-11366

Ε

EGOROV, A D

General results of medical investigations in Salyut-6 nanned space flights [IAF PAPER 83-202] p 20 A84-11761

ELIZONDO, R S Thermoregulation in Erythrocebus patas - A thermal

balance study p 9 A84-12663 ELLIS. J A.

Effects of behavioral objectives and instructions on earning a category task

[AD-A130386] p 30 N84-10750

EMMETT M R

Calculations of radiation fields and monkey mid-head and mid-thorax responses in AFRRI-TRIGA reactor facility experiments

[DE83-015483] p 13 N84-11741

EREMEEV, M S Extenonzation of the effect of hyperthermia by observing the sympathoadrenal activity in subjects under psychoemotional stress p 18 A84-11555

EUBANKS, J L. An application of signal detection theory to air combat

p 29 A84-10972 training EVDOKIMOVA, T A.

Prediction of hemodynamic reactions to isometric p 17 A84-11333 exercise

FABBRI, L. M

Time course of airway hyperresponsiveness induced by Ozone in dogs p 2 A84-10286 FARFAN, H F

Cervical spline analysis for ejection injury prediction [AD-A131081] p 23 N84-10739

FARRELL P A

Plasma adrenocorticotropin and cortisol responses to submaximal and exhaustive exercise p 21 A84-12656 FARRELL R

Integrated Cuing Requirements (ICR) study: Feasibility analysis and demonstration study p 32 N84-10758

[AD-A131039] FELL, R. D

Exercise training and glucose uptake by skeletal muscle in rats p 8 A84-12652

FERCHAKOVA, A.

The effect of ischemia and postischemic restoration of blood circulation on the ultrastructure of the neurons

Pharmacokinetics of pentobarbital under hyperbaric and hyperbaric hyperoxic conditions in the dog p 6 A84-12063

FILIMONOV, V N.

External respiration in electric welders p 19 A84-11571

FILIPPOV. A. K

The hormonal regulation of calcium channels of cardiac membranes p 8 A84-12571

FILIPPOV, ZH A

Hyperventilation as a method for detecting disorders of atrioventricular conductivity in athletes p 18 A84-11562

Effect of a 42 2-km footrace and subsequent rest or exercise on muscle glycogen and enzymes p 15 A84-10285

FINOGENOVA, R I

Demonstration of gas bubbles in canine pulmonary artery and aorta by means of ultrasonic echography with intravenous air infusion p 11 N84-11708

FISCHER, G. J

Fetal development - Effects of decompression sickness A84-12070

FISHER, D. R Concepts of dose to soft tissue at the cellular level

[DE83-013830] p 28 N84-11748 FLYNN, E T

Efficiency of high-frequency ventilation as determined by nitrogen washouts A model study [AD-A131331] p 27 N84-11745

FORTADO, C. Effect of physical training on myocardial enzyme p 2 A84-10288 activities in aging rats

FRANCESCONI, R P

Hypohydration and exercise - Effects of heat acclimation, p 15 A84-10281 gender, and environment

FRANCOIS, H W K

Study and development activities of Dornier System on space biology/medicine equipment and payloads for Spacelab and freeflying platform application

p 37 A84-11757 [IAF PAPER 83-183] FRENKEL, I D.

Energy metalbolism enzymes in simulation of some spaceflight factors p 26 N84-11704

Extended development procedure EDeP user's manual

[AD-A131381] p 31 N84-10756

FRIED, R.

Polycythemia and the acute hypoxic response in awake rats following chronic hypoxia p 1 A84-10282

FROLOVA, A. D.

Biochemical criteria for evaluating cardiotoxic effects p 5 A84-11567

FRY, R J M

The relevance of experimental animal studies to the human experience [DE83-014053] p 10 N84-10729

FULCO, C S Prevention of acute mountain sickness by dexamethasone

p 23 N84-10737

G

GALKINA, T B

JAD-A1315331

Physiological and ecological characteristics of the water fern, azolla pinnata, and prospects of using it in biological life-support system for man p 39 N84-11709 GANDHI, O. P.

Moment-method solutions and SAR calculations for inhomogeneous models of man with large number of p 38 A84-12293 GARDNER, D. E.

Influence of nitrogen dioxide on xenobiotic metabolism

n anımals (PR83-2397231 p 14 N84-11743

GARDNER, R M.

'Anaerobic threshold' - Problems of determination and validation p 15 A84-10284

GARTHWAITE, T L.

Plasma adrenocorticotropin and cortisol responses to submaximal and exhaustive exercise p 21 A84-12656

Respective role of microgravity and cosmic rays on paramecium tetraurelia cultured aboard Salyut 6 [IAF PAPER 83-186] p 6 A84-11759

GAUTIER, H.

Ventilatory response of intact cats to carbon monoxide p 1 A84-10277 hypoxia

GAVRILKOV, A.G.

The application of an electromagnetic field in patients following disorders of brain blood circulation

p 18 A84-11561

GAZENBO, O G

USSR report Space Biology and Aerospace Medicine, volume 17, no 5, September - October 1983 [JPRS-84655] p 10 N84-11693

GAZENKO, O G.

General results of medical investigations in Salyut-6 manned space flights [IAF PAPER 83-202] p 20 A84-11761

GEBELIAIN, KH

Integrator of climate data for assessing indoor microclimate p 36 A84-11570

GELFAND, I M

Predicting ventricular arrythmia of the heart in patients with myocardial infarction p 18 A84-11564

GELFAND, I N

Comparative evaluation of changes in MB CPK activity and indicators of precardial mapping p 19 A84-11565 GELTSEL M IU

Heart-rhythm reaction to sensonmotor loads of varying p 16 A84-11331

GENIN, A. M.

General results of medical investigations in Salyut-6 manned space flights [IAF PAPER 83-202] p 20 A84-11761

GEORGE, F L

Proceedings of the 18th Annual Conference on Manual

[AD-A131256] p 39 N84-10763

GEORGE, J

Vacuum UV laser induced scission of Simian virus 40 DNA p 7 A84-12425

GEVINS, A S

Neurocognitive pattern analysis [AD-A131302] p 24 N84-10740

GEVLICH, G I

Evaluation of skeletal muscle tone by recording lateral p 27 N84-11717 naidity

GILL P H R.

A cockpit and equipment integration laboratory p 35 A84-10734

GILMAN, S.C.

Fetal development - Effects of decompression sickness and treatment p 7 A84-12070

GLAZUNOV, A. S

Comparative evaluation of changes in MB CPK activity and indicators of precardial mapping p 19 A84-11565

GNATIUK, M. S. A quantitative evaluation of various cardiac regions in young and old white rats

GÓNCHAROVA, N V

A comparative study of dendntic spines in the principal cortical regions of the turtle forebrain p 5 A84-11557 GONSKII. IA. I

The role of metals in free radical oxidation processes in the tissues of organisms according to data of spontaneous and initiated chemiluminescence

p 2 A84-10483

GORDON, C. J.

Behavioral and autonomic thermoregulation in mice exposed to microwave radiation p 2 A84-10287

GORINA, M. S. The effect of an increased mechanical load on the dependence of the contraction of isolated heart muscle on the concentration of Ca(2+) in the perfusate

p 3 A84-10843

GOROSHINSKAIA, I. A.

The seasonal characteristics of the effect of low temperature on the activity of brain monamine oxidase and the sensitivity of rats to hyperoxia p 4 A84-10846 GRACOVETSKY, S.

Cervical spline analysis for ejection injury prediction [AD-A131081] p 23 N84-10739

Recent advances in EPA's (Environmental Prog

p 24 N84-10743

monitoring and methods development research

[PB83-2312091

GRAHAM, C HAYASHI, F IOSELIANI, K K Task validation for studies on fragmented sleep and Overall 'gain' of the respiratory control system in Level of arterial pressure and vegetative cardiac ognitive efficiency under stress normoxic humans awake and asleep p 22 A84-12660 regulation during the simulation of intense operator [AD-A130260] p 31 N84-10753 p 16 A84-11327 HEARON R F activity Vertical impact evaluation of the F/FB-111 crew restraint GRAHAM, J A ITSEKHOVSKIY, O G configuration, headrest position, and upper extremity Influence of nitrogen dioxide on xenobiotic metabolism Study of cardiovascular system during long-term paceflights p 25 N84-11694 bracing technique p 38 A84-12059 spaceflights HELLEUR, C D [PB83-2397231 p 14 N84-11743 IUNKEROV, V I Cervical spline analysis for ejection injury prediction GRAHAM, W. R. effect of the [AD-A131081] The administration p 23 N84-10739 Simulation of the motion of a Shuttle-attached flexible 8-arginine-vasopressin during a period of adaptation to HÈMPEL. F G manipulator arm p 37 A84-11935 hyperthermia p 17 A84-11340 In vivo comparison of cytochrome aa3 redox state and GRANTALIANO, G tissue PO2 in transient anoxia IURKIV, V I p 1 A84-10276 Biofeedback monitoring-devices for astronauts in space HEPLER. P The role of metals in free radical oxidation processes p 37 A84-12025 environment p 12 N84-11722 in the tissues of organisms according to data of Calcium and mitosis GRASSIA, J HESSE, H spontaneous and initiated chemiluminescence Direct comparison of intuitive, guasi-rational and Extension of the capability of army aircraft personnel p 2 A84-10483 analytical cognition for conducting night operations, by means of image-intensifying eyeglasses p 36 A84-11057 IVANEKHA, E V [AD-A130273] p 31 N84-10751 The effect of a constant magnetic field on the processes GREENE, K M HIDEĞ. J of peroxide oxidation of lipids in phospholipid membranes p 8 A84-12570 Fetal development - Effects of decompression sickness Modern method and instrument for measuring psychic p 7 A84-12070 and treatment IVANOV, E R p 30 A84-11756 FIAF PAPER 83-1811 Protein phosphorylation in the brain p 4 A84-11253 GRIGORYEVA, L. S The role of adrenalin in the genesis of disorders of motor Oxygen regimen in the human peripheral tissue during skills in conditions of emotional stress space flights [IAF PAPER 83-197] Evaluation of skeletal muscle tone by recording lateral p 30 A84-11338 p 19 A84-11760 p 27 N84-11717 naidity IVANOVA, T L. HILL R C Heat-transfer characteristics of port workers in the A cockpit and equipment integration laboratory Pharmacokinetics of pentobarbital under hyperbanc and p 19 A84-11572 Arctic p 35 A84-10734 hyperbaric hyperoxic conditions in the dog HOCHSTEIN, L. I IVES, J p 6 A84-12063 The growth of paracoccus halodenitrificans in a defined Human physiology research under microgravity GUILL F C conditions and the proposed 'anthrorack' facility medium U.S. Navy ejectee anthropometry - 1 January 1969 NASA-TM-84411] p 9 N84-10724 p 15 A84-10397 through 31 December 1979 p 16 A84-10742 HODGDON, J. A. GUREVICH, M I A survey of body fat content of US Navy male The cardiostimulating action of norepinephrine Exercise training and glucose uptake by skeletal muscle personnel contained in the liposomes in conditions of adrenoreceptor ın rats D 8 A84-12652 [AD-A131500] p 23 N84-10736 blockade p 3 A84-10842 IZAKOV, V IA HOGAN, M C GUSTAFSON, A B Rhythmoinotropic phenomena in the human heart Lactate accumulation during incremental exercise with Plasma adrenocorticotropin and cortisol responses to p 16 A84-11329 varied inspired oxyen fractions p 14 A84-10280 submaximal and exhaustive exercise p 21 A84-12656 HOHIMER, A R The effect of mechanical conditions on chronoinotropy of the myocardium p 8 A84-12572 Regional distribution of blood flow during mild dynamic eg exercise in the baboon p 2 A84-10283 HOLLOSZY, J. O. Exercise training and glucose uptake by skeletal muscle HAASE, H p 8 A84-12652 Oxygen regimen in the human peripheral tissue during space flights [IAF PAPER 83-197] HOLTON, E. M. JACKSON, W M Bone and calcium alterations during spaceflight p 19 A84-11760 Vacuum UV laser induced scission of Simian virus 40 p 12 N84-11729 HAGERMAN, F C DNA p 7 A84-12425 Effect of a 42 2-km footrace and subsequent rest or HOLTZMAN, M J JARSUMBECK, B Time course of airway hyperresponsiveness induced by exercise on muscle glycogen and enzymes Oxygen regimen in the human peripheral tissue during p 2 A84-10286 p 15 A84-10285 ozone in dogs space flights HOMICK, J. L. HAGMANN M J p 19 A84-11760 [IAF PAPER 83-197] Transdermal scopolamine in the prevention of motion Moment-method solutions and SAR calculations for JOBSIS, F F inhomogeneous models of man with large number of sickness Evaluation of the time course of efficacy p 20 A84-12061 In vivo comparison of cytochrome aa3 redox state and p 38 A84-12293 p 1 A84-10276 tissue PO2 in transient anoxia HAHN, E E HONDA, Y JOHANSON, D. C. Overall 'gain' of the respiratory control system in Computer analysis in helmet design Inflight loss of consciousness p 15 A84-10739 p 33 A84-10710 normoxic humans awake and asleep p 22 A84-12660 HALES, J R HOROWITZ J M JOHNSON-THOMPSON, M Gravitational study of the central nervous system Vacuum UV laser induced scission of Simian virus 40 Regional distribution of blood flow during mild dynamic DNA p 12 N84-11730 р7 A84-12425 leg exercise in the baboon p 2 A84-10283 HALEY, J L. JOHNSON, E J HOUDAS, Y Impact and vibration testing of a modified UH-1 crew Human body temperature - Its measurement and Representations of perceptions of risks [AD-A131443] p 32 N84-10759 regulation p 16 A84-11017 [AD-A130279] p 38 N84-10760 HUGHES, T JOHNSON, J C HALPERN, J B Bioassay of particulate organic matter from ambient Impact and vibration testing of a modified UH-1 crew Vacuum UV laser induced scission of Simian virus 40 seat DNA p 7 A84-12425 [PB83-239731] [AD-A130279] HUISINGH, J L. JOHNSON, J O Direct comparison of intuitive, quasi-rational and Bioassay of particulate organic matter from ambient Calculations of radiation fields and monkey mid-head analytical cognition and mid-thorax responses in AFRRI-TRIGA reactor facility [AD-A130273] p 31 N84-10751 [PB83-239731] p 29 N84-11754 experiments HAMMOND, K R HUMPELER, E IDF83-0154831 p 13 N84-11741 Direct comparison of intuitive, quasi-rational and Training-dependent changes of red cell density and JOHNSON, P.C. JR. analytical cognition Cardiovascular examinations and observations of erythrocytic oxygen transport p 21 A84-12653 [AD-A130273] p 31 N84-10751 HUMPHREY, J D deconditioning during the Space Shuttle orbital flight test HANSEN, J E p 20 A84-12062 Measurement of lung function using the magnetometer program Optimizing the exercise protocol for cardiopulmonary JOHNSON, S. A. system assessment p 22 A84-12662 [AD-A130841] p 23 N84-10738 Ultrasound tomography by Galerkin or moment HARBESON, M M methods HYNES, A G Effects of head impact acceleration on human Heat stress related to the operation of Canadian forces [AD-A131408] p 28 N84-11747 performance Overview and preliminary battery JOHNSON, T S aircraft - A historical review and possible solution identification p 34 A84-10719 Prevention of acute mountain sickness by [AD-A130286] p 31 N84-10754 HARRISON, B dexamethasone [AD-A131533] p 23 N84-10737 In search of - An acceptable lap belt JONES, B H p 34 A84-10716 HARTWELL, T D The energy cost and heart rate response of trained and ILLING, J W Personal exposure to volatile organics and other untrained subjects walking and running in shoes and compounds indoors and outdoors Influence of nitrogen dioxide on xenobiotic metabolism The TEAM (Total boots p 23 N84-10735 Exposure Assessment Methodology) study in animals [AD-A1314201 [PB83-239723] p 24 N84-10744 [PB83-231357] p 14 N84-11743 JUNGERS, R H

IMAIZUMI, S

Pseudo-critical heat capacity of single lipid bilayers

p 4 A84-11115

Pseudo-critical heat capacity of single lipid bilayers

p 4 A84-11115

KAAIJK, J

Results and interpretation of labor-hygienic studies in the paintshop of the jet engine depot of the Woensdrecht

[PML-1982-54] KALANDAROV. S

p 40 N84-11759

Energy metalbolism enzymes in simulation of some spaceflight factors p 26 N84-11704

KALINICHENKO, V V

Changes in cardiac output and orthostatic stability of p 25 N84-11697

KAMON F

Single breath cardiac output - Enhanced sampling and analysis techniques p 38 A84-12064

KAN. E. L.

of catecholamine metabolism and Indicators hemodynamics in air traffic controllers neurocirculatory dystonia of the hypertension type controllers

KANTOR, G.

Performance of a new 916 MHz direct contact applicator with reduced leakage, a detailed analysis [PB83-226621] p p 24 N84-10742

KAPELKO, V I

The effect of an increased mechanical load on the dependence of the contraction of isolated heart muscle on the concentration of Ca(2+) in the perfusate

p 3 A84-10843

In vivo comparison of cytochrome aa3 redox state and tissue PO2 in transient anoxia p 1 A84-10276

Modern method and instrument for measuring psychic performance

[IAF PAPER 83-181]

p 30 A84-11756

KATAEV. S I

The microcirculatory bed of the liver according to data of scanning electron microscopy KATHREN, R L. p 5 A84-11560

Evaluation of a draft standard on performance specifications for health physics instrumentation p 28 N84-11749

Evaluation of a draft standard on performance specifications for health physics instrumentation [DE83-016186] p 28 N84-11750

KATKOV, V Y

Normal human coronary circulation during postural tests and decompression of lower half of body

p 26 N84-11699

p 11 N84-11708

KATUNTSEV, V P

Demonstration of gas bubbles in canine pulmonary artery and aorta by means of ultrasonic echography with intravenous air infusion N84-11708

KAUFMAN, P B

Gravitropic responses in the grass pulvinus Model p 12 N84-11728 system for asymmetric growth KAZAKOVA, R T

Demonstration of gas bubbles in canine pulmonary artery and aorta by means of ultrasonic echography with

ntravenous air infusion KENOYER J L.

Evaluation of a draft standard on performance specifications for health physics instrumentation

DE83-016169] p 28 N84-11749 Evaluation of a draft standard on performance [DE83-016169] specifications for health physics instrumentation [DE83-016186] p 28 N84-11750

KÉPEZHENAS, Á. K

Dependence of structures of heart rhythm on the physical work capacity of athletes p 16 A84-11328 KERKAR, S. P.

A critical analysis of the uses of multiple regression in the study of human judgement

FAD-A1312241 KHARCHENKO, V I p 31 N84-10755

Simulation of cerebrocranial trauma for evaluation and development of gear to protect pilots against impacts p 25 N84-11695

KHASINA, E I

Effect of eleuterococcus extract on recovery processes ın rats following seven-day hypokinesia

p 11 N84-11706

KHOMSKAIA. E D

Functions of the frontal lobes of the brain p 20 A84-11962

Heat-transfer characteristics of port workers in the Arctic p 19 A84-11572

KILLEEN, PR

An application of signal detection theory to air combat training p 29 A84-10972

KILLION, T H

Companion trainer aircraft. Concept test p 32 N84-11757 [AD-A131378]

KIMURA, H

Overall 'gain' of the respiratory control system in normoxic humans awake and asleep p 22 A84-12660

KIRILLOVA, V F

External resouration in electric welders

p 19 A84-11571

KLIMENKO, L. L.

The effect of a constant magnetic field on the processes peroxide oxidation of lipids n phospholipid p 8 A84-12570 membranes

KLONTZ. G. W.

Aquaculture techniques A production forecasting model for aquaculture systems

(PB83-221713)

KNAPIK, J J The energy cost and heart rate response of trained and untrained subjects walking and running in shoes and boots

[AD-A131420] p 23 N84-10735

KNOCHE H

Impact and vibration testing of a modified UH-1 crew

[AD-A130279]

p 38 N84-10760

p 29 N84-11754

KNUETTEL, B.

Development and construction of an apparatus based on the principle of multidimensional nuclear magnetic resonance for the formation of images of organs and parts of the body

[BMFT-FB-T-83-102]

p 29 N84-11752

KOGAN-IASNYI, V V

The use of functional rheovasography for the examination of athletes with circulatory disorders in lower p 18 A84-11551 extremities

KOHL R L

Transdermal scopolamine in the prevention of motion sickness Evaluation of the time course of efficacy p 20 A84-12061

KOLBER, A.

Bioassay of particulate organic matter from ambient

[PB83-239731]

KOLKA, M A. Thermoregulation in Erythrocebus patas - A thermal

p 9 A84-12663 balance study KOLOGANOV, A. V

A hygienic evaluation of several characteristics of p 19 A84-11566 intermittent noise

KOLPAKOV, Y V

Normal human coronary circulation during postural tests and decompression of lower half of body p 26 N84-11699

KONAKHEVICH, Y G

Simulation of cerebrocranial trauma for evaluation and development of gear to protect pilots against impacts

KONDAKOV, A. V

Hemodynamic reactions to positive intrathoraci pressure at +G sub z accelerations p 25 N84-11698

KONOSKE, P J

Effects of behavioral objectives and instructions on earning a category task (AD-A1303861 p 30 N84-10750

KOROBEINICHEVA, I K.

An investigation of the interaction of poly A with phospholipid membranes using an Ir spectroscopic p 8 A84-12569 KOSTANDOV, E.A.

Functional asymmetry of the cerebral hemispheres and p 20 A84-12131 unconscious perception

KOVALENKO, E A.

Oxygen regimen in the human peripheral tissue during space flights

[IAF PAPER 83-197]

p 19 A84-11760 KOZAROV. D

Motor units of human skeletal muscles

p 21 A84-12158 KOZLOVSKAYA, I. B

Evaluation of skeletal muscle tone by recording lateral naidity

KRAKAT, K

Report on development, installation of industrial p 39 N84-11339 robots

KRAMER, W G.

Pharmacokinetics of pentobarbital under hyperbanc and hyperbanc hyperoxic conditions in the dog p 6 A84-12063

KRIKORIAN, A D

Developing higher plant systems in space

p 12 N84-11727

KROPOTOV. IU. D

Neuron correlates of the recognition of visual stimuli 1 Dynamics of the means and variances of the current discharge frequency of neuron populations of the human brain in tests involving visual-stimulus recognition. II -Investigation of space-time correlations between current frequencies of the impulse activity of neuron populations of the human brain during the recognition of visual p 17 A84-11335 stimidi

KRUK, R.

Flying performance on the advanced simulator for pilot training and laboratory tests of vision p 30 A84-10973 KUEHN, L. A.

Heat stress related to the operation of Canadian forces aircraft - A historical review and possible solution p 34 A84-10719

KULAEV. I S

Generation of electric potentials on mitochondnal membranes during the hydrolysis of pyrophosphate p 5 inorganic p 5 A84-11366

KUPRIIANOV, V A.

Indicators of catecholamine hemodynamics in air traffic metabolism controllers with neurocirculatory dystonia of the hypertension type

p 19 A84-11568

LAFOLLETTE, S

Effect of physical training on myocardial enzyme ctivities in aging rats LAMB, M J.

Naval aviation on-board oxygen generation system 1982 p 35 A84-10736 - A status report LANTSOV. L. S

A hygienic evaluation of elevated dynamic loads on passengers in urban transport vehicles p 19 A84-11569

LAPAEV, E V Displacement of liquid in a model of semicircular canals the effect of angular accelerations p 18 A84-11350 voiahtlacenace

LAPSHINA, N A Changes in cardiac output and orthostatic stability of p 25 N84-11697 cosmonauts

LARIKOVA, L. P

Prediction of hemodynamic reactions to isometric p 17 A84-11333 exercise

LARSEN, P R

Adrenergic activation of triodothyronine production in brown adipose tissue p 4 A84-11268 LAVRENTYEVA, I N Experimental psychological methods used in expert evaluation of mental work capacity of flight personnel in the presence of functional disturbances and central

nervous system diseases

LEISEIFER, H P Biological life support system [IAF PAPER 83-174]

LEVKIN. L. A. The influence of the neuropeptide arginine-vasopressin on human tolerance to a hot dry environment

LEVKOVICH, IU I The pattern of local vascular responses in conditions of an increased activity of the cerebral cortex

p 3 A84-10844

p 25 N84-10749

p 26 N84-11712

p 37 A84-11755

Registry of toxic effects of chemical substances User's guide to the RTECS computer tape p 25 N84-10748 [PB83-223172]

LEWTAS, J. Evaluation of motor vehicle and other combustion

emissions using short-term genetic bioassays [PB83-233270] p 10 N84-10731

LIPPITT, M W., JR

Development of passive diver thermal protection p 39 N84-10762

[AD-A130685] LIPSETT, M J

Direct biological effects of increased atmospheric carbon dioxide levels

[PB83-224360] LIRMAN, A. V

Hyperventilation as a method for detecting disorders of atnoventncular conductivity in athletes p 18 A84-11562

The cardiostimulating action of norepinephrine contained in the liposomes in conditions of adrenoreceptor blockade

LITOVCHENKO, V V

Hemodynamic reactions to positive intrathoracic pressure at +G sub z accelerations p 25 N84-11698

LONGRIDGE, T.

LONGRIDGE, T

Flying performance on the advanced simulator for pilot training and laboratory tests of vision p 30 A84-10973

Microwaves, hyperthermia, and human leukocyte function

(PB83-2253751 p 24 N84-10746 LUIZOV, A. V

The eye and light p 38 A84-12127 LUPANDIN, IU V

An analysis of the mechanism of the hypothermic action of neurotropic compounds p 3 A84-10845 LUPANDIN, V I

Distribution of individual indices of the subjective p 30 A84-11337 evaluation of loudness

LURIIA, A R. Functions of the frontal lobes of the brain

p 20 A84-11962

Heat-transfer characteristics of port workers in the p 19 A84-11572 Arctic

M

MACKIE, B G

Influence of training on blood flow to different skeletal muscle fiber types p 1 A84-10278

MAHER, J T Prevention of acute mountain

sickness by p 23 N84-10737 [AD-A131533]

MAIER. H Civil applications of infrared techniques

[BMFT-FB-T-83-132] p 29 N84-11753

MAIRBAEURL, H Training-dependent changes of red cell density and

p 21 A84-12653 erythrocytic oxygen transport MAKSIMCHUK, T P

The role of metals in free radical oxidation processes in the tissues of organisms according to data of spontaneous and initiated chemiluminesce

p 2 A84-10483

MALACINSKI, G. M.

Polarity of the amphibian egg ● p 12 N84-11731 MALINOVSKAIA, K I

The effect of an increased mechanical load on the dependence of the contraction of isolated heart muscle on the concentration of Ca(2+) in the perfusate p 3 A84-10843

MALINOVSKAIA, O O

Indicators of catecholamine metabolism hemodynamics in air controllers traffic with neurocirculatory dystonia of the hypertension type p 19 A84-11568

MALTSEVA, T V

An investigation of the interaction of poly A with phospholipid membranes using an Ir spectroscopic method p 8 A84-12569

MANDERS, W. W.

The confirmation of 9-carboxy-THC in unne by gas chromatography/mass spectrometry p 20 A84-12068 MANINGAS, P. A.

Diaphragmatic rupture during G-maneuvers in a T33 jet p 20 A84-12069

MANSFELD, A D

Demonstration of gas bubbles in canine pulmonary artery and aorta by means of ultrasonic echography with intravenous air infusion p 11 N84-11708

MANSUROVA, S E

Generation of electric potentials on mitochondrial membranes during the hydrolysis p 5 A84-11366 pyrophosphate

MARCINIK, E J A survey of body fat content of U.S. Navy male personnel

[AD-A131500] p 23 N84-10736

MARGULIES, L.

Simulation of Viking biology experiments suggests smectites not palagonites, as martian soil analogu p 41 A84-10655

MARIANOVICH, A T

The influence of the neuropeptide arginine-vasopressin on human tolerance to a hot dry environment p 17 A84-11339

MARSHALA, I. I

The effect of ischemia and postischemic restoration of blood circulation on the ultrastructure of the neurons

p 5 A84-11556 MASLOVSKAIA, S G. The application of an electromagnetic field in patients following disorders of brain blood circulation.

p 18 A84-11561

MATHASH III M

The role of metals in free radical oxidation processes in the tissues of organisms according to data of spontaneous and initiated chemiluminescence

p 2 A84-10483

MCCAULEY, D.S.

Ballistic protective headgear for Navy/Marine Corps rotary wing aircrew p 33 A84-10708 Physiological testing of a helicopter mobile aircrewman p 34 A84-10725 cooling system MCHEDLISHVILI, G I

The pattern of local vascular responses in conditions of an increased activity of the cerebral cortex

p 3 A84-10844

MCLANE, J A Exercise training and glucose uptake by skeletal muscle p 8 A84-12652

MCMURTRY, I F potentiates hypoxic p 8 A84-12658 of glycolysis Inhibition vasoconstriction in rat lungs

Aircrew restraint improvement program p 35 A84-10735

MEDLOCK, C

in rate

Pharmacokinetics of pentobarbital under hyperbanc and hyperbanc hyperoxic conditions in the dog

p 6 A84-12063 MELESHKO, G. I.

Physiological and ecological characteristics of the water fern, azolla pinnata, and prospects of using it in biological support system for man p 39 N84-11709 MELIKHOV, S A.

Hyperventilation as a method for detecting disorders of atnoventricular conductivity in athletes p 18 A84-11562

MERZON, K. A.

The effect of diuretics on the concentration of calcium in blood serum and its excretion with the unne

p 18 A84-11563 MEYRICK, B

Polycythemia and the acute hypoxic response in awake rats following chronic hypoxia p 1 A84-10282 MICHAEL S.D.

Age-related responses to mild restraint in the rat p 8 A84-12654

MICHAELSON, S. M.

Microwaves, hyperthermia, and human leukocyte function

[PB83-225375] p 24 N84-10746

MIKHAILOVA, N S

Integrator of climate data for assessing indoor microclimate p 36 A84-11570

MILEHAM, A P

Evaluation of a draft standard on performance pecifications for health physics instrumentation p 28 N84-11750 [DE83-016186]

MILLEDGE, J S

Renin, angiotensin-converting enzyme, and aldosterone p 14 A84-10279 in humans on Mount Everest Cardiorespiratory response to exercise in men repeatedly exposed to extreme altitude p 21 A84-12651

MILLER, F J Influence of nitrogen dioxide on xenobiotic metabolism p 14 N84-11743 [PB83-2397231

MILLER, R A

Design strategies for computer-based information displays in real-time control systems p 36 A84-10970 Simulation of the motion of a Shuttle-attached flexible manipulator arm p 37 A84-11935

MILLER, R L

The USAFSAM advanced oxygen system concept p 34 A84-10713

MIMPEN A. M

Technique for measuring the sound pressure levels under flying helmets and headsets p 40 N84-11765 [IZF-1982-391

MINTON, S.

Metaphor and common-sense reasoning p 32 N84-11756 [AD-A131423]

MIROLIUBOV, A. V

The relationship between the operator performance under maximum information loads and the individual parameters of the EEG alpha rhythm p 30 A84-11343

MIROSHNIKOVA, Y R

Free amino acids of blood before and after short-term p 26 N84-11702 spaceflights

Effect of hypokinesia on amino acid metabolism in rats on diets differing in calcium and phosphorus content p 11 N84-11707

Design strategies for computer-based information displays in real-time control systems p 36 A84-10970 MITCHELL G S

Metabolic acids and H(+) regulation in brain tissue dunng acclimatization to chronic hypoxia

p 9 A84-12659

p 10 N84-10728

MITCHELL, T J

Nonparametric estimation of the distribution of time to onset for specific diseases in survival/sacrifice experiments (DE83-013726)

MITSKAN, M A

The role of metals in free radical oxidation processes in the tissues of organisms according to data of spontaneous and initiated chemiluminescence

p 2 A84-10483

MOGILENSKY, J

spaceflight activity planning with knowledge-based systems TAIAA PÄPER 83-23741 p 33 A84-10035

MOLIARENKO, T N

Morphofunctional correlations as exemplified by the relationships between the cardiovascular system and the physique p 17

Biofeedback monitoring-devices for astronauts in space environment p 37 A84-12025

MOROZOV. I S

The role of adrenalin in the genesis of disorders of motor skills in conditions of emotional stress

p 30 A84-11338

MOSKALENKO, IU E

Rheoencephalography - Biophysical foundations, information content, and limits of application p 5 A84-11326

MUKHAMEDOV, E G

A method of assessing cardiac function with bicycle ergometry in expert medical certification of pilots p 27 N84-11716

MURRAY, T F Effect of a 42 2-km footrace and subsequent rest or

exercise on muscle glycogen and enzymes o 15 A84-10285

MUSACCHIA, X J

Rat hindlimb muscle responses to suspension p 6 A84-12065 hypokinesia/hypodynamia

MUSCH, T. I. Metabolic acids and H(+) regulation in brain tissue during acclimatization to chronic hypoxia

p 9 A84-12659

p 20 A84-11761

p 6 A84-11758

MYASNIKOV. V I

Experimental psychological methods used in expert evaluation of mental work capacity of flight personnel in the presence of functional disturbances and central p 26 N84-11712 vous system diseases

N

NADEL, J A

Time course of airway hyperresponsiveness induced by ozone in dogs p 2 A84-10286

NAHMIAS, C

Platelets and leukocytes in the lungs after acute p 9 A84-12661 hypobaric hypoxia NASOLODIN, V V Metabolism of certain trace elements and the

prophylaxis of their deficit in athletes p 18 A84-11553 NAYDINA, V.P. Physiological and ecological characteristics of the water fern, azolla pinnata, and prospects of using it in biological life-support system for man p 39 N84-11709

NEFEDOV, IU G General results of medical investigations in Salyut-6 manned space flights

[IAF PAPER 83-202] NESMITH, M F

Self-locking telescoping manipulator arm [NASA-CASE-MFS-25906-1] p 40 N84-11761

NÈSTLER, E J Protein phosphorylation in the brain p 4 A84-11253 NEUBERT, J

The frog-statolith-experiment (STATEX) of the German Spacelab mission D1 - Scientific background and technical

description [IAF PAPER 83-184]

NIKOLAYEV, V P Demonstration of gas bubbles in canine pulmonary artery and aorta by means of ultrasonic echography with p 11 N84-11708 intravenous air infusion

Overall 'gain' of the respiratory control system in normoxic humans awake and asleep p 22 A84-12660

Integrator of climate data for assessing indoor microclimate p 36 A84-11570

PANDOLF, K. B

PANIN, L. E.

PANFEROVA. N E

gender, and environment

Hypohydration and exercise - Effects of heat acclimation,

Skin capillary bed under the prolonged limitation of

Biochemical mechanisms of stress p 7 A84-12156

human muscular activity in the antiorthostatic position

p 15 A84-10281

p 17 A84-11334

PANKOVA, A. S NORMAN, D A. Morphometric study of rat adrenal medulla during Representation in memory [AD-A130662] p 32 N84-10757 long-term hypokinesia p 10 N84-11705 NÔVIKOV, G V PAPSUEVICH, O S. A hygienic evaluation of elevated dynamic loads on The influence of the neuropeptide arginine-vasopressin passengers in urban transport vehicles on human tolerance to a hot dry environment p 19 A84-11569 p 17 A84-11339 NOVIKOVA, N A. PASTUSHENKO, V F The effect of an increased mechanical load on the The destruction of a bilayer lipid membrane as a result of electrical breakdown dependence of the contraction of isolated heart muscle p 7 A84-12568 on the concentration of Ca(2+) in the perfusate PAVLOVSKAIA, N. I p 3 A84-10843 The effect of ischemia and postischemic restoration of NOZDRACHEV. A. D. blood circulation on the ultrastructure of the neurons The physiology of the vegetative nervous system p 5 A84-11556 p 3 A84-10489 PEARSON, T Direct comparison of intuitive, quasi-rational and Development of passive diver thermal protection analytical cognition p 31 N84-10751 system [AD-A130273] ÁD-A1306851 p 39 N84-10762 PELLIZZARI, E D NUCKOLS, M L Personal exposure to volatile organics and other Design guidelines for carbon dioxide scrubbers compounds indoors and outdoors. The Exposure Assessment Methodology) study The TEAM (Total (AD-A130459) p 39 N84-10761 NULLMEYER, R T [PB83-231357] p 24 N84-10744 Companion trainer aircraft Concept test Bioassay of particulate organic matter from ambient p 32 N84-11757 [AD-A131378] p 29 N84-11754 [PR83-239731] PESSENHOFER, H 0 Training-dependent changes of red cell density and erythrocytic oxygen transport p 21 A84-12653 OAKES, T W Intercomparison of stable-element content of foods by Simulation of cerebrocranial trauma for evaluation and statistical methods development of gear to protect pilots against impacts [DE83-014029] OBODCHUK, G S p 39 N84-10764 p 25 N84-11695 PETRUS, V.S. Changes in the amino acid contents of saliva and urine An evaluation of the bacterial environment on motor p 19 A84-11573 in oil and gas drillers p 6 A84-11575 PLANEL, H Time course of airway hyperresponsiveness induced by Respective role of microgravity and cosmic rays on ozone in dogs p 2 A84-10286 paramecium tetraurelia cultured aboard Salyut 6 OESEBURG, F [IAF PAPER 83-186] p 6 A84-11759 Results and interpretation of labor-hygienic studies in PLASTUNOV, B A the paintshop of the jet engine depot of the Woensdrecht An evaluation of the bacterial environment on motor p 6 A84-11575 [PML-1982-54] p 40 N84-11759 PLASTUNOV, V A OHYABU, Y An evaluation of the bacterial environment on motor Overall 'gain' of the respiratory control system in normoxic humans awake and asleep p 22 A84-12660 PLIAMOTAIA-ABDRAKHMANOVA, R SH OKOLUKHIN, IU A. Assessment of the functional condition of the female Integrator of climate data for assessing indoor p 36 A84-11570 organism in factories p 17 A84-11341 microclimate POGLAZOV, B F ORENDACHOVA, IU Regulatory functions of actin in the cell The effect of ischemia and postischemic restoration of p 5 A84-11349 blood circulation on the ultrastructure of the neurons POLIAKOV, A. M p 5 A84-11556 The role of temporal parameters of the interspike interval ORLANDO, N E p 4 A84-10849 in the coding of temperature A system for intelligent teleoperation research [AIAA PAPER 83-2376] p 33 A8 p 33 A84-10070 Aircraft crew diet in emergency situations ORLOVA, T A. p 39 N84-11696 Changes in blood urea content under hypokinetic conditions p 26 N84-11703 The relationship between the operator performance under maximum information loads and the individual Human physiology research under microgravity parameters of the EEG alpha rhythm p 30 A84-11343 conditions and the proposed 'anthrorack' facility POROTIKOV, V. I p 15 A84-10397 The hormonal regulation of calcium channels of cardiac OSIPOV, IU P p 8 A84-12571 membranes effect of the administration 8-arginine-vasopressin during a period of adaptation to Flying training R&D (Research and Development) at the hyperthermia p 17 A84-11340 Air Force Human Resources Laboratory OSÓKINA, T F [AD-A130250] p 31 N84-10752 Prediction of vorniting in dogs exposed to radiation with POTULOVA, L. A. p 11 N84-11710 shielding of midabdomen Dependence of the time of recognition of significant optical stimuli on the features characterizing the space-time organization of brain bipotentials p 17 A84-11336 POWELL, C J. PACE, J V. III Calculations of radiation fields and monkey mid-head Extended development procedure EDeP user's and mid-thorax responses in AFRRI-TRIGA reactor facility [AD-A131381] p 31 N84-10756 experiments PRASOLOVA, T V
The use of functional rheovasography for the [DE83-015483] p 13 N84-11741 PACK. D J examination of athletes with circulatory disorders in lower Intercomparison of stable-element content of foods by p 18 A84-11551 statistical methods PRAVETSKIY, N V [DE83-014029] p 39 N84-10764 Normal human coronary circulation during postural tests PANCHERI, P and decompression of lower half of body Biofeedback monitoring-devices for astronauts in space

PURER, A. manual REMES. P function p 26 N84-11699 ROCK, P. B. PRIKHODKINA, L I Prevention of acute mountain sickness by Distribution of individual indices of the subjective p 30 A84-11337 dexamethasone evaluation of loudness [AD-A1315331 PROSKURINA, T M. RODRIQUEZ, J Skin capillary bed under the prolonged limitation of

human muscular activity in the antiorthostatic position

Energy metalbolism enzymes in simulation of some

p 26 N84-11704

PROSKUROVA, G. I.

spaceflight factors

PROTSENKO, IU. L. Rhythmoinotropic phenomena in the human heart p 16 AB4-11329 Displacement of liquid in a model of semicircular canals under the effect of angular accelerations weightlessness p 18 A84-11350 PRUSSKIY, A. A. Effect of redistribution of blood on severity of spatial p 26 N84-11701 position illusions in weightlessness The role of adrenalin in the genesis of disorders of motor skills in conditions of emotional stress p 30 A84-11338 Design guidelines for carbon dioxide scrubbers [AD-A130459] p 39 N84-10761 R RABINOVITCH, M. Polycythemia and the acute hypoxic response in awake p 1 A84-10282 rats following chronic hypoxia RADDIN, J H., JR. Vertical impact evaluation of the F/FB-111 crew restraint configuration, headrest position, and upper extremity p 38 A84-12059 bracing technique RASMUSSEN H The plasma membrane calcium pump p 13 N84-11734 RATTNER, B. A. Age-related responses to mild restraint in the rat p 8 A84-12654 RAZGOVOROV. B L. Prediction of vomiting in dogs exposed to radiation with shielding of midabdomen p 11 N84-11710 Carboxylic acid ionophores as probes of the role of p 13 N84-11735 calcium in biological systems REGAN. D Flying performance on the advanced simulator for pilot training and laboratory tests of vision p 30 A84-10973 Polycythemia and the acute hypoxic response in awake rats following chronic hypoxia REIGELUTH, C M Extended development procedure EDeP user's p 31 N84-10756 [AD-A131381] Modern method and instrument for measuring psychic [IAF PAPER 83-181] p 30 A84-11756 RESCHKE, M. F. Transdermal scopolamine in the prevention of motion sickness Evaluation of the time course of efficacy p 20 A84-12061 REYMAN, A. M Demonstration of gas bubbles in canine pulmonary artery and aorta by means of ultrasonic echography with p 11 N84-11708 intravenous air infusion RICHOILLEY, G Respective role of microgravity and cosmic rays on paramecium tetraurelia cultured aboard Salyut 6 p 6 A84-11759 [IAF PAPER 83-186] A voice interactive system for aiding and documentation of space-based tasks p 33 A84-10025 [AIAA PAPER 83-2355] RING, E F. J. Human body temperature - Its measurement and p 16 A84-11017 regulation ROBERTS, N J , JR Microwaves, hyperthermia, and human leukocyte [PB83-225375] p 24 N84-10746 ROBINSON, K R Local calcium entry and the guidance of growth p 12 N84-11726 ROBINSON, T E. Optimizing the exercise protocol for cardiopulmonary assessment p 22 A84-12662

p 23 N84-10737

p 35 A84-10735

p 10 N84-10726

Aircrew restraint improvement program

[AD-A131084]

Microbial fouling and its effect on power generation

SCHELEGLE, E S SHULZHENKO, E B ROMER, L. D Efficiency of high-frequency ventilation as determined Ozone toxicity effects consequent to prolonged, high General results of medical investigations in Salyut-6 by nitrogen washouts. A model study intensity exercise manned space flights [PB83-237388] p 27 N84-11745 [IAF PAPER 83-202] [AD-A131331] p 29 N84-11755 p 20 A84-11761 ROSS, M D SCHILLER, P SILVA, J E Study and development activities of Dornier System on Adrenergic activation of triodothyronine production in Calcium ions, stores, and modulators. What is the gravity p 13 N84-11733 space biology/medicine equipment and payloads for brown adipose tissue p 4 A84-11268 receptor connection? Spacelab and freeflying platform application SIMAKOV, A. A. ROTONDO, G [IAF PAPER 83-183] p 37 Displacement of liquid in a model of semicircular canals inder the effect of angular accelerations in Biofeedback monitoring-devices for astronauts in space SCHWABERGER, G environment p 37 A84-12025 under Training-dependent changes of red cell density and weightlessness p 18 A84-11350 ROUSE, S H erythrocytic oxygen transport p 21 A84-12653 Effect of redistribution of blood on seventy of spatial Analysis and classification of human error SCHYMANIETZ, K p 26 N84-11701 p 29 A84-10388 position illusions in weightlessness Analysis and outlook concerning an employment of SKALATSKIY. O N ROUSE, W B military helicopters in night operations analysis and classification of human error Method for identifying trace contaminants in chamber p 36 A84-11058 p 29 A84-10388 p 39 N84-11718 atmosphere at high pressure SEARS, W J SKOBELEV, L. I ROUTZAHN, R L. A cockpit and equipment integration laboratory The fractionation of plasma proteins in large scale Naval aviation solid chemical oxygen emergency system p 35 A84-10734 p 36 A84-10737 preparations of blood p 3 A84-10492 program ROUX, S J Utilisation of the European retneval carner EURECA for The Regulatory Functions of Calcium and the Potential life science research Biological life support system p 6 A84-11753 [IAF PAPER 83-174] p 37 A84-11755 Role of Calcium in Mediating Gravitational Responses in SELBY, J M Cells and Tissues Evaluation of a draft standard on performance SKOOGH, B-E p 11 N84-11720 ecifications for health physics instrumentation [NASA-CP-2286] Time course of airway hyperresponsiveness induced by p 28 N84-11749 ozone in dogs Evidence for a regulatory role of calcium in [DE83-016169] p 2 A84-10286 p 11 N84-11721 Evaluation of a draft standard on performance SKULACHEV, V P gravitropism specifications for health physics instrumentation ROWE, R W Generation of electric potentials on mitochondrial [DE83-016186] p 28 N84-11750 Founer-processed images of dynamic lung function from membranes during the hydrolysis of SEMENKOV, V N p 5 A84-11366 pyrophosphate list-mode data Oxygen regimen in the human penpheral tissue during [DE83-013276] p 24 N84-10741 SLIUSAR, I B space flights The influence of the neuropeptide arginine-vasopressin ROWELL, L. B [IAF PAPER 83-197] p 19 A84-11760 Regional distribution of blood flow during mild dynamic on human tolerance to a hot dry environment SEMENOV, S M p 2 A84-10283 p 17 A84-11339 leg exercise in the baboon Mathematical modeling of ecological processes RUBLAK. K SMIRNOV, V M p 7 A84-12151 Integrator of climate data for assessing indoor An analysis of the mechanisms of the accelerating effect SEMENOVA. T D p 36 A84-11570 microclimate of the vagus nerve on the work of the heart Level of arterial pressure and vegetative cardiac p 4 A84-10848 RUMELHART, D E regulation during the simulation of intense operator Representation in memory p 16 A84-11327 p 32 N84-10757 [AD-A130662] Metabolic acids and H(+) regulation in brain tissue SEMEVSKII, F N RUMYANTSEV, V V during acclimatization to chronic hypoxia Mathematical modeling of ecological processes p 9 A84-12659 Normal human coronary circulation during postural tests p 7 A84-12151 SMITH, O A and decompression of lower half of body SHAKHOV, IU A p 26 N84-11699 Regional distribution of blood flow during mild dynamic Generation of electric potentials on mitochondrial leg exercise in the baboon p 2 A84-10283 RUSANOV, V M membranes during the hydrolysis of inorganic The fractionation of plasma proteins in large scale SMOLINSKAIA, V A p 5 A84-11366 pyrophosphate preparations of blood p 3 A84-10492 The role of metals in free radical oxidation processes SHAMKOV, N V in the tissues of organisms according to data of RYRIN I A Distribution of individual indices of the subjective spontaneous and initiated chemiluminescence Distribution of individual indices of the subjective evaluation of loudness p 30 A84-11337 p 30 A84-11337 p 2 A84-10483 evaluation of loudness SHANAHAN, D F SMOORENBURG, G F RYZHOV, B N Impact and vibration testing of a modified UH-1 crew Technique for measuring the sound pressure levels Method for assessing mental stress in operators seat under flying helmets and headsets p 32 N84-11715 [AD-A130279] p 38 N84-10760 [IZF-1982-39] p 40 N84-11765 SHAPKOV, IU T SOFFEN, G Motor units of human skeletal muscles p 13 N84-11732 Programmatic comments p 21 A84-12158 SOLODOVNIK, F. A. SHCHIGOLEV. V V Displacement of liquid in a model of semicircular canals SADOSKI, D. M. Changes in cardiac output and orthostatic stability of the effect of angular accelerations The effects of cuing in time-shared tasks cosmonauts p 25 N84-11697 p 18 A84-11350 p 29 A84-10971 weightlessness SHEPELEV, Y Y Effect of redistribution of blood on severity of spatial SALNITSKIY, V P Physiological and ecological characteristics of the water p 26 N84-11701 position illusions in weightlessness Method for assessing mental stress in operators fern, azolla pinnata, and prospects of using it in biological SOLOMIN. I L. p 32 N84-11715 p 39 N84-11709 The relationship between the operator performance under maximum information loads and the individual life-support system for man SAPOVA, N I SHERMAN, W M Dynamics of rheographic parameters of cerebral circulation and circulation in the extremities during active Effect of a 42 2-km footrace and subsequent rest or parameters of the EEG alpha rhythm p 30 A84-11343 exercise on muscle glycogen and enzymes SPARACINO, C. p 26 N84-11700 orthostatic test Personal exposure to volatile organics and other p 15 A84-10285 SARI, F SHEVELEV, O A compounds indoors and outdoors The TEAM (Total Extended development procedure EDeP user's Exposure Assessment Methodology) study Circadian fluctuations of certain indicators of the [PB83-231357] p 24 N84-10744 condition of the cardiovascular system and skin electrical p 31 N84-10756 [AD-A131381] SPARK, R F characteristics in young female athletes engaged in SAROL, Z. academic rowing Prevention of acute mountain sickness by Oxygen regimen in the human peripheral tissue during SHMONIN. A. E. space flights [AD-A131533] p 23 N84-10737 Heat-transfer characteristics of port workers in the [IAF PAPER 83-197] p 19 A84-11760 SPAUL, W A. Arctic p 19 A84-11572 SAVINA, Y A. The physiological effects of simultaneous exposures to SHOLPO, L. N Morphometric study of rat adrenal medulla during heat and vibration Simulation of cerebrocranial trauma for evaluation and p 10 N84-11705 long-term hypokinesia NASA-TM-844001 p 22 N84-10732 development of gear to protect pilots against impacts SAWKA, M. N. STANBROOK, H S p 25 N84-11695 Hypohydration and exercise - Effects of heat acclimation, potentiates of alycotysis hypoxic Inhibition SHORTAL, J P., III p 15 A84-10281 gender, and environment vasoconstriction in rat lungs p 8 A84-12658 Effects of head impact acceleration on human erformance Overview and preliminary battery SĂZONOVA, L. IA. STARK, E.A. performance The cardiostimulating action of norepinephrine Human factors in flight simulator development identification p 37 A84-11921 contained in the liposomes in conditions of adrenoreceptor [AD-A130286] p 31 N84-10754 blockade D 3 A84-10842 STARKOVA, M N SHTARK, M B SCARL, E A. Predicting ventricular anythmia of the heart in patients Heart-rhythm reaction to sensorimotor loads of varying spaceflight p 18 A84-11564 Manned activity planning with with myocardial infarction p 16 A84-11331 knowledge-based systems complexity STEFANOV, A. V [AIAA PAPER 83-2374] SHULMAN, E I p 33 A84-10035 The cardiostimulating action of norepinephrine SCHATZ, A Heart-rhythm reaction to sensorimotor loads of varying contained in the liposomes in conditions of adrenoreceptor The frog-statolith-experiment (STATEX) of the German complexity p 3 A84-10842 p 16 A84-11331 blockade

description

[IAF PAPER 83-184]

Spacelab mission D1 - Scientific background and technical

p 6 A84-11758

SHULTS, G

microclimate

Integrator of climate data for assessing indoor

p 36 A84-11570

STEFFEN. J M

hypokinesia/hypodynamia

Rat hindlimb muscle responses to suspension

p 6 A84-12065

p 25 N84-11697

PERSONAL AUTHOR INDEX
STENGER, F
Ultrasound tomography by Galerkin or moment methods
[AD-A131408] p 28 N84-11747 STRAUCH, D
Hygienic microbiological/virological examination of an
airwasher concerning the emission of airborne microorganisms
[BMFT-FB-T-83-130] p 14 N84-11742 STRELKOVA, N. I.
Physical methods of treatment in neurology
p 15 A84-10488 The application of an electromagnetic field in patients
following disorders of brain blood circulation p. 18 A84-11561
STRELTSOVA, E N The application of an electromagnetic field in patients
following disorders of brain blood circulation
p 18 A84-11561 SUDAKOV, K. V.
Principles of the physiology of functional systems p 3 A84-10487
SUE, D Y
Optimizing the exercise protocol for cardiopulmonary assessment p 22 A84-12662
SUKHAREV, S ! The destruction of a bilayer lipid membrane as a result
of electrical breakdown p 7 A84-12568
SUKHORUKOV, O A Method for identifying trace contaminants in chamber
atmosphere at high pressure p 39 N84-11718 SULTANBEKOV, Q R.
Comparative evaluation of changes in MB CPK activity
and indicators of precardial mapping p 19 A84-11565 SUSSKIND, H
Fourier-processed images of dynamic lung function from list-mode data
[DE83-013276] p 24 N84-10741 SUZUKI. K
Pseudo-critical heat capacity of single lipid bilayers
p 4 A84-11115 SVIDOVYI, V 1
External respiration in electric welders p 19 A84-11571
SWAIN, A D
An approach to modeling of human performance for purposes of probabilistic risk assessment
[DÉ83-009292] p 40 N84-11764 SWAJA, R E
Accuracy of external personnel dosimetry systems in
mixed neutron and gamma radiation fields [DE83-015712] p 28 N84-11751
SWEENEY, J Extended development procedure EDeP user's
manual
[AD-A131381] p 31 N84-10756 SWINTH, K L.
Evaluation of a draft standard on performance specifications for health physics instrumentation
[DE83-016169] p 28 N84-11749
Evaluation of a draft standard on performance specifications for health physics instrumentation
[DE83-016186] p 28 N84-11750
SYRKIN, A L. Predicting ventricular arrythmia of the heart in patients
with myocardial infarction p 18 A84-11564
Т
-
TANNEHILL, R S Neurocognitive pattern analysis
[AD-A131302] p 24 N84-10740 TATKEN, R L.
Registry of toxic effects of chemical substances. User's
guide to the RTECS computer tape (PB83-223172) p 25 N84-10748
TEDOR, J B The USAFSAM advanced oxygen system concept
p 34 A84-10713
TEMPLIER, J Respective role of microgravity and cosmic rays on
paramecium tetraurelia cultured aboard Salyut 6

[IAF PAPER 83-186]

[NASA-CASE-MFS-25740-1]

Prosthetic occlusive device for an internal

Influence of training on blood flow to different skeletal

Platelets and leukocytes in the lungs after acute

TENNEY, J B., JR

passageway

TERJUNG, R L

THIND, A.

muscle fiber types

hypobanc hypoxia

THYOK, N Physiological and ecological characteristics of the water fern, azolla pinnata, and prospects of using it in biological p 39 N84-11709 life-support system for man TIKHONOV, M. A. Hemodynamic reactions to positive intrathoracic pressure at +G sub z accelerations p 25 N84-11698 TIXADOR, R Respective role of microgravity and cosmic rays on paramecium tetraurelia cultured aboard Salyut 6 p 6 A84-11759 [IAF PAPER 83-186] TOMLINSON, G. A. The growth of paracoccus halodenitrificans in a defined INASA-TM-844111 p 9 N84-10724 TONER, M M Hypohydration and exercise - Effects of heat acclimation, p 15 A84-10281 gender, and environment The energy cost and heart rate response of trained and untrained subjects walking and running in shoes and [AD-A131420] p 23 N84-10735 TRAD, L Prevention of acute mountain sickness by dexamethasone p 23 N84-10737 TRAVIS. M Effect of physical training on myocardial enzyme activities in aging rats TROSHKIN A V Parameters of the distribution of EKG R-R intervals in the prediction of the work capacity of human operators p 16 A84-11330 TSIEN, R Y Measurement and control of free calcium inside small intact cells p 13 N84-11736 TSIVAREVA, E V. Circadian fluctuations of certain indicators of the condition of the cardiovascular system and skin electrical characteristics in young female athletes engaged in p 17 A84-11332 academic rowing TURAKHIA, M H Microbial fouling and its effect on power generation [AD-A131084] TURNBULL, B W Nonparametric estimation of the distribution of time to for specific diseases in survival/sacrifice experiments [DE83-013726] p 10 N84-10728 TVERSKY, A Representations of perceptions of risks p 32 N84-10759 U UGLANOVA, N A Simulation of cerebrocranial trauma for evaluation and development of gear to protect pilots against impacts ULLMAN, S Computational studies in the interpretation of structure and motion Summary and extension p 27 N84-11746 [AD-A131598] ULTMAN, J S. Single breath cardiac output - Enhanced sampling and p 38 A84-12064 analysis techniques USHAKOV, A. S Free amino acids of blood before and after short-term p 26 N84-11702 spaceflights USHAKOV, V V The role of temporal parameters of the interspike interval p 4 A84-10849 in the coding of temperature USTIUSHIN, B V Heat-transfer characteristics of port workers in the p 19 A84-11572

p 6 A84-11759

p 27 N84-11744

p 1 A84-10278

p 9 A84-12661

V	
VACEK, A.	
Oxygen regimen in the humai	n penpheral tissue during
space flights	
[IAF PAPER 83-197]	p 19 A84-11760
VAGILEVICH, V V	
The role of metals in free rai	dical oxidation processes
in the tissues of organisms	according to data of
spontaneous and initiated chem	ituminescence
	p 2 A84-10483
VAINSHTEIN, G. B.	
Rheoencephalography - B	iophysical foundations,
information content, and limits of	of application
	p 5 A84-11326
VANDERBY, R., JR	•

p 33 A84-10710

Computer analysis in helmet design

VASILEV, IA. A Dependence of the time of recognition of significant optical stimuli on the features characterizing the space-time organization of brain bipotentials p 17 A84-11336 VASILEV, V N Extenonzation of the effect of hyperthermia by observing the sympathoadrenal activity in subjects under psychoemotional stress p 18 A84-11555 VASILYEV. P V Changes in cardiac output and orthostatic stability of

VAVILOV, V A. Theory and experiment in the analysis of the work of p 33 A84-10473 operators VAWTER, D L Measurement of lung function using the magnetometer

cosmonauts

system

[AD-A130841] p 23 N84-10738 VEHNUIZEN, J R

Method for evaluating operator inputs to digital

p 40 N84-11763 [DE83-013521] VENDA, V F Theory and experiment in the analysis of the work of

p 33 A84-10473 operators VERKHOSHANSKII, IU V

Long-term retarded training effect of force loads p 18 A84-11554 VESTEWIG. R

A voice interactive system for aiding and documentation of space-based tasks [AIAA PAPER 83-2355] p 33 A84-10025 VIANO, D C

Cardiovascular injury from blunt thoracic impact of epinephrine and isoproterenol injected rabbits p 6 A84-12060

VIGNERON, F R Simulation of the motion of a Shuttle-attached flexible manipulator arm p 37 A84-11935 VINOGRADOV, A V

Comparative evaluation of changes in MB CPK activity and indicators of precardial mapping p 19 A84-11565

Free amino acids of blood before and after short-term p 26 N84-11702 spaceflights Effect of hypokinesia on amino acid metabolism in rats

on diets diffening in calcium and phosphorus content p 11 N84-11707 VOLCHEK, O D

Determination of a subjects condition according to pitch p 27 N84-11714 of the vocal vowel 'A' VOLKOVA, L. P. Energy metalbolism enzymes in simulation of some

p 26 N84-11704 paceflight factors VOLOKHOV. V F

Experimental psychological methods used in expert evaluation of mental work capacity of flight personnel in the presence of functional disturbances and central p 26 N84-11712 ous system diseases VOROBEV F I

General results of medical investigations in Salyut-6 manned space flights [IAF PAPER 83-202] p 20 A84-11761

VORONIN, L G Problems in theory and methodology for the investigation

of higher nervous activity in man - Selected works VOSKRESENKIY, A. D

Changes in cardiac output and orthostatic stability of p 25 N84-11697 cosmonaute VYREMKOV. IU E

The microcirculatory bed of the liver according to data p 5 A84-11560 of scanning electron microscopy

w

WALLACE, L. A Personal exposure to volatile organics and other compounds indoors and outdoors. The TEAM (Total compounds indoors and outdoors Exposure Assessment Methodology) study p 24 N84-10744 [PB83-231357] WALLACH, H. An effect of speed on induced motion p 30 A84-12786 WALTERS, E H

Time course of airway hyperresponsiveness induced by ozone in dogs p 2 A84-10286 WARD, D.S.

Effect of intravenous dopamine on hypercapni ventilatory response in humans p 21 A84-12655 WARD, M. P. Cardiorespiratory response to exercise in men

repeatedly exposed to extreme altitude p 21 A84-12651

WASSERMAN, K. WASSERMAN, K Control of breathing at the start of exercise as influenced by posture p 21 A84-12657 Optimizing the exercise protocol for cardiopulmonary assessment p 22 A84-12662 WATERS, M Bioassay of particulate organic matter from ambient [PB83-239731] p 29 N84-11754 WATTERSON, D M Intracellular calcium receptors Calmodulin and related p 12 N84-11724 proteins WEBB, J. T. Stability of rat brain glutamine synthetase to oxygen toxicity (oxygen at high pressure) p 9 N84-10725 [AD-A131049] WEIL C Radiofrequency radiation exposure for bio-effects research at the Health Effects Research Laboratory, Research Triangle Park, North Carolina [PB83-229591] p 25 N84-10747 WEILER-RAVELL, D Control of breathing at the start of exercise as influenced p 21 A84-12657 by posture WEISS, M S Neurophysiological effects of -X impact acceleration p 7 A84-12066 Effects of impact acceleration on somatosensory evoked p 22 N84-10734 [AD-A130280] WEKERLE, J Hygienic microbiological/virological examination of an airwasher concerning the emission of airborne microorganisms p 14 N84-11742 [BMFT-FB-T-83-130] WELCH, D W Pharmacokinetics of pentobarbital under hyperbanc and hyperbaric hyperoxic conditions in the dog p 6 A84-12063 WELCH, H G Lactate accumulation during incremental exercise with p 14 A84-10280 varied inspired oxyen fractions Impact and vibration testing of a modified UH-1 crew seat [AD-A130279] p 38 N84-10760 WENDT, P A Down in the Arctic - Equipment and training for p 35 A84-10726 survival WEST, J B Renin, angiotensin-converting enzyme, and aldosterone in humans on Mount Everest p 14 A84-10279 WHIPP, B J Optimizing the exercise protocol for cardiopulmonar p 22 A84-12662 assessment WHIPP, D. J. Control of breathing at the start of exercise as influenced p 21 A84-12657 by posture WHITING, J D chromatography/mass spectrometry p 20 A84-12068 WHITNEY C. Probabilistic model for assessing time-varying contaminant levels p 24 N84-10745 [PB83-232108]

The confirmation of 9-carboxy-THC in urine by gas

WILLIAMS, E S

Cardiorespiratory response to exercise in men repeatedly exposed to extreme altitude p 21 A84-12651

WITTERS, D M. JR

Performance of a new 916 MHz direct contact applicator with reduced leakage, a detailed analysis p 24 N84-10742 [PB83-226621]

WOLFF, T Bioassay of particulate organic matter from ambient

p 29 N84-11754 [PB83-239731] WOOD, M E

Companion trainer aircraft Concept test p 32 N84-11757 [AD-A131378] WYDEVEN, T

Composition and analysis of a model waste for a CELSS (Controlled Ecological Life Support System) [NASA-TM-84368] p 40 N84-11760

'Anaerobic threshold' - Problems of determination and validation p 15 A84-10284 YEGOROV, A D Study of cardiovascular system during long-term paceflights p 25 N84-11694 spaceflights

YEH, M P

'Anaerobic threshold' - Problems of determination and nogshilev p 15 A84-10284 YOSHIDA, A.

Overall 'gain' of the respiratory control system in normoxic humans awake and asleep p 22 A84-12660 YOUNG, J C

Exercise training and glucose uptake by skeletal muscle in rats p8 A84-12652 YOUNG, R

Programmatic comments YUROVA, K S

p 13 N84-11732

Demonstration of gas bubbles in canine pulmonary artery and aorta by means of ultrasonic echography with intravenous air infusion p 11 N84-11708

Z

ZAIKIN, V A Economical regimes of running for athletes of different ges in a hot climate p 18 A84-11552

ZAVIISKII. IU M The role of metals in free radical oxidation processes

in the tissues of organisms according to data of spontaneous and initiated chemiluminescence p 2 A84-10483

ZEITLIN, G. M

Neurocognitive pattern analysis

(AD-A131302) p 24 N84-10740

ZELON. H Personal exposure to volatile organics and other compounds indoors and outdoors. The TEAM (Total Exposure Assessment Methodology) study p 24 N84-10744 [PB83-231357]

ZELVER. N Microbial fouling and its effect on power generation [AD-A131084] p 10 N84-10726 ZGODA, N V

effect of the administration 8-arginine-vasopressin during a period of adaptation to p 17 A84-11340 hyperthermia ZHARIKOVA, O L.

The development and structure of the lymphoepithelial pharyngeal ring of the Macacus rhesus

p 5 A84-11559 ZHELAMSKII, S V

The effect of mechanical conditions on chronomotive of the myocardium p8 A84-12572

Dependence of structures of heart rhythm on the physical work capacity of athletes p 16 A84-11328 ZHIKHAREVA, A. I

Changes in the amino acid contents of saliva and unne in oil and gas drillers p 19 A84-11573

ZHUKOVA, L. B Method for identifying trace contaminants in chamber p 39 N84-11718 atmosphere at high pressure

ZLATAREV. K Oxygen regimen in the human peripheral tissue during space flights

[IAF PAPER 83-197] p 19 A84-11760 ZÜBAL. I G

Fourier-processed images of dynamic lung function from list-mode data [DE83-013276] p 24 N84-10741

ZUBKOVA, S M

Spontaneous biochemituminescence of mitochondria of several tissues in normal conditions and during the action p 2 A84-10484 of physical factors

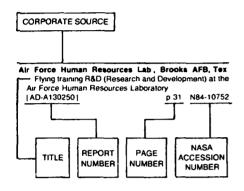
YANOWITZ, F G

CORPORATE SOURCE INDEX

AEROSPACE MEDICINE AND BIOLOGY / A Continuing Bibliography (Supplement 255)

FEBRUARY 1984

Typical Corporate Source Index Listing



Listings in this index are arranged alphabetically by corporate source. The title of the document is used to provide a brief description of the subject matter The page number and the accession 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

AEG-Telefunken, Heilbronn (West Germany)

Civil applications of infrared techniques

p 29 N84-11753 [BMFT-FB-T-83-132]

Aerospace Medical Research Labs., Wright-Patterson

Preliminary investigation of variation in some dark adaptation aspects for possible relevance to military helicopter aircrew

[AD-A1302311 p 22 N84-10733

Agricultural Research Center, Beltsville, Md

Calcium modulation of plant plasma membrane-bound ATPase activities p 12 N84-11723

Air Force Academy, Colo

Stability of rat brain glutamine synthetase to oxygen toxicity (oxygen at high pressure) [AD-A131049] p 9 N84-10725

Air Force Human Resources Lab, Brooks AFB, Tex Flying training R&D (Research and Development) at the

Air Force Human Resources Laboratory [AD-A1302501 D 31 N84-10752

Companion trainer aircraft Concept test

[AD-A131378] p 32 N84-11757

Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio

Proceedings of the 18th Annual Conference on Manual Control [AD-A131256] p 39 N84-10763

Albert Einstein Coll of Medicine, New York.

Controls of intracellular communication mediated by gap p 13 N84-11738

Army Aeromedical Research Lab, Fort Rucker, Ala. Impact and vibration testing of a modified UH-1 crew

[AD-A130279] p 38 N84-10760 Army Research Inst. of Environmental Medicine. Natick, Mass

The energy cost and heart rate response of trained and untrained subjects walking and running in shoes and

p 23 N84-10735 [AD-A131420]

Prevention of acute mountain sickness by dexamethasone [AD-A131533] p 23 N84-10737

B

Baylor Coil of Medicine, Houston, Tex.

Role of calmodulin in cell proliferation p 13 N84-11737

Boeing Aerospace Co., Seattle, Wash Integrated Cuing Requirements (ICR) study Feasibility

analysis and demonstration study [AD-A1310391 p 32 N84-10758

Brookhaven National Lab , Upton, N Y The design and operation of systems for inhalation exposure of animals

[DE83-015388] p 10 N84-10727 Founer-processed images of dynamic lung function from ist-mode data

[DE83-013276] n 24 NR4-10741 Bruker Analytische Messtechnik G.m b H, Rheinstetten

(West Germany)

Development and construction of an apparatus based on the principle of multidimensional nuclear magnetic resonance for the formation of images of organs and parts of the body

[BMFT-FB-T-83-102] p 29 N84-11752

California Univ . Berkelev

Measurement and control of free calcium inside small intact cells p 13 N84-11736

California Univ , Davis.

Gravitational study of the central nervous system

p 12 N84-11730 Ozone toxicity effects consequent to prolonged, high intensity exercise [PB83-237388] p 29 N84-11755

California Univ , San Diego, La Jolla

Representation in memory

[AD-A130662] p 32 N84-10757

Carnegie-Mellon Univ , Pittsburgh, Pa Metaphor and common-sense reasoning

[AD-A131423] p 32 N84-11756

Colorado Univ , Boulder

Direct comparison of intuitive, quasi-rational and

analytical cognition [AD-A130273] p 31 N84-10751

Concordia Univ., Montreal (Quebec)

Cervical spline analysis for ejection injury prediction [AD-A131081] p 23 N84-10739

Connecticut Univ , Farmington

Local calcium entry and the guidance of growth p 12 N84-11726

D

District of Columbia Univ., Washington, D. C.

Vacuum UV laser induced scission of Simian virus 40 p 7 A84-12425 DNA Draper (Charles Stark) Lab , Inc , Cambridge, Mass. Probabilistic model for assessing time-varving

contaminant levels p 24 N84-10745 [PB83-232108]

E

Edgerton, Germeshausen and Grier, Inc., Idaho Falls,

Method for evaluating operator inputs to digital controllers [DE83-013521] p 40 N84-11763

FFG Systems Lab., San Francisco, Calif

Neurocognitive pattern analysis

(AD-A1313021 n 24 NR4-10740 Environmental Monitoring and Support Lab , Research Triangle Park, N C

Recent advances in EPA's (Environmental Prog monitoring and methods development research p 24 N84-10743 PB83-2312091

G

Georgetown Univ, Washington, D C

Vacuum UV laser induced scission of Simian virus 40 DNA p 7 A84-12425

Georgia Inst. of Tech , Atlanta

Analysis and classification of human error

p 29 A84-10388 Measurement of lung function using the magnetometer * system [AD-A130841] p 23 N84-10738

Georgia Univ , Athens
Role of calcium and calmodulin in plant cell regulation

p 12 N84-11725

Н

Health Effects Research Lab , Research Triangle Park,

Evaluation of motor vehicle and other combustion emissions using short-term genetic bioassays

p 10 N84-10731 [PB83-233270]

Radiofrequency radiation exposure for bio-effects research at the Health Effects Research Laboratory, Research Triangle Park, North Carolina [PB83-229591] p 25 N84-10747

Influence of nitrogen dioxide on xenobiotic metabolism in animals

[PB83-239723] p 14 N84-11743 Bioassay of particulate organic matter from ambient

p 29 N84-11754 [PB83-239731] Hohenhelm Univ , Stuttgart (West Germany)

Hygienic microbiological/virological examination of an airwasher concerning the emission of airborne microorganisms [BMFT-FB-T-83-130]

p 14 N84-11742

Howard Univ , Washington, D C Vacuum UV laser induced scission of Simian virus 40 DNA p 7 A84-12425

Idaho Univ , Moscow

Aquaculture techniques A production forecasting model for aquaculture systems [PB83-221713] p 10 N84-10730

Illinois Univ , Urbana.

spaceflights

Photosynthesis in intact plants

IDE83-0160451 p 13 N84-11740

Indiana Univ., Bloomington

Thermoregulation in Erythrocebus patas - A thermal p 9 A84-12663 balance study Polanty of the amphibian ego p 12 N84-11731

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

Technique for measuring the sound pressure levels under flying helmets and neadsets HZF-1982-391 p 40 N84-11765

Joint Publications Research Service, Arlington, Va. Report on development, installation of industrial p 39 N84-11339 USSR report Space Biology and Aerospace Medicine, volume 17, no 5, September - October 1983 [JPRS-84655] p 10 N84-11693 Study of cardiovascular system during long-term

p 25 N84-11694

	Description of the 11700	Calculations of coduction fields and mankey and boad
Simulation of cerebrocranial trauma for evaluation and development of gear to protect pilots against impacts	Programmatic comments p 13 N84-11732 National Aeronautics and Space Administration. Ames	Calculations of radiation fields and monkey mid-head and mid-thorax responses in AFRRI-TRIGA reactor facility
p 25 N84-11695 Aircraft crew diet in emergency situations	Research Center, Moffett Field, Calif Simulation of Viking biology experiments suggests	experiments [DE83-015483] p 13 N84-11741
p 39 N84-11696	smectites not palagonites, as martian soil analogues	Accuracy of external personnel dosimetry systems in
Changes in cardiac output and orthostatic stability of cosmonauts p 25 N84-11697	p 41 A84-10655 The growth of paracoccus halodenitrificans in a defined	mixed neutron and gamma radiation fields [DE83-015712] p 28 N84-11751
Hemodynamic reactions to positive intrathoracic	medium	(DE00-010112) p 20 110-11101
pressure at +G sub z accelerations p 25 N84-11698 Normal human coronary circulation during postural tests	[NASA-TM-84411] p 9 N84-10724 The physiological effects of simultaneous exposures to	P
and decompression of lower half of body	heat and vibration	•
p 26 N84-11699 Dynamics of rheographic parameters of cerebral	[NASA-TM-84400] p 22 N84-10732	Pacific Northwest Lab , Richland, Wash Concepts of dose to soft tissue at the cellular level
circulation and circulation in the extremities during active	Composition and analysis of a model waste for a CELSS (Controlled Ecological Life Support System)	[DE83-013830] p 28 N84-11748
orthostatic test p 26 N84-11700 Effect of redistribution of blood on severity of spatial	[NASA-TM-84368] p 40 N84-11760	Evaluation of a draft standard on performance specifications for health physics instrumentation
position illusions in weightlessness p 26 N84-11701 Free amino acids of blood before and after short-term	National Aeronautics and Space Administration Lyndon B Johnson Space Center, Houston, Tex	[DE83-016169] p 28 N84-11749
spaceflights p 26 N84-11702	Transdermal scopolamine in the prevention of motion sickness Evaluation of the time course of efficacy	Evaluation of a draft standard on performance specifications for health physics instrumentation
Changes in blood urea content under hypokinetic conditions p 26 N84-11703	p 20 A84-12061	[DE83-016186] p 28 N84-11750
Energy metalbolism enzymes in simulation of some	Cardiovascular examinations and observations of deconditioning during the Space Shuttle orbital flight test	Polish Academy of Sciences, Warsaw Conference on Ultrasonics in Biology and Medicine,
spaceflight factors p 26 N84-11704 Morphometric study of rat adrenal medulla during	program p 20 A84-12062	UBIOMED 6 Report summanes
long-term hypokinesia p 10 N84-11705	Absorbent product and articles made therefrom [NASA-CASE-MSC-18223-2] p 40 N84-11758	[ISSN-0208-5658] p 9 N84-10723 Prins Maurits Lab TNO, Rijswijk (Netherlands)
Effect of eleuterococcus extract on recovery processes in rats following seven-day hypokinesia	National Aeronautics and Space Administration	Results and interpretation of labor-hygienic studies in
p 11 N84-11706	Langley Research Center, Hampton, Va A system for intelligent teleoperation research	the paintshop of the jet engine depot of the Woensdrecht airbase
Effect of hypokinesia on amino acid metabolism in rats on diets differing in calcium and phosphorus content	[AIAA PAPER 83-2376] p 33 A84-10070	[PML-1982-54] p 40 N84-11759
p 11 N84-11707 Demonstration of gas bubbles in canine pulmonary artery	National Aeronautics and Space Administration Marshall Space Flight Center, Huntsville, Ala	D
and aorta by means of ultrasonic echography with	Prosthetic occlusive device for an internal	R
intravenous air infusion p 11 N84-11708 Physiological and ecological characteristics of the water	passageway [NASA-CASE-MFS-25740-1] p 27 N84-11744	Research Triangle Inst., Research Triangle Park, N C
fern, azolla pinnata, and prospects of using it in biological	Self-locking telescoping manipulator arm	Personal exposure to volatile organics and other compounds indoors and outdoors. The TEAM (Total
life-support system for man p 39 N84-11709 Prediction of vomiting in dogs exposed to radiation with	[NASA-CASE-MFS-25906-1] p 40 N84-11761 National Center for Devices and Radiological Health,	Exposure Assessment Methodology) study
shielding of midabdomen p 11 N84-11710 Condition of erythrocytes during long-term exposure to	Rockville, Md	[PB83-231357] p 24 N84-10744 Rice Univ , Houston, Tex
magnetic field -p 11 N84-11711	Performance of a new 916 MHz direct contact applicator with reduced leakage, a detailed analysis	A critical analysis of the uses of multiple regression in
Experimental psychological methods used in expert evaluation of mental work capacity of flight personnel in	[PB83-226621] p 24 N84-10742	the study of human judgement [AD-A131224] p 31 N84-10755
the presence of functional disturbances and central	National Inst for Occupational Safety and Health, Cincinnati, Ohio	Rochester General Hospital, N Y Prosthetic occlusive device for an internal
nervous system diseases p 26 N84-11712 Determination of a subjects condition according to pitch	Registry of toxic effects of chemical substances User's	passageway
of the vocal vowel 'A' p 27 N84-11714	guide to the RTECS computer tape [PB83-223172] p 25 N84-10748	[NASA-CASE-MFS-25740-1] p 27 N84-11744 Rochester Univ , N Y
Method for assessing mental stress in operators p 32 N84-11715	Naval Biodynamics Lab , New Orleans, La	Microwaves, hyperthermia, and human leukocyte
A method of assessing cardiac function with bicycle ergometry in expert medical certification of pilots	Effects of impact acceleration on somatosensory evoked potentials	function [PB83-225375] p 24 N84-10746
p 27 N84-11716	[AD-A130280] p 22 N84-10734	-
Evaluation of skeletal muscle tone by recording lateral	Effects of board consist acceleration in business	
	Effects of head impact acceleration on human performance Overview and preliminary battery	S
rigidity p 27 N84-11717 Method for identifying trace contaminants in chamber	performance Overview and preliminary battery identification	San Francisco Univ , Calif
rigidity p 27 N84-11717	performance Overview and preliminary battery	San Francisco Univ , Calif The Golgi-Hortega-Lavilla technique, with a useful
rigidity p 27 N84-11717 Method for identifying trace contaminants in chamber	performance Overview and preliminary battery identification [AD-A130286] p 31 N84-10754 Naval Coastal Systems Lab , Panama City, Fla Design guidelines for carbon dioxide scrubbers	San Francisco Univ , Calif The Golgi-Hortega-Lavilla technique, with a useful additional step for application to brain tissue after prolonged fixation p 7 A84-12274
ngidity p 27 N84-11717 Method for identifying trace contaminants in chamber atmosphere at high pressure p 39 N84-11718	performance Overview and preliminary battery identification [AD-A130286] p 31 N84-10754 Naval Coastal Systems Lab , Panama City, Fla Design guidelines for carbon dioxide scrubbers [AD-A130459] p 39 N84-10761 Naval Coastal Systems Center, Panama City, Fla	San Francisco Univ , Calif The Golgi-Hortega-Lavilla technique, with a useful additional step for application to brain tissue after prolonged fixation p 7 A84-12274 Sandia Labs , Albuquerque, N Mex.
ngidity p 27 N84-11717 Method for identifying trace contaminants in chamber atmosphere at high pressure p 39 N84-11718 L Louisville Univ , Ky Rat hindlimb muscle responses to suspension	performance Overview and preliminary battery identification [AD-A130286] p 31 N84-10754 Naval Coastal Systems Lab , Panama City, Fla Design guidelines for carbon dioxide scrubbers [AD-A130459] p 39 N84-10761 Naval Coastal Systems Center, Panama City, Fla Development of passive diver thermal protection	San Francisco Univ , Calif The Golgi-Hortega-Lavilla technique, with a useful additional step for application to brain tissue after prolonged fixation p 7 A84-12274 Sandia Labs , Albuquerque, N Mex. An approach to modeling of human performance for purposes of probabilistic risk assessment
rigidity p 27 N84-11717 Method for identifying trace contaminants in chamber atmosphere at high pressure p 39 N84-11718 L Louisville Univ , Ky	performance Overview and preliminary battery identification [AD-A130286] p 31 N84-10754 Naval Coastal Systems Lab , Panama City, Fla Design guidelines for carbon dioxide scrubbers [AD-A130459] p 39 N84-10761 Naval Coastal Systems Center, Panama City, Fla Development of passive diver thermal protection system [AD-A130685] p 39 N84-10762	San Francisco Univ , Calif The Golgi-Hortega-Lavilla technique, with a useful additional step for application to brain tissue after prolonged fixation p 7 A84-12274 Sandia Labs , Albuquerque, N Mex. An approach to modeling of human performance for
ngidity p 27 N84-11717 Method for identifying trace contaminants in chamber atmosphere at high pressure p 39 N84-11718 L Louisville Univ , Ky Rat hindlimb muscle responses to suspension hypokinesia/hypodynamia p 6 A84-12065	performance Overview and preliminary battery identification [AD-A130286] p 31 N84-10754 Naval Coastal Systems Lab , Panama City, Fia Design guidelines for carbon dioxide scrubbers [AD-A130459] p 39 N84-10761 Naval Coastal Systems Center, Panama City, Fia Development of passive diver thermal protection system [AD-A130685] p 39 N84-10762 Naval Health Research Center, San Diego, Calif	San Francisco Univ , Calif The Golgi-Hortega-Lavilla technique, with a useful additional step for application to brain tissue after prolonged fixation p7 A84-12274 Sandia Labs , Albuquerque, N Mex. An approach to modeling of human performance for purposes of probabilistic risk assessment [DE83-009292] p 40 N84-11764 SRI International Corp , Menio Park , Calif Direct biological effects of increased atmospheric
ngidity p 27 N84-11717 Method for identifying trace contaminants in chamber atmosphere at high pressure p 39 N84-11718 L Louisville Univ , Ky Rat hindlimb muscle responses to suspension hypokinesia/hypodynamia p 6 A84-12065	performance Overview and preliminary battery identification [AD-A130286] p 31 N84-10754 Naval Coastal Systems Lab , Panama City, Fla Design guidelines for carbon dioxide scrubbers [AD-A130459] p 39 N84-10761 Naval Coastal Systems Center, Panama City, Fla Development of passive diver thermal protection system [AD-A130685] p 39 N84-10762 Naval Health Research Center, San Diego, Calif A survey of body fat content of U.S. Navy male personnel	San Francisco Univ , Calif The Golgi-Hortega-Lavilla technique, with a useful additional step for application to brain tissue after prolonged fixation p7 A84-12274 Sandia Labs , Albuquerque, N Mex. An approach to modeling of human performance for purposes of probabilistic risk assessment [DE83-009292] p 40 N84-11764 SRI International Corp , Menio Park, Calif Direct biological effects of increased atmospheric carbon dioxide levels [PB83-224380] p 25 N84-10749
ngidity p 27 N84-11717 Method for identifying trace contaminants in chamber atmosphere at high pressure p 39 N84-11718 L L Louisville Univ , Ky Rat hindlimb muscle responses to suspension hypokinesia/hypodynamia p 6 A84-12065 M Massachusetts Inst of Tech , Cambridge	performance Overview and preliminary battery identification [AD-A130286] p 31 N84-10754 Naval Coastal Systems Lab , Panama City, Fla Design guidelines for carbon dioxide scrubbers [AD-A130459] p 39 N84-10761 Naval Coastal Systems Center, Panama City, Fla Development of passive diver thermal protection system [AD-A130685] p 39 N84-10762 Naval Health Research Center, San Diego, Calif A survey of body fat content of US Navy male	San Francisco Univ , Calif The Golgi-Hortega-Lavilla technique, with a useful additional step for application to brain tissue after prolonged fixation p 7 A84-12274 Sandia Labs , Albuquerque, N Mex. An approach to modeling of human performance for purposes of probabilistic risk assessment [DE83-009292] p 40 N84-11764 SRI International Corp , Menio Park , Calif Direct biological effects of increased atmospheric carbon dioxide levels
ngidity p 27 N84-11717 Method for identifying trace contaminants in chamber atmosphere at high pressure p 39 N84-11718 L Louisville Univ , Ky Rat hindlimb muscle responses to suspension hypokinesia/hypodynamia p 6 A84-12065 M Massachusetts Inst of Tech , Cambridge Computational studies in the interpretation of structure and motion. Summary and extension	performance Overview and preliminary battery identification [AD-A130286] p 31 N84-10754 Naval Coastal Systems Lab , Panama City, Fla Design guidelines for carbon dioxide scrubbers [AD-A130459] p 39 N84-10761 Naval Coastal Systems Center, Panama City, Fla Development of passive diver thermal protection system [AD-A130685] p 39 N84-10762 Naval Health Research Center, San Diego, Calif A survey of body fat content of US Navy male personnel [AD-A131500] p 23 N84-10736 Naval Medical Research Inst , Bethesda, Md Efficiency of high-frequency ventilation as determined	San Francisco Univ , Calif The Golgi-Hortega-Lavilla technique, with a useful additional step for application to brain tissue after prolonged fixation p7 A84-12274 Sandia Labs , Albuquerque, N Mex. An approach to modeling of human performance for purposes of probabilistic risk assessment [DE83-009292] p40 N84-11764 SRI International Corp , Menio Park, Calif Direct biological effects of increased atmospheric carbon dioxide levels [PB83-224380] p25 N84-10749 Stanford Univ , Calif Representations of perceptions of risks [AD-A131443] p32 N84-10759
ngidity p 27 N84-11717 Method for identifying trace contaminants in chamber atmosphere at high pressure p 39 N84-11718 L Louisville Univ , Ky Rat hindlimb muscle responses to hypokinesia/hypodynamia p 6 A84-12065 M Massachusetts inst of Tech , Cambridge Computational studies in the interpretation of structure	performance Overview and preliminary battery identification [AD-A130286] p 31 N84-10754 Naval Coastal Systems Lab , Panama City, Fla Design guidelines for carbon dioxide scrubbers [AD-A130459] p 39 N84-10761 Naval Coastal Systems Center, Panama City, Fla Development of passive diver thermal protection system [AD-A130685] p 39 N84-10762 Naval Health Research Center, San Diego, Calif A survey of body fat content of U.S. Navy male personnel [AD-A131500] p 23 N84-10736 Naval Medical Research Inst , Bethesda, Md	San Francisco Univ , Calif The Golgi-Hortega-Lavilla technique, with a useful additional step for application to brain tissue after prolonged fixation p. 7. A84-12274 Sandia Labs , Albuquerque, N. Mex. An approach to modeling of human performance for purposes of probabilistic risk assessment [DE83-009292] p. 40. N84-11764 SRI International Corp , Menio Park, Calif Direct biological effects of increased atmospheric carbon dioxide levels [PB83-224360] p. 25. N84-10749 Stanford Univ , Calif Representations of perceptions of risks
ngidity p 27 N84-11717 Method for identifying trace contaminants in chamber atmosphere at high pressure p 39 N84-11718 L Louisville Univ , Ky Rat hindlimb muscle responses to suspension hypokinesia/hypodynamia p 6 A84-12065 M Massachusetts Inst of Tech , Cambridge Computational studies in the interpretation of structure and motion Summary and extension [AD-A131598] p 27 N84-11746 Massachusetts Univ , Amherst Calcium and mitosis p 12 N84-11722	performance Overview and preliminary battery identification [AD-A130286] p 31 N84-10754 Naval Coastal Systems Lab , Panama City, Fia Design guidelines for carbon dioxide scrubbers [AD-A130459] p 39 N84-10761 Naval Coastal Systems Center, Panama City, Fia Development of passive diver thermal protection system [AD-A130685] p 39 N84-10762 Naval Health Research Center, San Diego, Calif A survey of body fat content of U.S. Navy male personnel [AD-A131500] p 23 N84-10736 Naval Medical Research Inst , Bethesda, Md Efficiency of high-frequency ventilation as determined by nitrogen washouts A model study [AD-A131331] p 27 N84-11745 Naval Personnel Research and Development Center,	San Francisco Univ , Calif The Golgi-Hortega-Lavilla technique, with a useful additional step for application to brain tissue after prolonged fixation p7 A84-12274 Sandia Labs , Albuquerque, N Mex. An approach to modeling of human performance for purposes of probabilistic risk assessment [DE83-009292] p40 N84-11764 SRI International Corp , Menio Park, Calif Direct biological effects of increased atmospheric carbon dioxide levels [PB83-224360] p25 N84-10749 Stanford Univ , Calif Representations of perceptions of risks [AD-A131443] p32 N84-10759 State Univ of New York, Stony Brook Developing higher plant systems in space p12 N84-11727
ngidity p 27 N84-11717 Method for identifying trace contaminants in chamber atmosphere at high pressure p 39 N84-11718 L Louisville Univ , Ky Rat hindlimb muscle responses to suspension hypokinesia/hypodynamia p 6 A84-12065 M Massachusetts Inst of Tech , Cambridge Computational studies in the interpretation of structure and motion Summary and extension [AD-A131598] p 27 N84-11746 Massachusetts Univ , Amherst Calcium and mitosis p 12 N84-11722 Michigan Univ , Ann Arbor Gravitropic responses in the grass pulvinus Model	performance Overview and preliminary battery identification [AD-A130286] p 31 N84-10754 Naval Coastal Systems Lab , Panama City, Fia Design guidelines for carbon dioxide scrubbers [AD-A130459] p 39 N84-10761 Naval Coastal Systems Center, Panama City, Fia Development of passive diver thermal protection system [AD-A130685] p 39 N84-10762 Naval Health Research Center, San Diego, Calif A survey of body fat content of U.S. Navy male personnel [AD-A131500] p 23 N84-10736 Naval Medical Research Inst , Bethesda, Md Efficiency of high-frequency ventilation as determined by nitrogen washouts. A model study [AD-A131331] p 27 N84-11745	San Francisco Univ , Calif The Golgi-Hortega-Lavilla technique, with a useful additional step for application to brain tissue after prolonged fixation p7 A84-12274 Sandia Labs , Albuquerque, N Mex. An approach to modeling of human performance for purposes of probabilistic risk assessment [DE83-009292] p 40 N84-11764 SRI International Corp , Menio Park , Calif Direct biological effects of increased atmospheric carbon dioxide levels [PB83-224360] p 25 N84-10749 Stanford Univ , Calif Representations of perceptions of risks [AD-A131443] p 32 N84-10759 State Univ of New York, Stony Brook Developing higher plant systems in space
ngidity p 27 N84-11717 Method for identifying trace contaminants in chamber atmosphere at high pressure p 39 N84-11718 L Louisville Univ , Ky Rat hindlimb muscle responses to suspension hypokinesia/hypodynamia p 6 A84-12065 M Massachusetts Inst of Tech , Cambridge Computational studies in the interpretation of structure and motion Summary and extension [AD-A131598] p 27 N84-11746 Massachusetts Univ , Amherst Calcium and mitosis p 12 N84-11722 Michigan Univ , Ann Arbor Gravitropic responses in the grass pulvinus Model system for asymmetric growth p 12 N84-11728	performance Overview and preliminary battery identification [AD-A130286] p 31 N84-10754 Naval Coastal Systems Lab , Panama City, Fia Design guidelines for carbon dioxide scrubbers [AD-A130459] p 39 N84-10761 Naval Coastal Systems Center, Panama City, Fia Development of passive diver thermal protection system [AD-A130685] p 39 N84-10762 Naval Health Research Center, San Diego, Calif A survey of body fat content of U.S. Navy male personnel [AD-A131500] p 23 N84-10736 Naval Medical Research Inst , Bethesda, Md Efficiency of high-frequency ventilation as determined by nitrogen washouts A model study [AD-A131331] p 27 N84-11745 Naval Personnel Research and Development Center, San Diego, Calif Effects of behavioral objectives and instructions on earning a category task	San Francisco Univ , Calif The Golgi-Hortega-Lavilla technique, with a useful additional step for application to brain tissue after prolonged fixation p7 A84-12274 Sandia Labs , Albuquerque, N Mex. An approach to modeling of human performance for purposes of probabilistic risk assessment [DE83-009292] p40 N84-11764 SRI International Corp , Menio Park, Calif Direct biological effects of increased atmospheric carbon dioxide levels [PB83-224360] p25 N84-10749 Stanford Univ , Calif Representations of perceptions of risks [AD-A131443] p32 N84-10759 State Univ of New York, Stony Brook Developing higher plant systems in space p12 N84-11727 Syracuse Univ , N Y Extended development procedure EDeP user's manual
ngidity p 27 N84-11717 Method for identifying trace contaminants in chamber atmosphere at high pressure p 39 N84-11718 L Louisville Univ , Ky Rat hindlimb muscle responses to suspension p 6 A84-12065 M Massachusetts Inst of Tech , Cambridge Computational studies in the interpretation of structure and motion Summary and extension [AD-A131598] p 27 N84-11746 Massachusetts Univ , Amherst Calcium and mitosis p 12 N84-11722 Michigan Univ , Ann Arbor Gravitropic responses in the grass system for asymmetric growth Calciumions, stores, and modulators yet on the gravity receptor connection? p 13 N84-11733	performance Overview and preliminary battery identification [AD-A130286] p 31 N84-10754 Naval Coastal Systems Lab , Panama City, Fia Design guidelines for carbon dioxide scrubbers [AD-A130459] p 39 N84-10761 Naval Coastal Systems Center, Panama City, Fia Development of passive diver thermal protection system [AD-A130685] p 39 N84-10762 Naval Health Research Center, San Diego, Calif A survey of body fat content of U.S. Navy male personnel [AD-A131500] p 23 N84-10736 Naval Medical Research Inst , Bethesda, Md Efficiency of high-frequency ventilation as determined by nitrogen washouts. A model study [AD-A131331] p 27 N84-11745 Naval Personnel Research and Development Center, San Diego, Calif Effects of behavioral objectives and instructions on	San Francisco Univ , Calif The Golgi-Hortega-Lavilla technique, with a useful additional step for application to brain tissue after prolonged fixation p7 A84-12274 Sandia Labs , Albuquerque, N Mex. An approach to modeling of human performance for purposes of probabilistic risk assessment [DE83-009292] p40 N84-11764 SRI International Corp , Menio Park, Calif Direct biological effects of increased atmospheric carbon dioxide levels [PB83-224360] p25 N84-10749 Stanford Univ , Calif Representations of perceptions of nisks [AD-A131443] p32 N84-10759 State Univ of New York, Stony Brook Developing higher plant systems in space p12 N84-11727 Syracuse Univ , N Y Extended development procedure EDeP user's
ngidity p 27 N84-11717 Method for identifying trace contaminants in chamber atmosphere at high pressure p 39 N84-11718 L L Louisville Univ , Ky Rat hindlimb muscle responses to suspension p 6 A84-12065 M Massachusetts Inst of Tech , Cambridge Computational studies in the interpretation of structure and motion Summary and extension [AD-A131598] p 27 N84-11746 Massachusetts Univ , Amherst Calcium and mitosis p 12 N84-11722 Michigan Univ , Ann Arbor Gravitropic responses in the grass pulvinus Model system for asymmetric growth p 12 N84-11728 Calcium ions, stores, and modulators What is the gravity	performance Overview and preliminary battery identification [AD-A130286] p 31 N84-10754 Naval Coastal Systems Lab , Panama City, Fia Design guidelines for carbon dioxide scrubbers [AD-A130459] p 39 N84-10761 Naval Coastal Systems Center, Panama City, Fia Development of passive diver thermal protection system [AD-A130685] p 39 N84-10762 Naval Health Research Center, San Diego, Calif A survey of body fat content of U.S. Navy male personnel [AD-A131500] p 23 N84-10736 Naval Medical Research Inst , Bethesda, Md Efficiency of high-frequency ventilation as determined by nitrogen washouts. A model study [AD-A13131] p 27 N84-11745 Naval Personnel Research and Development Center, San Diego, Calif Effects of behavioral objectives and instructions on earning a category task [AD-A130386] p 30 N84-10750 Naval Ship Research and Development Center, Bethesda, Md	San Francisco Univ , Calif The Golgi-Hortega-Lavilla technique, with a useful additional step for application to brain tissue after prolonged fixation p7 A84-12274 Sandia Labs , Albuquerque, N Mex. An approach to modeling of human performance for purposes of probabilistic risk assessment [DE83-009292] p40 N84-11764 SRI International Corp , Menio Park, Calif Direct biological effects of increased atmospheric carbon dioxide levels [PB83-224360] p25 N84-10749 Stanford Univ , Calif Representations of perceptions of risks [AD-A131443] p32 N84-10759 State Univ of New York, Stony Brook Developing higher plant systems in space p12 N84-11727 Syracuse Univ , N Y Extended development procedure EDeP user's manual
Method for identifying trace contaminants in chamber atmosphere at high pressure p 39 N84-11718 L Louisville Univ , Ky Rat hindlimb muscle responses to suspension p 6 A84-12065 M Massachusetts inst of Tech , Cambridge Computational studies in the interpretation of structure and motion Summary and extension [AD-A131598] p 27 N84-11746 Massachusetts Univ , Amherst Calcium and mitosis p 12 N84-11722 Michigan Univ , Ann Arbor Gravitropic responses in the grass system for asymmetric growth p 12 N84-11728 Maturions, stores, and modulators p 13 N84-11733 Midwest Research Inst., Kansas City, Mo Task validation for studies on fragmented sleep and cognitive efficiency under stress	performance Overview and preliminary battery identification [AD-A130286] p 31 N84-10754 Naval Coastal Systems Lab , Panama City, Fia Design guidelines for carbon dioxide scrubbers [AD-A130459] p 39 N84-10761 Naval Coastal Systems Center, Panama City, Fia Development of passive diver thermal protection system [AD-A130685] p 39 N84-10762 Naval Health Research Center, San Diego, Calif A survey of body fat content of U.S. Navy male personnel [AD-A131500] p 23 N84-10736 Naval Medical Research Inst , Bethesda, Md Efficiency of high-frequency ventilation as determined by nitrogen washouts. A model study [AD-A131331] p 27 N84-11745 Naval Personnel Research and Development Center, San Diego, Calif Effects of behavioral objectives and instructions on earning a category task [AD-A130386] p 30 N84-10750 Naval Ship Research and Development Center,	San Francisco Univ , Calif The Golgi-Hortega-Lavilla technique, with a useful additional step for application to brain tissue after prolonged fixation p7 A84-12274 Sandia Labs , Albuquerque, N Mex. An approach to modeling of human performance for purposes of probabilistic risk assessment [DE83-009292] p40 N84-11764 SRI International Corp , Menio Park, Calif Direct biological effects of increased atmospheric carbon dioxide levels [PB83-224360] p25 N84-10749 Stanford Univ , Calif Representations of perceptions of risks [AD-A131443] p32 N84-10759 State Univ of New York, Stony Brook Developing higher plant systems in space p12 N84-11727 Syracuse Univ , N Y Extended development procedure EDeP user's manual
Method for identifying trace contaminants in chamber atmosphere at high pressure p 39 N84-11718 L L Louisville Univ , Ky Rat hindlimb muscle responses to suspension hypokinesia/hypodynamia p 6 A84-12065 M Massachusetts Inst of Tech , Cambridge Computational studies in the interpretation of structure and motion Summary and extension [AD-A131598] p 27 N84-11746 Massachusetts Univ , Amherst Calcium and mitosis p 12 N84-11722 Michigan Univ , Ann Arbor Gravitropic responses in the grass pulvinus Model system for asymmetric growth p 12 N84-11728 Calcium ions, stores, and modulators receptor connection? p 13 N84-11733 Midwest Research Inst., Kansas City, Mo Task validation for studies on fragmented sleep and cognitive efficiency under stress [AD-A130260] p 31 N84-10753 Mitre Corp., Bedford, Mass	performance Overview and preliminary battery identification [AD-A130286] p 31 N84-10754 Naval Coastal Systems Lab , Panama City, Fia Design guidelines for carbon dioxide scrubbers [AD-A130459] p 39 N84-10761 Naval Coastal Systems Center, Panama City, Fia Development of passive diver thermal protection system [AD-A130685] p 39 N84-10762 Naval Health Research Center, San Diego, Calif A survey of body fat content of U.S. Navy male personnel [AD-A131500] p 23 N84-10736 Naval Medical Research Inst , Bethesda, Md Efficiency of high-frequency ventilation as determined by nitrogen washouts. A model study [AD-A131331] p 27 N84-11745 Naval Personnel Research and Development Center, San Diego, Calif Effects of behavioral objectives and instructions on earning a category task [AD-A130386] p 30 N84-10750 Naval Ship Research and Development Center, Bethesda, Md A survey of robotic technology [AD-A130999] p 40 N84-11762	San Francisco Univ , Calif The Golgi-Hortega-Lavilla technique, with a useful additional step for application to brain tissue after prolonged fixation p7 A84-12274 Sandia Labs , Albuquerque, N Mex. An approach to modeling of human performance for purposes of probabilistic risk assessment [DE83-009292] p40 N84-11764 SRI International Corp , Menio Park, Calif Direct biological effects of increased atmospheric carbon dioxide levels [PB83-224360] p25 N84-10749 Stanford Univ , Calif Representations of perceptions of risks [AD-A131443] p32 N84-10759 State Univ of New York, Stony Brook Developing higher plant systems in space p12 N84-11727 Syracuse Univ , N Y Extended development procedure EDeP user's manual [AD-A131381] p31 N84-10756 T Technology, Inc , Houston, Tex Transdermal scoppolamine in the prevention of motion
Method for identifying trace contaminants in chamber atmosphere at high pressure p 39 N84-11718 L Louisville Univ , Ky Rat hindlimb muscle responses to suspension p 6 A84-12065 M Massachusetts Inst of Tech , Cambridge Computational studies in the interpretation of structure and motion Summary and extension (AD-A131598) p 27 N84-11746 Massachusetts Univ , Amherst Calcium and mitosis p 12 N84-11722 Michigan Univ , Ann Arbor Gravitropic responses in the grass system for asymmetric growth p 12 N84-11730 Midwest Research Inst., Kansas City, Mo Task validation for studies on fragmented sleep and cognitive efficiency under stress (AD-A130260) p 31 N84-10753 Mitre Corp., Bedford, Mass Manned spaceflight activity planning with	performance Overview and preliminary battery identification [AD-A130286] p 31 N84-10754 Naval Coastal Systems Lab , Panama City, Fia Design guidelines for carbon dioxide scrubbers [AD-A130459] p 39 N84-10761 Naval Coastal Systems Center, Panama City, Fia Development of passive diver thermal protection system [AD-A130685] p 39 N84-10762 Naval Health Research Center, San Diego, Calif A survey of body fat content of U.S. Navy male personnel [AD-A131500] p 23 N84-10736 Naval Medical Research Inst , Bethesda, Md Efficiency of high-frequency ventilation as determined by nitrogen washouts A model study [AD-A131331] p 27 N84-11745 Naval Personnel Research and Development Center, San Diego, Calif Effects of behavioral objectives and instructions on earning a category task [AD-A130386] p 30 N84-10750 Naval Ship Research and Development Center, Bethesda, Md A survey of robotic technology	San Francisco Univ , Calif The Golgi-Hortega-Lavilla technique, with a useful additional step for application to brain tissue after prolonged fixation p7 A84-12274 Sandia Labs , Albuquerque, N Mex. An approach to modeling of human performance for purposes of probabilistic risk assessment [DE83-009292] p40 N84-11764 SRI International Corp , Menio Park, Calif Direct biological effects of increased atmospheric carbon dioxide levels [PB83-224380] p25 N84-10749 Stanford Univ , Calif Representations of perceptions of risks [AD-A131443] p32 N84-10759 State Univ of New York, Story Brook Developing higher plant systems in space p12 N84-11727 Syracuse Univ , N Y Extended development procedure EDeP user's manual [AD-A131381] p31 N84-10756 T Technology, Inc , Houston, Tex Transdermal scopolamine in the prevention of motion sickness Evaluation of the time course of efficacy p 20 A84-12061
Method for identifying trace contaminants in chamber atmosphere at high pressure p 39 N84-11718 L L Louisville Univ , Ky Rat hindlimb muscle responses to suspension hypokinesia/hypodynamia p 6 A84-12065 M Massachusetts Inst of Tech , Cambridge Computational studies in the interpretation of structure and motion Summary and extension [AD-A131598] p 27 N84-11746 Massachusetts Univ , Amherst Calcium and mitosis p 12 N84-11722 Michigan Univ , Ann Arbor Gravitropic responses in the grass pulvinus Model system for asymmetric growth p 12 N84-11728 Calcium ions, stores, and modulators receptor connection? p 13 N84-11733 Midwest Research Inst., Kansas City, Mo Task validation for studies on fragmented sleep and cognitive efficiency under stress [AD-A130260] p 31 N84-10753 Mitre Corp., Bedford, Mass Manned spaceflight activity knowledge-based systems [AIAA PAPER 83-2374] p 33 A84-10035	performance Overview and preliminary battery identification [AD-A130286] p 31 N84-10754 Naval Coastal Systems Lab , Panama City, Fia Design guidelines for carbon dioxide scrubbers [AD-A130459] p 39 N84-10761 Naval Coastal Systems Center, Panama City, Fia Development of passive diver thermal protection system [AD-A130685] p 39 N84-10762 Naval Health Research Center, San Diego, Calif A survey of body fat content of U.S. Navy male personnel [AD-A131500] p 23 N84-10736 Naval Medical Research Inst , Bethesda, Md Efficiency of high-frequency ventilation as determined by nitrogen washouts. A model study [AD-A131331] p 27 N84-11745 Naval Personnel Research and Development Center, San Diego, Calif Effects of behavioral objectives and instructions on earning a category task [AD-A130386] p 30 N84-10750 Naval Ship Research and Development Center, Bethesda, Md A survey of robotic technology [AD-A130999] p 40 N84-11762	San Francisco Univ , Calif The Golgi-Hortega-Lavilla technique, with a useful additional step for application to brain tissue after prolonged fixation p7 A84-12274 Sandia Labs , Albuquerque, N Mex. An approach to modeling of human performance for purposes of probabilistic risk assessment [DE83-009292] p40 N84-11764 SRI International Corp , Menio Park, Califf Direct biological effects of increased atmospheric carbon dioxide levels [PB83-224360] p25 N84-10749 Stanford Univ , Califf Representations of perceptions of risks [AD-A131443] p32 N84-10759 State Univ of New York, Stony Brook Developing higher plant systems in space p12 N84-11727 Syracuse Univ , N Y Extended development procedure EDeP user's manual [AD-A131381] p31 N84-10756 T Technology, Inc , Houston, Tex Transdermal scopolamine in the prevention of motion sickness Evaluation of the time course of efficacy p20 A84-12061 Texas Univ , Austin
Method for identifying trace contaminants in chamber atmosphere at high pressure L Louisville Univ , Ky Rat hindlimb muscle responses to suspension hypokinesia/hypodynamia M Massachusetts Inst of Tech , Cambridge Computational studies in the interpretation of structure and motion Summary and extension [AD-A131598] Massachusetts Univ , Amherst Calcium and mitosis Calcium and mitosis P 12 N84-11728 Michigan Univ , Ann Arbor Gravitropic responses in the grass system for asymmetric growth Calcium ions, stores, and modulators system for asymmetric growth Calcium ions, stores, and modulators Midwest Research Inst., Kansas City, Mo Task validation for studies on fragmented sleep and cognitive efficiency under stress [AD-A130260] Mitre Corp., Bedford, Mass Manned spaceflight activity planning with knowledge-based systems	performance Overview and preliminary battery identification [AD-A130286] p 31 N84-10754 Naval Coastal Systems Lab , Panama City, Fia Design guidelines for carbon dioxide scrubbers [AD-A130459] p 39 N84-10761 Naval Coastal Systems Center, Panama City, Fia Development of passive diver thermal protection system [AD-A130685] p 39 N84-10762 Naval Health Research Center, San Diego, Calif A survey of body fat content of US Navy male personnel [AD-A131500] p 23 N84-10736 Naval Medical Research Inst , Bethesda, Md Efficiency of high-frequency ventilation as determined by nitrogen washouts A model study [AD-A131331] p 27 N84-11745 Naval Personnel Research and Development Center, San Diego, Calif Effects of behavioral objectives and instructions on earning a category task [AD-A130386] p 30 N84-10750 Naval Ship Research and Development Center, Bethesda, Md A survey of robotic technology [AD-A130999] p 40 N84-11762	San Francisco Univ , Calif The Golgi-Hortega-Lavilla technique, with a useful additional step for application to brain tissue after prolonged fixation p7 A84-12274 Sandia Labs , Albuquerque, N Mex. An approach to modeling of human performance for purposes of probabilistic risk assessment [DE83-009292] p40 N84-11764 SRI International Corp , Menio Park , Calif Direct biological effects of increased atmospheric carbon dioxide levels [PB83-224380] p25 N84-10749 Stanford Univ , Calif Representations of perceptions of risks [AD-A131443] p32 N84-10759 State Univ of New York, Story Brook Developing higher plant systems in space p12 N84-11727 Syracuse Univ , N Y Extended development procedure EDeP user's manual [AD-A131381] p31 N84-10756 T Technology, Inc , Houston, Tex Transdermal scopolamine in the prevention of motion sickness Evaluation of the time course of efficacy p20 A84-12061 Texas Univ , Austin The Regulatory Functions of Calcium and the Potential Role of Calcium in Mediating Gravitational Responses in
Method for identifying trace contaminants in chamber atmosphere at high pressure p 39 N84-11718 L Louisville Univ , Ky Rat hindlimb muscle responses to suspension p 6 A84-12065 M Massachusetts Inst of Tech , Cambridge Computational studies in the interpretation of structure and motion Summary and extension [AD-A131598] p 27 N84-11746 Massachusetts Univ , Amherst Calcium and mitosis p 12 N84-11722 Michigan Univ , Ann Arbor Gravitropic responses in the grass system for asymmetric growth p 12 N84-11730 Midwest Research Inst., Kansas City, Mo Task validation for studies on fragmented sleep and cognitive efficiency under stress [AD-A130260] p 31 N84-10753 Mitre Corp., Bedford, Mass Manned spaceflight activity knowledge-based systems [AIAA PAPER 83-2374] p 33 A84-10035 Montana State Univ , Bozeman	performance Overview and preliminary battery identification [AD-A130286] p 31 N84-10754 Naval Coastal Systems Lab , Panama City, Fia Design guidelines for carbon dioxide scrubbers [AD-A130459] p 39 N84-10761 Naval Coastal Systems Center, Panama City, Fia Development of passive diver thermal protection system [AD-A130685] p 39 N84-10762 Naval Health Research Center, San Diego, Calif A survey of body fat content of U.S. Navy male personnel [AD-A131500] p 23 N84-10736 Naval Medical Research Inst , Bethesda, Md Efficiency of high-frequency ventilation as determined by nitrogen washouts. A model study [AD-A13131] p 27 N84-11745 Naval Personnel Research and Development Center, San Diego, Calif Effects of behavioral objectives and instructions on earning a category task [AD-A130386] p 30 N84-10750 Naval Ship Research and Development Center, Bethesda, Md A survey of robotic technology [AD-A130999] p 40 N84-11762 CO Oak Ridge National Lab , Tenn Nonparametric estimation of the distribution of time to onset for specific diseases in survival/sacrifice experiments	San Francisco Univ , Calif The Golgi-Hortega-Lavilla technique, with a useful additional step for application to brain tissue after prolonged fixation p7 A84-12274 Sandia Labs , Albuquerque, N Mex. An approach to modeling of human performance for purposes of probabilistic risk assessment [DE83-009292] p40 N84-11764 SRI International Corp , Menio Park, Calif Direct biological effects of increased atmospheric carbon dioxide levels [PB83-224360] p25 N84-10749 Stanford Univ , Calif Representations of perceptions of risks [AD-A131443] p32 N84-10759 State Univ of New York, Stony Brook Developing higher plant systems in space p12 N84-11727 Syracuse Univ , N Y Extended development procedure EDeP user's manual [AD-A131381] p31 N84-10756 T Technology, Inc , Houston, Tex Transdermal scopolamine in the prevention of motion sickness Evaluation of the time course of efficacy p20 A84-12061 Texas Univ , Austin The Regulatory Functions of Calcium and the Potential Role of Calcium in Mediating Gravitational Responses in Cells and Tissues
Method for identifying trace contaminants in chamber atmosphere at high pressure p 39 N84-11718 L Louisville Univ , Ky Rat hindlimb muscle responses to suspension hypokinesia/hypodynamia p 6 A84-12065 M Massachusetts Inst of Tech , Cambridge Computational studies in the interpretation of structure and motion Summary and extension [AD-A131598] p 27 N84-11746 Massachusetts Univ , Amherst Calcium and mitosis p 12 N84-11722 Michigan Univ , Ann Arbor Gravitropic responses in the grass pulvinus Model system for asymmetric growth p 12 N84-11728 Calcium ions, stores, and modulators receptor connection? p 13 N84-11733 Midwest Research Inst., Kansas City, Mo Task validation for studies on fragmented sleep and cognitive efficiency under stress [AD-A130260] Mitre Corp., Bedford, Mass Manned spaceflight activity knowledge-based systems [AIAA PAPER 83-2374] p 33 A84-10035 Montana State Univ , Bozeman Microbal folioling and its effect on power generation [AD-A131084]	performance Overview and preliminary battery identification [AD-A130286] p 31 N84-10754 Naval Coastal Systems Lab , Panama City, Fia Design guidelines for carbon dioxide scrubbers [AD-A130459] p 39 N84-10761 Naval Coastal Systems Center, Panama City, Fia Development of passive diver thermal protection system [AD-A130685] p 39 N84-10762 Naval Health Research Center, San Diego, Calif A survey of body fat content of U.S. Navy male personnel [AD-A131500] p 23 N84-10736 Naval Medical Research Inst , Bethesda, Md Efficiency of high-frequency ventilation as determined by nitrogen washouts. A model study [AD-A131331] p 27 N84-11745 Naval Personnel Research and Development Center, San Diego, Calif Effects of behavioral objectives and instructions on earning a category task [AD-A130386] p 30 N84-10750 Naval Ship Research and Development Center, Bethesda, Md A survey of robotic technology [AD-A130999] p 40 N84-11762 CO Oak Ridge National Lab , Tenn Nonparametric estimation of the distribution of time to onset for specific diseases in survival/sacrifice experiments [DE83-013726] p 10 N84-10728	San Francisco Univ , Calif The Golgi-Hortega-Lavilla technique, with a useful additional step for application to brain tissue after prolonged fixation p7 A84-12274 Sandia Labs , Albuquerque, N Mex. An approach to modeling of human performance for purposes of probabilistic risk assessment [DE83-009292] p40 N84-11764 SRI International Corp , Menio Park , Calif Direct biological effects of increased atmospheric carbon dioxide levels [PB83-224380] p25 N84-10749 Stanford Univ , Calif Representations of perceptions of risks [AD-A131443] p32 N84-10759 State Univ of New York, Stony Brook Developing higher plant systems in space p12 N84-11727 Syracuse Univ , N Y Extended development procedure EDeP user's manual [AD-A131381] p31 N84-10756 T Technology, Inc , Houston, Tex Transdermal scopolamine in the prevention of motion sickness Evaluation of the time course of efficacy p20 A84-12061 Texas Univ , Austin The Regulatory Functions of Calcium and the Potential Role of Calcium in Mediating Gravitational Responses in Cells and Tissues [NASA-CP-2286] p11 N84-11720 Evidence for a regulatory role of calcium in
Method for identifying trace contaminants in chamber atmosphere at high pressure p 39 N84-11718 L Louisville Univ , Ky Rat hindlimb muscle responses to suspension p 6 A84-12065 M Massachusetts Inst of Tech , Cambridge Computational studies in the interpretation of structure and motion Summary and extension (AD-A131598) p 27 N84-11746 Massachusetts Univ , Amherst Calcium and mitosis p 12 N84-11722 Michigan Univ , Ann Arbor Gravitropic responses in the grass system for asymmetric growth p 12 N84-11728 Michigan Univ , Ann Arbor Gravitropic responses in the grass system for asymmetric growth p 12 N84-11733 Midwest Research Inst., Kansas City, Mo Task validation for studies on fragmented sleep and cognitive efficiency under stress [AD-A130260] p 31 N84-10753 Mitre Corp., Bedford, Mass Manned spaceflight activity knowledge-based systems [AIAA PAPER 83-2374] p 33 A84-10035 Montana State Univ , Bozeman Microbial fouling and its effect on power generation p 10 N84-10726	performance Overview and preliminary battery identification [AD-A130286] p 31 N84-10754 Naval Coastal Systems Lab , Panama City, Fia Design guidelines for carbon dioxide scrubbers [AD-A130459] p 39 N84-10761 Naval Coastal Systems Center, Panama City, Fia Development of passive diver thermal protection system [AD-A130685] p 39 N84-10762 Naval Health Research Center, San Diego, Calif A survey of body fat content of U.S. Navy male personnel [AD-A131500] p 23 N84-10736 Naval Medical Research Inst , Bethesda, Md Efficiency of high-frequency ventilation as determined by nitrogen washouts A model study [AD-A131331] p 27 N84-11745 Naval Personnel Research and Development Center, San Diego, Calif Effects of behavioral objectives and instructions on earning a category task [AD-A130386] p 30 N84-10750 Naval Ship Research and Development Center, Bethesda, Md A survey of robotic technology [AD-A130999] p 40 N84-11762 CO Oak Ridge National Lab , Tenn Nonparametric estimation of the distribution of time to onset for specific diseases in survival/sacrifice experiments [DE83-013726] p 10 N84-10728 The relevance of experimental animal studies to the human experience	San Francisco Univ , Calif The Golgi-Hortega-Lavilla technique, with a useful additional step for application to brain tissue after prolonged fixation p7 A84-12274 Sandia Labs , Albuquerque, N Mex. An approach to modeling of human performance for purposes of probabilistic risk assessment [DE83-009292] p40 N84-11764 SRI International Corp , Menio Park, Calif Direct biological effects of increased atmospheric carbon dioxide levels [PB83-224360] p25 N84-10749 Stanford Univ , Calif Representations of perceptions of risks [AD-A131443] p32 N84-10759 State Univ of New York, Stony Brook Developing higher plant systems in space p12 N84-11727 Syracuse Univ , N Y Extended development procedure EDeP user's manual [AD-A131381] p31 N84-10756 T Technology, Inc , Houston, Tex Transdermal scopolamine in the prevention of motion sickness Evaluation of the time course of efficacy p20 A84-12061 Texas Univ , Austin The Regulatory Functions of Calcium and the Potential Role of Calcium in Mediating Gravitational Responses in Cells and Tissues [NASA-CP-2286] p11 N84-11720
Method for identifying trace contaminants in chamber atmosphere at high pressure L Louisville Univ , Ky Rat hindlimb muscle responses to suspension hypokinesia/hypodynamia Massachusetts Inst of Tech , Cambridge Computational studies in the interpretation of structure and motion Summary and extension [AD-A131598] Massachusetts Univ , Amherst Calcium and mitosis Calcium and mitosis P 12 N84-11722 Michigan Univ , Ann Arbor Gravitropic responses in the grass system for asymmetric growth Calcium ions, stores, and modulators receptor connection? Midwest Research Inst., Kansas City, Mo Task validation for studies on fragmented sleep and cognitive efficiency under stress [AD-A130260] Mitre Corp., Bedford, Mass Manned spaceflight activity knowledge-based systems [AIAA PAPER 83-2374] Montana State Univ , Bozeman Microbial fouling and its effect on power generation p 10 N84-10726 N National Aeronautics and Space Administration,	performance Overview and preliminary battery identification [AD-A130286] p 31 N84-10754 Naval Coastal Systems Lab , Panama City, Fia Design guidelines for carbon dioxide scrubbers [AD-A130459] p 39 N84-10761 Naval Coastal Systems Center, Panama City, Fia Development of passive diver thermal protection system [AD-A130685] p 39 N84-10762 Naval Health Research Center, San Diego, Calif A survey of body fat content of U.S. Navy male personnel [AD-A131500] p 23 N84-10736 Naval Medical Research Inst , Bethesda, Md Efficiency of high-frequency ventilation as determined by nitrogen washouts. A model study [AD-A13131] p 27 N84-11745 Naval Personnel Research and Development Center, San Diego, Calif Effects of behavioral objectives and instructions on earning a category task [AD-A130386] p 30 N84-10750 Naval Ship Research and Development Center, Bethesda, Md A survey of robotic technology [AD-A130999] p 40 N84-11762 CO Oak Ridge National Lab , Tenn Nonparametric estimation of the distribution of time to onset for specific diseases in survival/sacrifice experiments [DE83-013726] p 10 N84-10728 The relevance of experimental animal studies to the human experience [DE83-014053] p 10 N84-10729	San Francisco Univ , Calif The Golgi-Hortega-Lavilla technique, with a useful additional step for application to brain tissue after prolonged fixation p7 A84-12274 Sandia Labs , Albuquerque, N Mex. An approach to modeling of human performance for purposes of probabilistic risk assessment [DE83-009292] p40 N84-11764 SRI International Corp , Menio Park , Calif Direct biological effects of increased atmospheric carbon dioxide levels [PB83-224360] p25 N84-10749 Stanford Univ , Calif Representations of perceptions of risks [AD-A131443] p32 N84-10759 State Univ of New York, Stony Brook Developing higher plant systems in space p12 N84-11727 Syracuse Univ , N Y Extended development procedure EDeP user's manual [AD-A131381] p31 N84-10756 T Technology, Inc , Houston, Tex Transdermal scopolamine in the prevention of motion sickness Evaluation of the time course of efficacy p20 A84-12061 Texas Univ , Austin The Regulatory Functions of Calcium and the Potential Role of Calcium in Mediating Gravitational Responses in Cells and Tissues [NASA-CP-2286] p11 N84-11720 Evidence for a regulatory role of calcium in gravitropism p11 N84-11721 Summary of study group session discussions p 13 N84-11739
Method for identifying trace contaminants in chamber atmosphere at high pressure p 39 N84-11718 L Louisville Univ , Ky Rat hindlimb muscle responses to suspension p 6 A84-12065 M Massachusetts Inst of Tech , Cambridge Computational studies in the interpretation of structure and motion Summary and extension (AD-A131598) p 27 N84-11746 Massachusetts Univ , Amherst Calcium and mitosis p 12 N84-11722 Michigan Univ , Ann Arbor Gravitropic responses in the grass system for asymmetric growth p 12 N84-11728 Michigan Univ , Ann Arbor Gravitropic responses in the grass system for asymmetric growth p 12 N84-11733 Midwest Research Inst., Kansas City, Mo Task validation for studies on fragmented sleep and cognitive efficiency under stress [AD-A130260] p 31 N84-10753 Mitre Corp., Bedford, Mass Manned spaceflight activity knowledge-based systems [AIAA PAPER 83-2374] p 33 A84-10035 Montana State Univ , Bozeman Microbial fouling and its effect on power generation p 10 N84-10726	performance Overview and preliminary battery identification [AD-A130286] p 31 N84-10754 Naval Coastal Systems Lab , Panama City, Fia Design guidelines for carbon dioxide scrubbers [AD-A130459] p 39 N84-10761 Naval Coastal Systems Center, Panama City, Fia Development of passive diver thermal protection system [AD-A130685] p 39 N84-10762 Naval Health Research Center, San Diego, Calif A survey of body fat content of U.S. Navy male personnel [AD-A131500] p 23 N84-10736 Naval Medical Research Inst , Bethesda, Md Efficiency of high-frequency ventilation as determined by nitrogen washouts A model study [AD-A131331] p 27 N84-11745 Naval Personnel Research and Development Center, San Diego, Calif Effects of behavioral objectives and instructions on earning a category task [AD-A130386] p 30 N84-10750 Naval Ship Research and Development Center, Bethesda, Md A survey of robotic technology [AD-A130999] p 40 N84-11762 CO Oak Ridge National Lab , Tenn Nonparametric estimation of the distribution of time to onset for specific diseases in survival/sacrifice experiments [DE83-013726] p 10 N84-10728 The relevance of experimental animal studies to the human experience	San Francisco Univ , Calif The Golgi-Hortega-Lavilla technique, with a useful additional step for application to brain tissue after prolonged fixation p7 A84-12274 Sandia Labs , Albuquerque, N Mex. An approach to modeling of human performance for purposes of probabilistic risk assessment [DE83-009292] p40 N84-11764 SRI International Corp , Menio Park, Calif Direct biological effects of increased atmospheric carbon dioxide levels [PB83-224360] p25 N84-10749 Stanford Univ , Calif Representations of perceptions of risks [AD-A131443] p32 N84-10759 State Univ of New York, Stony Brook Developing higher plant systems in space p12 N84-11727 Syracuse Univ , N Y Extended development procedure EDeP user's manual [AD-A131381] p31 N84-10756 T Technology, Inc , Houston, Tex Transdermal scopolamine in the prevention of motion sickness Evaluation of the time course of efficacy p20 A84-12061 Texas Univ , Austin The Regulatory Functions of Calcium and the Potential Role of Calcium in Mediating Gravitational Responses in Cells and Tissues [NASA-CP-2286] p11 N84-11720 Evidence for a regulatory role of calcium in gravitropism p11 N84-11721 Summary of study group session discussions

U

Utah Univ., Salt Lake City
Ultrasound tomography by Galerkin or moment methods [AD-A131408] p 28 N84-11747

Vanderbilt Univ , Nashville, Tenn Intracellular calcium receptors Calmodulin and related proteins p 12 N84-11724 Carboxylic acid ionophores as probes of the role of calcium in biological systems p 13 N84-11735

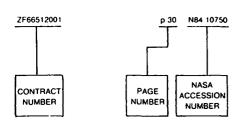
Yale Univ , New Haven, Conn
The plasma membrane calcium pump
p 13 N84-11734

FEBRUARY 1984

CONTRACT NUMBER INDEX

AEROSPACE MEDICINE AND BIOLOGY / A Continuing Bibliography (Supplement 255)

Typical Contract Number Index Listing



Listings in this index are arranged alphanumencally by contract number. Under each contract number, the accession numbers denoting documents that have been produced as a result of research done under that contract are arranged in ascending order with the AIAA accession numbers appearing first. The accession number denotes the number by which the citation is identified in the abstract section. Preceding the accession number is the page number on which the citation may be found.

AF PROJ 1123	p 32	N84-11757
AF PROJ 2308	p 9	N84-10725
AF PROJ 2312	p 23	N84-10739
AF PROJ 6114	p 32	N84-10758
AF PROJ 7184	p 22	N84-10733
AF PROJ 9991	p 39	N84-10763
AF-AFOSR-0012-81	p 23	N84-10739
AF-AFOSR-0111-80	p 24	N84-10746
AF-AFOSR-78-3711	p 30	A84-10973
A78/KLU/065	p 40	N84-11759
A80/K/112	p 40	N84-11765
DA PROJ 3E1-62777-A-878	p 38	N84-10760
DA PROJ 3E1-62777-A-879	p 23	N84-10737
0	p 31	N84-10753
DAAG29-83-K-0012	p 28	N84-11747
DAMD17-77-C-7006	p 9	A84-12659
DAMD17-80-C-0075	p 31	N84-10753
DE-AC02-76CH-00016	p 10	N84-10727
DE-7100E-70011-00010	p 24	N84-10741
DE-AC02-80ER-10701	p 13	N84-11740
DE-AC04-76DP-00789	p 40	N84-11764
DE-AC06-76BL-01830	p 28	N84-11748
DE-NOO-10NE-01830		N84-11749
	p 28	
DE-AC07-76ID-01570	p 28	N84-11750
DI-14-34-0001-0216	p 40	N84-11763
EPA-R-806390	p 10	N84-10730
EPA-R-808039	p 24	N84-10746
EPA-68-02-3716	p 24	N84-10746
EPA-68-03-3679	p 25	N84-10749
F19628-82-C-0001	p 24	N84-10744
F33615-77-C-0054	p 33	A84-10035
F33615-77-C-0054	p 29	A84-10972
F33615-79-C-0014	p 32	N84-10758
F33615-79-C-0523	p 38	A84-12059
F33657-78-C-0651	p 24	N84-10746
	p 38	A84-12059
MRC-MA-6242	р9	A84-12661
MR0000101	p 27	N84-11745
NAG2-123	p 29	A84-10388
NAG2-51	p 29	A84-10971
NAG5-17	р7	A84-12425
NASA PROJECT 8980	p 33	A84-10035
NCA2-OR-335-001	р9	A84-12663
NCC2-47	p 7	A84-12274
NIH-AM-16703	р9	A84-12663
NIH-AM-18986	р8	A84-12652
NIH-AM-21617	р1	A84-10278
NIH-ES-02304	p 38	A84-12293
NIH-F-32-HL-06304	p 1	A84-10282
NIH-GM-23095	p 15	A84-10284
NIH-GM-29531	•	
MILI-CIAI-52931	p 1	A84-10276

NIH-HL-07090	p 2	A84-10283
NIH-HL-14985	р8	A84-12658
NIH-HL-15469	p 9	A84-12659
NIH-HL-16910	p 2	A84-10283
NIH-HL-23232	p 1	A84-10282
NIH-HL-24136	p 2	A84-10286
NIH-HL-24335	p 14	A84-10279
NIH-HL-24429	p 9	A84-12659
NIH-RR-00166	р2	A84-10283
NIH-RR-08005-10	p 7	A84-12425
NIH-11907	p 21	A84-12657
NIH-7088	p 14	A84-10280
NOAA-NA-81AAD00092	p 6	A84-12063
NR PROJ 197-058	p 32	N84-10759
NR PROJ 197-074	p 31	N84-10755
NR PROJ 667-437	p 32	N84-10757
NSERC-A-0323	p 30	A84-10973
NSF CHE-78-05375-A01	p 7	A84-12425
NSF MCS-79-23110	p 27	N84-11746
NSG-2191	р6	A84-12065
NSG-2325	р6	A84-12065
NSG-7480	p 11	N84-11720
NSG-7512	p 41	A84-10655
N00014-77-C-0336	p 31	N84-10751
N00014-79-C-0077	p 32	N84-10759
N00014-79-C-0323	p 32	N84-10757
N00014-79-C-0661	p 32	N84-11756
N00014-80-C-0475	p 10	N84-10726
N00014-80-C-0505	p 27	N84-11746
N00014-81-K-0126	p 23	N84-10738
N00014-82-C-0001	p 31	N84-10755
N00014-82-C-5076	p 32	N84-11756
N00014-83-C-0022	p 24	N84-10740
PDP-110B	p 28	N84-11747
PHS-AM-18616	p 4	A84-11268
PHS-HSM-99-72-18	p 24	N84-10745
PHS-NIOSH-210-81-8101	p 25	N84-10748
PHS-11089	p 30	A84-12786
PHS-210-81-6103	p 6	A84-12063
PHS-3-HR-6-2915	p 14	A84-10279
R01-CA1-29728	p 28	N84-11747
U\$8M-G0155006	p 38	A84-12064
W-7405-ENG-26	p 10	N84-10728
	p 10	N84-10729
	p 39	N84-10764
	p 13	N84-11741
	p 28	N84-11751
ZF66512001	p 30	N84-10750
	-	

AEROSPACE MEDICINE AND BIOLOGY / A Continuing Bibliography (Supplement 255)

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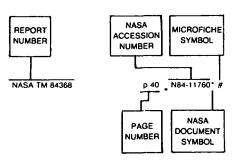
p 28 N84-11747 #

NAS 1 15 84368

NAS 1 15 84400

FEBRUARY 1984

Typical Report Number Index Listing



Listings in this index are arranged alphanumerically by report number. The page number indicates the page on which the citation is located. The accession number denotes the number by which the citation is identified. An asterisk (*) indicates that the item is a NASA report A pound sign (#) indicates that the item is available on microfiche

A-9350	p 40	N84-11760°#
A-9458	p 22	
A-9487	p 9	N84-10724* #
71 0-101	۲۰	1104 10724 #
AD-A130231	p 22	N84-10733 #
AD-A130250	p 31	N84-10752 #
AD-A130250 AD-A130260	p 31	N84-10753 #
AD-A130230 AD-A130273	p 31	N84-10751 #
AD-A130279	p 38	
AD-A130280	p 22	N84-10734 #
AD-A130286	p 31	N84-10754 #
AD-A130386	p 30	N84-10750 #
AD-A130459	p 39	N84-10761 #
AD-A130662	p 32	N84-10757 #
AD-A130685	p 39	N84-10762 #
AD-A130841	p 23	N84-10738 #
AD-A130999	p 40	N84-11762 #
AD-A131039	p 32	N84-10758 #
AD A131049	p 9	N84-10725 #
AD-A131081	p 23	
AD-A131084	p 10	
AD-A131224	p 31	N84-10755 #
AD-A131256	p 39	N84-10763 #
AD-A131302	p 24	
AD-A131331	p 27	N84-11745 #
AD-A131378	p 32	N84-11757 #
AD-A131381	p 31	N84-10756 #
AD-A131408	p 28	N84-11747 #
AD-A131420	p 23	N84-10735 #
AD-A131423	p 32	N84-11756 #
AD-A131443	p 32	N84-10759 #
AD-A131500	p 23	N84-10736 #
AD-A131533	p 23	
AD-A131598	p 27	N84-11746 #
AFAMRL-TR-83-053	p 22	N84-10733 #
AFIJEL TO BO OSCAL	- 00	NO4 40750 #
AFHRL-TP-82-25(1) AFHRL-TP-83-24	p 32	N84-10758 # N84-10752 #
AFRINE-17-03-24	p 31	N84-10752 #
AFHRL-TR-82-33	р 32	N84-11757 #
AFOSR-83-0590TR	p 23	N84-10739 #
AFWAL-TR-83-3021	p 39	N84-10763 #
AI-M-706	p 27	N84-11746 #
AIAA PAPER 83-2355	p 33	A84-10025 #
AIAA PAPER 83-2374	p 33	
AIAA PAPER 83-2376	p 33	A84-10070°#
ARB-R-83-191	•	N84-11755 #

ARO-19297 2-MA

DATE CO 7 00 400	- 00			NAC 4 45 04444	- 0	NO. 407044 #
BMFT-FB-T-83-102	p 29	N84-11752		NAS 1 15 84411	р9	N84-10724* #
BMFT-FB-T-83-130	p 14	N84-11742		NAS 1 55 2286	p 11	N84-11720* #
BMFT-FB-T-83-132	p 29	N84-11753	#			
				NASA-CASE-MFS-25740-1	p 27	N84-11744° #
BNL-33103	p 10	N84-10727		NASA-CASE-MFS-25906-1	p 40	N84-11761° #
BNL-33138	p 24	N84-10741	#	10167. 67.62 III 6 26666 1	p 40	1104 11101 11
CELSS-24	0.40	N84-11760°		NASA-CASE-MSC-18223-2	p 40	N84-11758* #
CELSS-24	p 40	1104-11760	#			
CUID 116	- 22	NO4 10757	4	NASA-CP-2286	p 11	N84-11720° #
CHIP-116	p 32	N84-10757	Ħ			
CMU-CS-83-110	p 32	N84-11756	#	NASA-TM-84368	p 40	N84-11760* #
01910-03-83-110	p 32	1404-11730	π	NASA-TM-84400	p 22	N84-10732* #
CONF-8205170-2	p 10	N84-10729	#	NASA-TM-84411	р9	N84-10724* #
CONF-8205201-2	p 39	N84-10764	#			
CONF-830518-5	p 40	N84-11763	#	NAVHLTHRSCHC-83-4	p 23	N84-10736 #
CONF-830665-3		N84-11748				
	p 28			NBDL-83R002	p 22	N84-10734 #
CONF-830695-3	p 28	N84-11749	#	NBDL-83R004	p 31	N84-10754 #
CONF-830695-4	p 28	N84-11750	#			
CONF-830710-6	p 28	N84-11751	#	NCSC-TECH-MAN-4110-1-83	p 39	N84-10761 #
CONF-830902-1	p 40	N84-11764	#			
CONF 830994-1	p 24	N84-10741	#	NCSC-TM-378-83	p 39	N84-10762 #
CRJP-248	p 31	N84-10751	#	NMRI-83-09	p 27	N84-11745 #
DE00 00000						
DE83-009292	p 40	N84-11764	#	NPRDC-SR-83-33	p 30	N84-10750 #
DE83-013276	p 24	N84-10741	#		,	
DE83-013521	p 40	N84-11763	#	ONR-83-AE	p 24	N84-10740 #
DE83-013726	p 10	N84-10728	#	SHIT OF ME	P 24	1104-107-40 #
DE83-013830	p 28	N84-11748	#	ORNL/CSD-111	p 10	N84-10728 #
DE83-014029	p 39	N84-10764	#	O111427 GOD-1117	p 10	1104-10720 #
DE83-014053	p 10	N84-10729	#	ORNL/TM-8807	0.12	N84-11741 #
DE83-015388	p 10	N84-10727	#	ORINE/TW-000/	p 13	1404-11741 #
DE83-015483	p 13	N84-11741	#	OWENT A OCCUPATOR	- 40	NO4 40700 #
DE83-015712	p 28	N84-11751	#	OWRT-A-063-IDA(2)	p 10	N84-10730 #
DE83-016045	p 13	N84-11740	#	0000 004740	- 10	NO4 40700 #
DE83-016169	p 28	N84-11749	#	PB83-221713	p 10	N84-10730 #
DE83-016186	p 28	N84-11750	#	PB83-223172	p 25	N84-10748 #
	•			PB83-224360	p 25	N84-10749 #
DHEW/DF-83/004A	p 25	N84-10748	#	PB83-225375	p 24	N84-10746 #
	F		.,	PB83-226621	p 24	N84-10742 #
DOE/ER-10701/T1	p 13	N84-11740	#	PB83-229591	p 25	N84-10747 #
				PB83-231209	p 24	N84-10743 #
DTNSRDC-83/053	p 40	N84-11762	#	PB83-231357	p 24	N84-10744 #
			.,	PB83-232108	p 24	N84-10745 #
EGG-M-17882	р 40	N84-11763	#	PB83-233270	p 10	N84-10731 #
200 111 1 1 002	P 40	1104 11700		PB83-237388	p 29	N84-11755 #
EPA-600/D-81-266	p 29	N84-11754	#	PB83-239723	p 14	N84-11743 #
EPA-600/D-83-078	p 10	N84-10731	#	PB83-239731	p 29	N84-11754 #
EPA-600/D-83-082	p 24	N84-10744	#			
EPA-600/D-83-085	p 24	N84-10743		PML-1982-54	p 40	N84-11759 #
			#			
EPA-600/1-83-008	p 24	N84-10746	#	PNL-SA-11055	p 28	N84-11749 #
EPA-600/2-83-018	p 25	N84-10747		PNL-SA-11058	p 28	N84-11750 #
EPA-600/6-83-001	p 25	N84-10749	#	PNL-SA-11419	p 28	N84-11748 #
EP1-600/D-83-062	0.14	NOA 44740	4		•	
EF 1-000/ D-03-002	p 14	N84-11743	#	REPT-8302-ONR	p 32	N84-10757 #
FDA/NCDRH-83/42	5.24	N84-10742	#			
1 DA/140DH11-03/42	p 24	1104-10742	π	SAND-83-0447C	p 40	N84-11764 #
HHS/PUB/FDA-83-8100	p 24	N84-10742	#			
11113/1 05/1 5A-03-0100	p 24	1104-10742	π	TDCK-77630	p 40	N84-11765 #
IAF PAPER 83-173	p 37	A84-11754	#	TDCK-77638	p 40	N84-11759 #
IAF PAPER 83-174	p 37	A84-11755				
IAF PAPER 83-181	p 30	A84-11756		TR-83-2	p 31	N84-10755 #
IAF PAPER 83-183	p 37	A84-11757				
IAF PAPER 83-184		A84-11757 A84-11758		US-PATENT-APPL-SN-219681	p 40	N84-11758* #
IAF PAPER 83-184	p6			US-PATENT-APPL-SN-368187	p 40	N84-11758* #
	p 6	A84-11759		US-PATENT-APPL-SN-371352	p 27	N84-11744° #
IAF PAPER 83-197	p 19	A84-11760		US-PATENT-APPL-SN-537757	p 40	N84-11761* #
IAF PAPER 83-202	p 20	A84-11761	Ħ			
ICCN ADDR FRED	- ^	NO. 10300	ш	US-PATENT-CLASS-128-DIG 25	p 27	N84-11744° #
ISSN-0208-5658	p 9	N84-10723		US-PATENT-CLASS-128-1R	p 27	N84-11744° #
ISSN-0340-7608	p 14	N84-11742		US-PATENT-CLASS-128-346	p 27	N84-11744° #
ISSN-0340-7608	p 29	N84-11752		US-PATENT-CLASS-604-368	p 40	N84-11758* #
ISSN-0340-7608	p 29	N84-11753	Ħ	US-PATENT-CLASS-604-378	p 40	N84-11758* #
				LIC DATENT OLACS COA 200	- 40	NO4 117509 #

US-PATENT-CLASS-604-396

US-PATENT-4,338,371

US-PATENT-4,408,597 US-PATENT-4,411,660

USAARL-83-10

USAFA-TR-83-12

p 40 N84-11765 #

N84-11693 #

N84-10753 #

N84-11760° #

N84-10732° #

p 10

p 31

p 40

p 22

N84-11758* #

N84-11758* #

N84-11744° # N84-11758° #

N84-10760 #

N84-10725 #

p 40

p 40

D 40

р 38

р9

REPORT NUMBER INDEX USARIEM-M-37/83

USARIEM-M-37/83 USARIEM-M-38/83

p 23 N84-10735 # p 23 N84-10737 # p 10 N84-10730 #

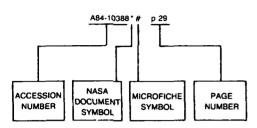
W83-03318

ACCESSION NUMBER INDEX

AEROSPACE MEDICINE AND BIOLOGY / A Continuing Bibliography (Supplement 255)

FEBRUARY 1984

Typical Accession Number Index Listina



Listings in this index are arranged alphanumerically by accession number. The page number listed to the right indicates the page on which the citation is located. An asterisk (*) indicates that the item is a NASA report. A pound sign (#) indicates that the item is available on microfiche

A84-10025 # p 33 A84-10973 # р 30 A84-10035*# A84-10070*# p 33 p 33 p 16 A84-11017 # A84-11057 p 36 A84-10276 A84-11058 р 36 A84-10277 **p** 1 A84-11059 p 36 A84-10278 p 1 A84-11115 p 4 p 14 A84-10279 A84-11253 # p 4 A84-10280 p 14 A84-11261 p 4 p 15 A84-10281 A84-11269 p 4 A84-10282 A84-11326 p 5 A84-10283 A84-11327 p 16 A84-10284 p 15 p 16 p 16 A84-10285 A84-11328 p 15 A84-11329 A84-10286 p 2 A84-11330 p 16 p 2 A84-10287 A84-11331 p 16 A84-10288 A84-11332 p p 29 A84-10388 A84-11333 p 17 A84-10397 p 15 A84-11334 p 17 A84-10473 p 33 A84-11335 p 17 p 2 p 2 AR4-10483 A84-11336 p 17 A84-10484 A84-11337 p 30 A84-10487 р3 A84-11338 p 30 p 15 A84-10488 A84-11339 p 17 A84-10489 A84-11340 p 17 484-10492 р3 A84-11341 р 17 р 17 A84-10655 p 41 A84-11342 р 33 A84-10708 A84-11343 p 30 A84-10710 D 33 A84-11349 p 5 A84-10712 p 34 A84-11350 p 18 A84-10713 p 34 р5 р 18 A84-10716 p 34 A84-11366 A84-11551 AR4-10717 p 34 A84-11552 p 18 A84-10719 p 34 A84-11553 p 18 A84-10721 p 34 p 18 A84-11554 A84-10725 p 34 p 18 p 5 p 35 A84-11555 A84-10726 p 35 A84-10729 A84-11557 # p 5 A84-10732 p 35 A84-11558 A84-10734 p 35 p 5 A84-11559 p 5 AR4-10735 p 35 р5 р 18 A84-11560 A84-10736 p 35 A84-11561 p 36 A84-10737 A84-11562 p 18 p 15 A84-10739 A84-11563 p 18 A84-10742 A84-11564 18 р3 р3 A84-10842 A84-10843 A84-11565 p 19 p 19 A84-11566 A84-10844 р3 p 5 A84-10845 A84-11567 р3 p 19 p 19 A84-11568 A84-10846 p 4 A84-11569 A84-10847 p 4 A84-11570 p 36 A84-10848 # p 4 A84-11571 p 19 A84-10849 # p 4 ΔR4-11572 # p 19 A84-10970 # p 36 A84-11573

A84-10971*#

A84-10972 #

p 29

p 29

p 37 A84-11754 A84-11755 p 37 A84-11756 p 30 A84-11757 p 37 A84-11758 0.6 A84-11760 p 19 A84-11761 p 20 A84-11921 p 37 A84-11935 D 37 A84-11962 p 20 A84-12025 p 37 AB4-12059 o 38 A84-12060 A84-12061 p 20 A84-12062 р6 A84-12063 A84-12064 p 38 A84-12065 AR4-12066 p 20 A84-12068 A84-12069 p 20 A84-12070 A84-12110 p 38 A84-12127 p 38 A84-12131 p 20 A84-12151 p 7 p 21 A84-12154 A84-12156 p 21 A84-12158 A84-12181 p 38 A84-12274 p 38 A84-12293 A84-12425 AR4-12568 A84-12569 p 8 A84-12570 р8 A84-12571 р8 A84-12572 p 21 A84-12651 A84-12652 D 8 A84-12653 p 21 A84-12654 n 8 A84-12655 p 21 p 21 A84-12656 A84-12657 A84-12658 р 8 р9 A84-12659 A84-12660 p 22 ABA-12661 p 9 p 22 A84-12662 A84-12663 p 30 A84-12786 # N84-10723 # N84-10724*# p 9 p 9 N84-10725 р9 р 10 р 10 N84-10726 N84-10727 N84-10728 p 10 N84-10729 p 10 N84-10730 p 10 N84-10731 p 10 N84-10732 p 22 p 22 N84-10733 # N84-10734 D 22 N84-10735 p 23 N84-10736 p 23 N84-10737 p 23 p 23 N84-10738 N84-10739 p 23 N84-10740 p 24 N84-10741 D 24 N84-10742 N84-10743 p 24 N84-10744 D 24 N84-10745 N84-10746 p 24 N84-10747 # p 25 N84-10748 #

p 25

p 25

p 30

N84-10749 #

N84-10750 #

p 19

p 19

p 6

A84-11574

A84-11575

A84-11753 #

p 6

N84-10751 # p 31 N84-10752 # p 31 N84-10753 # p 31 N84-10754 p 31 N84-10755 p 31 N84-10756 p 31 N84-10757 p 32 p 32 N84-10758 N84-10759 p 32 N84-10760 D 38 p 39 N84-10761 N84-10762 p 39 N84-10763 p 39 N84-10764 p 39 N84-11339 p 39 N84-11693 p 10 N84-11694 p 25 N84-11695 NR4-11696 p 39 N84-11697 p 25 N84-11698 25 N84-11699 p 26 N84-11700 p 26 N84-11701 p 26 N84-11702 p 26 N84-11703 p 26 N84-11704 p 26 N84-11705 p 10 N84-11706 p 11 N84-11707 D 11 N84-11708 p 11 N84-11709 p 39 N84-11710 p 11 N84-11711 p 11 N84-11712 p 26 p 27 N84-11714 N84-11715 p 32 N84-11716 D 27 N84-11717 p 27 N84-11718 p 39 N84-11720* p 11 N84-11721*# p 11 N84-11722* # p 12 p 12 N84-11723*# N84-11724*# 0 12 N84-11725*# N84-11726* # p 12 N84-11727*# p 12 N84-11728*# N84-11729*# p 12 N84-11730*# p 12 N84-11731*# p 12 N84-11732*# D 13 N84-11733*# 13 N84-11734 *# p 13 N84-11735°# p N84-11736* # p 13 N84-11737* p 13 N84-11738*# N84-11739*# p 13 p 13 N84-11740 # NR4-11741 p 13 N84-11742 # p 14 NR4-11743 N84-11744°# p 27 N84-11745 p 27 N84-11746 # p 27 N84-11747 p 28 N84-11748 p 28 N84-11749 p 28 N84-11750 p 28 p 28 N84-11751 N84-11752 p 29 N84-11753 p 29 N84-11754 p 29 N84-11755 p 29 N84-11756 p 32 N84-11757 p 32 N84-11758* p 40 N84-11759 # N84-11760*# p 40 p 40 p 40 N84-11761*# NB4-11762 # p 40

N84-11763 # p 40 N84-11764 # N84-11765 # p 40

		,			·
1 1	Report No. NASA SP-7011 (255)	2. Government Access	sion No	3. Recipient's Catalog	, No
4	Fitle and Subtitle			5. Report Date	
	Aerospace Medicine and Biolo	nav		February 198	4
	A Continuing Bibliography (S	Supplement 255)	Ī	6. Performing Organiz	zation Code
7 /	Author(s)			8 Performing Organiz	ation Report No
9 1	Performing Organization Name and Address			10. Work Unit No	
	National Aeronautics and Spa Washington, D. C. 20546	ice Administratio	on	11. Contract or Grant	No
12 5	Sponsoring Agency Name and Address			13. Type of Report ar	nd Period Covered
			}	14 Sponsoring Agency	Code
15	Supplementary Notes				
<u> </u>	Abstract				
	This bibliography introduced into th system in January	ie NASA scientif	ts, articles and o	ther documents nformation	
17	introduced into th	ie NASA scientif	ts, articles and or ic and technical in	nformation	
17	introduced into th system in January	ie NASA scientif	ic and technical i	nformation	
	introduced into the system in January Key Words (Suggested by Author(s)) Aerospace Medicine Bibliographies Biological Effects	e NASA scientif	ic and technical in	nformation - Unlimited	22. Price*
	introduced into the system in January Key Words (Suggested by Author(s)) Aerospace Medicine Bibliographies	ie NASA scientif	18 Distribution Statement Unclassified of this page)	nformation	22. Price* \$7.00 HC

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