NASA

Aerospace Medicine and Biology
A Continuing Bibliography with Indexes

NASA SP-7011(270)
April 1985

Aerospace Medicine & Biology

SPECIAL NOTICE ENCLOSED
NEW FOREIGN TECHNOLOGY INDEX INCLUDED IN THIS ISSUE

Aerospace Medicine and Biology
A Continuing Bibliography with Indexes

Pages 53-106

April 1985

NASA SP-7011(270)

SPECIAL NOTICE

FOREIGN TECHNOLOGY INDEX IN THIS ISSUE

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

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

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

Check below, tear out, fold, staple, and return this sheet.

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- ☐ Is useful, but other sources can be used.
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NASA SP-7011(270)

AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES

(Supplement 270)

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 March 1985 in

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

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

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

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

INTRODUCTION

This Supplement to *Aerospace Medicine and Biology* lists 417 reports, articles and other documents announced during March 1985 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA).* The first issue of the bibliography was published in July 1964.

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

Each entry in the bibliography consists of a bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged by *STAR* categories 51 through 55, the Life Sciences division. The citations, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* or *STAR*, including the original accession numbers from the respective announcement journals. The *IAA* items will precede the *STAR* items within each category.

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

An annual index will be prepared at the end of the calendar year covering all documents listed in the 1984 Supplements.

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All publications abstracted in this Section are available from the Technical Information Service, American Institute of Aeronautics and Astronautics, Inc. (AIAA), as follows: Paper copies of accessions are available at $8.50 per document. Microfiche[1] of documents announced in *IAA* are available at the rate of $4.00 per microfiche on demand. Standing order microfiche are available at the rate of $1.45 per microfiche for *IAA* source documents.

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

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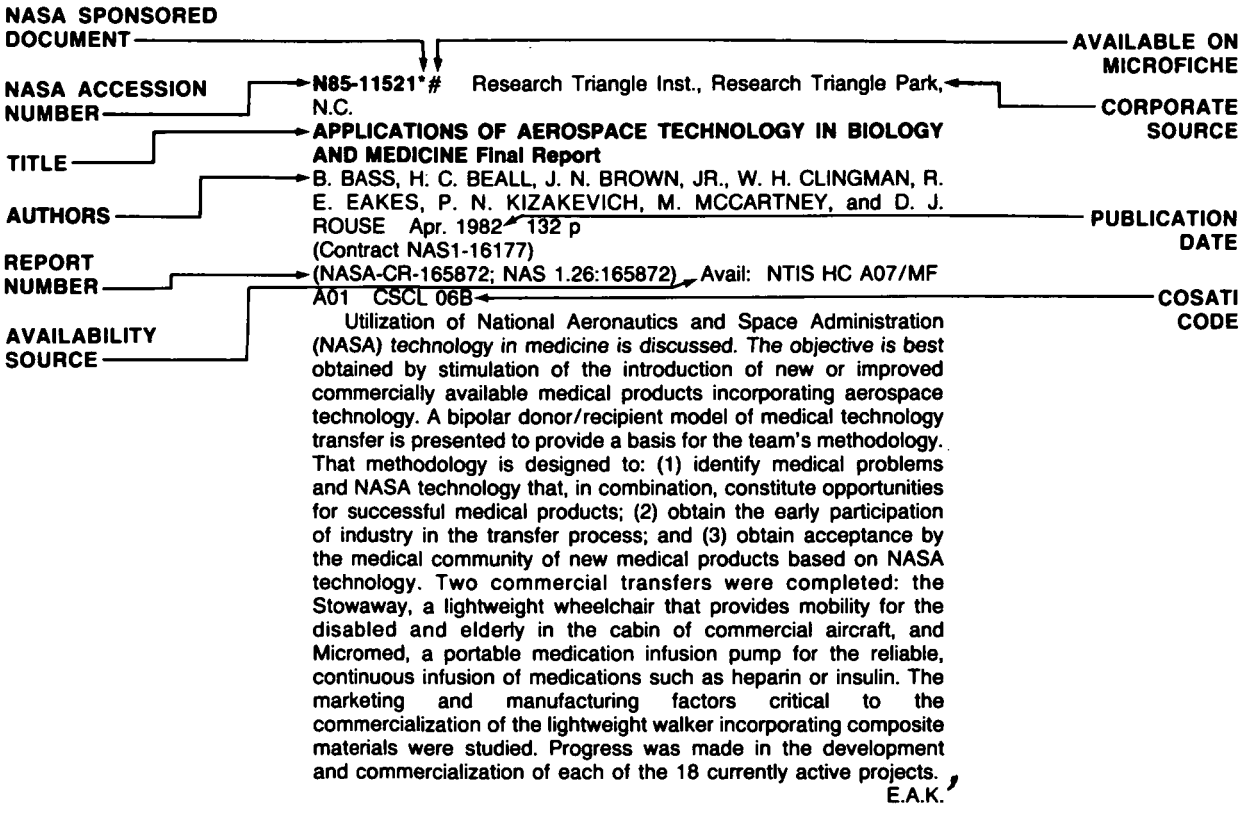

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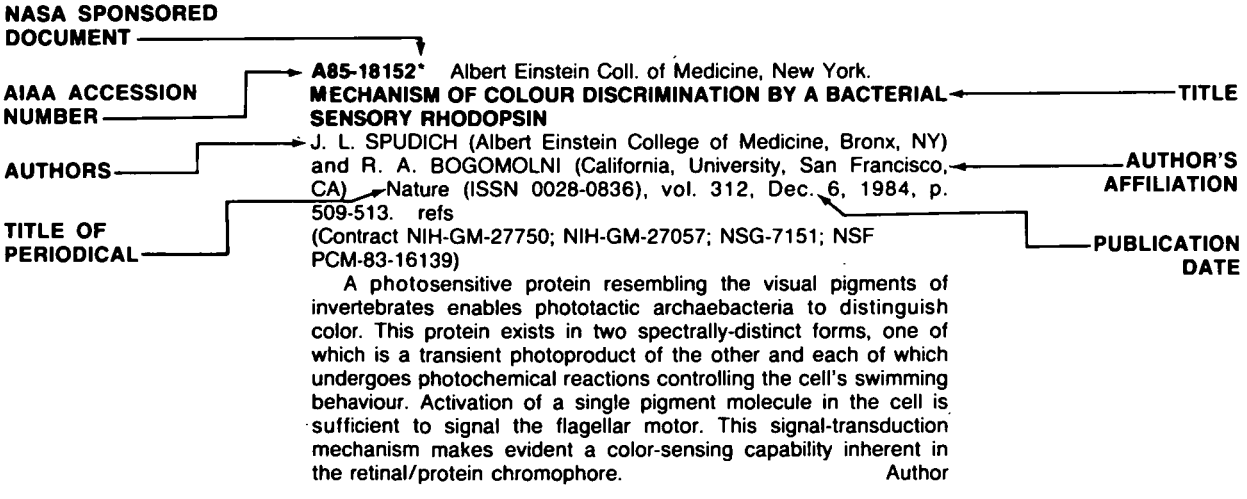

AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 270)

APRIL 1985

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LIFE SCIENCES (GENERAL)

Includes genetics.

A85-16165
THE EFFECT OF X-IRRADIATION ON THE CONTENT, COMPOSITION AND PARA-NITOANISOL-O-DEMETHYLASE ACTIVITY OF CYTOCHROME R-450 IN RAT LIVER MICROSOMES [VLIIANIE RENTGENOVSKOGO OBLUCHENIIA NA SODERZHANIE, SOSTAV I PARA-NITROANIZOL-O-DEMETILAZNUIU AKTIVNOST' TSITOKHROMA R-450 V MIKROSOMAKH PECHENI KRYS]
L. I. DEEV, M. IA. AKHALAIA, O. V. VASILENKO, A. G. PLATONOV, and G. I. TOPCHISHVILI (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR) Radiobiologiia (ISSN 0033-8192), vol. 24, Sept.-Oct. 1984, p. 612-615. In Russian. refs

A85-16166
A STUDY OF THE MECHANISMS FOR THE ACTION OF HIGH AND SUPERHIGH DOSES OF GAMMA-QUANTA AND NEUTRONS ON THE CENTRAL NERVOUS SYSTEM [K ISSLEDOVANIIU MEKHANIZMOV DEISTVIIA VYSOKIKH I SVERKHVYSOKIKH DOZ GAMMA-KVANTOV I NEITRONOV NA TSENTRAL'NUIU NERVNUIU SISTEMU]
G. A. LAVROVA, T. V. PUSHKAREVA, N. G. NIKANOROVA, and A. G. SVERDLOV (Akademiia Nauk SSSR, Leningradskii Institut Iadernoi Fiziki, Gatchina, USSR) Radiobiologiia (ISSN 0033-8192), vol. 24, Sept.-Oct. 1984, p. 616-619. In Russian. refs

A85-16167
RADIATION-INDUCED DAMAGE TO HEMOPOIESIS AS A FUNCTION OF THE LENGTH OF ADAPTATION TIME IN ALPINE CONDITIONS [LUCHEVOE PORAZHENIE GEMOPOEZA V USLOVIIAKH VYSOKOGOR'IA V ZAVISIMOSTI OT DLITEL'NOSTI ADAPTATSII]
IU. V. FARBER, IU. G. GRIGOREV, and A. V. SHAFIRKIN (Ministerstvo Zdravookhraneniia SSSR, Institut Biofiziki, Moscow, USSR) Radiobiologiia (ISSN 0033-8192), vol. 24, Sept.-Oct. 1984, p. 624-629. In Russian. refs

The impaired hemopoietic function of laboratory animals and dogs as a result of exposure to ionizing radiation in an alpine environment is studied experimentally. The radiation dose rate was 0.5 Gr/hr and the alpine environment was a biological research station in a mountain pass (altitude 3200 m). Evaluations were made of hemopoietic function on the 3rd, 15th, 22nd, 25th, and 33rd days of the period of adaptation to high-altitude conditions. It is shown that the radiation damage to hemopoiesis decreased at the beginning of the adaptation period due to the intensification of the following regenerative processes: DNA synthesis in the hemopoietic organs; and the activation of erythropoietic, myelopoietic and lymphopoietic functions. During the latter stages of the adaptation period (days 25-30), a two- to four-fold increase was noted in the number of hemopoietic stem cells. I.H.

A85-16168
THE EFFECT OF OXYGEN ON THE DENATURATION AND AGGREGATION OF ENZYME MACROMOLECULES DURING GAMMA-IRRADIATION [VLIIANIE KISLORODA NA DENATURATSIIU I AGREGATSIIU MAKROMOLEKUL FERMENTA V PROTSESSE GAMMA-OBLUCHENIIA]
L. I. KHARCHENKO and T. E. PAVLOVSKAIA (Akademiia Nauk SSSR, Institut Biokhimii, Moscow, USSR) Radiobiologiia (ISSN 0033-8192), vol. 24, Sept.-Oct. 1984, p. 643-646. In Russian. refs

A85-16169
THE DELAYED EFFECTS OF CHRONIC IRRADIATION AT DIFFERENT DOSE RATES IN RATS [OTDALENNYE POSLEDSTVIIA KHRONICHESKOGO OBLUCHENIIA KRYS PRI RAZLICHNOI MOSHCHNOSTI DOZY]
V. P. BOITSOVA, P. V. GOLOSHCHAPOV, and V. L. SHVEDOV (Ministerstvo Zdravookhraneniia SSSR, Institut Biofiziki, Moscow, USSR) Radiobiologiia (ISSN 0033-8192), vol. 24, Sept.-Oct. 1984, p. 672-675. In Russian. refs

Chronic exposure of four groups of rats to ionizing radiation at dose rates of 1.7 to 13.5 Gr/day is studied experimentally. It is found that the group of rats receiving 13.5 Gr of radiation per day exhibited both qualitative and quantitative pathological and anatomical changes after 86 hours of exposure. At lesser dose rates no qualitative changes were noted in the causes of death. An increase in the occurrence of tumors was recorded at the dose rate of 3.5 Gr/day. The average life of all the irradiated animals was significantly shorter than for animals in a control group. I.H.

A85-16170
THE EFFECT OF DIUCYPHONE ON THE HEMOPOIETIC AND IMMUNE SYSTEMS OF THE NORMAL AND IRRADIATED ORGANISM [VOZDEISTVIE DIUTSIFONA NA SISTEMU KROVETVORENIIA I IMMUNITETA V NORMAL'NOM I OBLUCHENNOM ORGANIZME]
L. E. KOSTIUK, O. V. SEMINA, E. S. KURILETS, A. M. POVERENNYI, N. M. GOLOSHCHAPOV, and T. N. SEMENETS (Akademiia Meditsinskikh Nauk SSSR, Obninsk, USSR) Radiobiologiia (ISSN 0033-8192), vol. 24, Sept.-Oct. 1984, p. 687-690. In Russian. refs

It is shown through a series of experiments with mice that the compound diucyphone injected 6-8 days after irradiation favored the production of antibodies in the spleen and increased the yield of exogenous splenic colonies. Differentiation in hemopoietic stem cells was corrected. In mice not exposed to radiation, diucyphone decreased colony-forming activity and did not change hemopoietic stem cell differentiation. The complete results of the experiment are presented in a table. I.H.

A85-16171
THE RADIOSENSITIVITY OF ANIMALS IRRADIATED IN A MODIFIED GAS MEDIUM - A MODIFICATION OF THE CEREBRAL SYNDROME IN MICE BY HYPOXIC HYPOXIA AND HYPEROXIA INDUCED DURING IRRADIATION [RADIOCHUVSTVITEL'NOST' ORGANIZMA PRI OBLUCHENII ZHIVOTNYKH V IZMENENNOI GAZOVOI SREDE - MODIFIKATSIIA TSEREBRAL'NOGO SINDROMA U MYSHEI GIPOKSICHESKOI GIPOKSIEI I GIPEROKSIEI VO VREMIA OBLUCHENIIA]
I. B. USHAKOV and M. M. ABRAMOV Radiobiologiia (ISSN 0033-8192), vol. 24, Sept.-Oct. 1984, p. 693-697. In Russian. refs

A85-16172
DAMAGE TO THE HEMOPOIETIC STEM POOL IN RATS AS A RESULT OF LONG-TERM EXTERNAL IRRADIATION [POVREZHDENIE STVOLOVOGO KROVETVORNOGO PULA U KRYS PRI DLITEL'NOM VNESHNEM OBLUCHENII]
K. N. MUKSINOVA (Ministerstvo Zdravookhraneniia SSSR, Institut Biofiziki, Moscow, USSR) Radiobiologiia (ISSN 0033-8192), vol. 24, Sept.-Oct. 1984, p. 703-707. In Russian. refs

A85-16173
A BREAKDOWN IN THE RECOVERY OF THE HEMOPOIETIC STEM POOL AFTER LONG TERM EXTERNAL IRRADIATION [NARUSHENIE VOSSTANOVLENIIA STVOLOVOGO KROVETVORNOGO PULA POSLE DLITEL'NOGO VNESHNEGO OBLUCHENIIA]
K. N. MUKSINOVA (Ministerstvo Zdravookhraneniia SSSR, Institut Biofiziki, Moscow, USSR) Radiobiologiia (ISSN 0033-8192), vol. 24, Sept.-Oct. 1984, p. 707-710. In Russian. refs

A85-16812
COMPARISON OF REWARMING BY RADIO WAVE REGIONAL HYPERTHERMIA AND WARM HUMIDIFIED INHALATION
J. D. WHITE, A. B. BUTTERFIELD, K. A. GREER, S. SCHOEM, C. JOHNSON, and R. R. HOLLOWAY (Georgetown University, Medical Center, Washington, DC) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 55, Dec. 1984, p. 1103-1106. Research supported by Monatherm, Inc. and Henry Medical Electronics, Inc. refs
(Contract NIH-RR-5360)

Anesthetized random source dogs were cooled by ice water immersion to a stable core temperature of 25 C and subsequently rewarmed with warm humidified inhalation (43 C, 450 cc of min ventilation per kg) or radio-frequency induction hyperthermia (4-6 watts per kg). The mean time required for core rewarming to 30 C was 280 + or - 114 min for ventilation and 58 + or - 13 min for radio wave therapy (p less than 0.001). There was no evidence of tissue damage with either modality. These data suggest radio wave heating is superior to warm humidified inhalation therapy for core rewarming of rapidly induced immersion hypothermia.
Author

A85-16814
HYPOTHERMIA AND ELECTROMAGNETIC REWARMING IN THE RHESUS MONKEY
R. G. OLSEN and T. D. DAVID (U.S. Naval Aerospace Medical Research Center, Medical Research Laboratory, Pensacola, FL) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 55, Dec. 1984, p. 1111-1117. refs

The present investigation had the objective to evaluate the effectiveness and safety of using radiofrequency (RF) energy to rewarm hypothermic casualties in the operational environment by using rhesus monkey (Macaca mulatta) subjects. In the experiments, five animals were subjected to repeated hypothermia procedures, under anesthesia, inside a specially designed chamber. Rewarming was afterwards accomplished either by conventional, surface application of heat or by RF energy applied with a helical induction coil around the animal's torso. Blood samples were obtained during and after the experiments to allow an assessment of the integrity of the inner organs. The obtained data indicate that the careful application of RF energy to the central core of the body can successfully be used for rewarming purposes.
G.R.

A85-16815
HEMODYNAMIC EFFECTS OF 10 PERCENT DEXTROSE AND OF DEXTRAN 70 ON HEMORRHAGIC SHOCK DURING EXPOSURE TO HYPERBARIC AIR AND HYPERBARIC HYPEROXIA
D. R. GROSS, K. T. DODD, D. W. WELCH, and W. P. FIFE (Texas A & M University, College Station, TX) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 55, Dec. 1984, p. 1118-1128. Sponsorship: National Institute for Occupational Safety and Health. refs
(Contract NIOSH-210-81-6103; NOAA-NA-81AAD00092)

A85-16816* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
HYPERGRAVITY EFFECTS ON LITTER SIZE, NURSING ACTIVITY, PROLACTIN, TSH, T3, AND T4 IN THE RAT
E. MEGORY and J. OYAMA (NASA, Ames Research Center, Biomedical Research Div., Moffett Field, CA) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 55, Dec. 1984, p. 1129-1135. refs

In a recent study of the effects of hypergravity (HG) on the reproductive system of the rat, it was found that the estrous cycle is perturbed in a pseudopregnancy-like pattern upon first exposure of animals to HG. This can be prevented by previous exposure to HG or by administration of bromergo cryptin. Adapted rats can mate and deliver in HG. However, little is known of the condition of the individual pregnant rat, fetuses, and newborn pups in this environment. There are also questions regarding the effects of HG on the number of fetuses, the mortality rate in different HG levels, and the effects on production and secretion of PRL and TSH. The present investigation is concerned with such questions, taking into account possible approaches to avoid or minimize the lethal effects of HG. The obtained results suggest that peripartum plasma PRL levels and thyroid hormone levels are critical for the survival of the litter.
G.R.

A85-17101
MAGNETOPHORESIS AND THE GRAVITATIONAL SEDIMENTATION OF ERYTHROCYTES [MAGNITOFOREZ I GRAVITSIONNAIA SEDIMENTATSIIA ERITROTSITOV]
L. A. PIRUZIAN, A. A. KUZNETSOV, V. M. CHIKOV, I. G. PLOTNIKOVA, and S. N. PODOINITSYN (Akademiia Nauk SSSR, Institut Khimicheskoi Fiziki, Moscow, USSR) Akademiia Nauk SSSR, Izvestiia, Seriia Biologicheskaia (ISSN 0002-3329), Jan.-Feb. 1984, p. 18-30. In Russian. refs

The status of current understanding of the processes of magnetophoresis and gravitational sedimentation of red blood cells is reviewed, and the results of an experimental determination of the hematological effects of a high gradient magnetic field are presented. The frequency distributions of phoresis parameters are obtained for a random sampling of a large number of cells. The relationship between the phoresis parameters of the cells and the effects of temperature, pH, and the osmotic conditions in the medium are analyzed. The possibility of constructing a high-gradient magnetic separator for magnetic levitation of red blood cells is considered.
I.H.

A85-17102
THE DISTINCTIVE GROWTH CHARACTERISTICS OF HAPLOPAPPUS GRACILIS CELLS (NUTT) A. GRAY IN VITRO UNDER CLINOSTATIC CONDITIONS [OSOBLIVOSTI ROSTU KLITIN HAPLOPAPPUS GRACILIS /NUTT/ A. GRAY IN VITRO V UMOVAKH KLINOSTATUVANNIA]
D. O. KLIMCHUK (Akademiia Nauk Ukrains'koi RSR, Institut Botaniki, Kiev, Ukrainian SSR) Ukrains'kii Botanichnii Zhurnal (ISSN 0372-4123), vol. 41, no. 2, 1984, p. 63-66. In Ukrainian. refs

The growth characteristics of Haplopappus gracilis cells are studied experimentally, under clinostatic conditions. Clinostatic

conditions in the experiment consisted of disorientation of the cultures by rotation around the horizontal axis. Analysis of the growth data showed no change in biomass gain (the relative masses of wet and dry matter). No differences were reported in the number of cells per weight unit or in the level of mitotic activity in the population of cells rotated at 2 rev per min and in the control group. At rotations of 50 rev/min an increase in the mass of wet matter was observed. This result is attributed to an increase in the intensity of cell growth due to elongation. I.H.

A85-17109
HISTOCHEMICAL STUDY OF CHANGES IN THE SKIN OF THE REAR EXTREMITIES OF RATS UNDER THE EFFECT OF LOCAL VIBRATION [GISTOKHIMICHESKOE IZUCHENIE IZMENENII V KOZHE ZADNIKH KONECHNOSTEI KRYS V PROTSESSE VOZDEISTVIIA LOKAL'NOI VIBRATSII]
I. M. SHNAIDMAN and A. P. FILIN (Karagandinskii Meditsinskii Institut, Karaganda, Kazakh SSR) Gigiena Truda i Professional'nye Zabolevaniia, March 1984, p. 51, 52. In Russian.

A85-17115
THE EFFECT OF LULIBERIN AND CHORIONIC GONADOTROPIN ON LUTEINIZING HORMONE AND TESTOSTERONE LEVELS IN MONKEY BLOOD UNDER ACUTE STRESS CONDITIONS [VLIIANIE LIULIBERINA I KHORIONICHESKOGO GONADOTROPINA NA UROVEN' LIUTEINIZIRUIU-SHCHEGO GORMONA I TESTOSTERONA V KROVI U OBEZ'IAN V USLOVIIAKH OSTROGO STRESSA]
G. V. KATSIIA, A. M. CHIRKOV, and N. P. GONCHAROV (Akademiia Meditsinskikh Nauk SSSR, Sukhumi, Georgian SSR) Problemy Endokrinologii, vol. 30, Jan.-Feb. 1984, p. 73-77. In Russian. refs

A85-17120
SYSTEM FOR THE RECORDING OF ELECTRONYSTAGMOGRAMS IN EXPERIMENTAL ANIMALS [SISTEMA DLIA REGISTRATSII ELEKTRONISTAGMOGRAMMY U EKSPERIMENTAL'NYKH ZHIVOTNYKH]
N. A. SHEVCHENKO and V. I. NAZARENKO (Kievskii Nauchno-Issledovatel'skii Institut Otolaringologii, Kiev, Ukrainian SSR) Zhurnal Ushnykh, Nosovykh i Gorlovykh Boleznei (ISSN 0044-4650), Mar.-Apr. 1984, p. 73. In Russian.

A system based on a biopotential amplifier has been developed which makes it possible to record nystagmus in response to rotational, caloric, electric, and other stimuli of the vestibular apparatus in experimental animals. A circuit diagram of the biopotential amplifier is presented, and sample results obtained with the system are examined. B.J.

A85-17122
ACTIVITY OF THE NA, K-DEPENDENT ATPASE IN SYNAPTOSOMES OF THE BRAIN HEMISPHERES OF RATS WITH ISCHEMIC NECROSIS OF THE MYOCARDIUM, REPRODUCED AFTER EMOTIONAL-PAIN STRESS AND WITHOUT SUCH STRESS [AKTIVNOST' NA, K-ZAVISIMOI ATF-AZY SINAPTOSOM POLUSHARII GOLOVNOGO MOZGA KRYS S ISHEMICHESKIM NEKROZOM MIOKARDA, VOSPROIZVEDENNYM POSLE EMOTSIONAL'NO-BOLEVOGO STRESSA I BEZ NEGO]
V. V. DAVYDOV, V. P. SKURYGIN, and V. S. IAKUSHEV (Orenburgskii Meditsinskii Institut, Orenburg, USSR; Zaporozhskii Meditsinskii Institut, Zaporozhe, Ukrainian SSR) Voprosy Meditsinskoi Khimii (ISSN 0042-8809), vol. 30, Mar.-Apr. 1984, p. 61-63. In Russian. refs

A85-17124
DAMAGE AND REPARATIVE SYNTHESIS OF THE DNA OF VARIOUS RAT ORGANS INDUCED BY EMOTIONAL-PAIN STRESS [POVREZHDENIE I REPARATIVNYI SINTEZ DNK RAZLICHNYKH ORGANOV KRYS, VYZVANNYE EMOTSIONAL'NO-BOLEVYM STRESSOM]
V. K. VASILEV and F. Z. MEERSON (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Voprosy Meditsinskoi Khimii (ISSN 0042-8809), vol. 30, Mar.-Apr. 1984, p. 112-114. In Russian. refs

A85-17134
INFLUENCE OF ADAPTATION TO SHORT-TERM STRESS EFFECTS ON THE DISTURBANCE OF THE CONTRACTILE FUNCTION OF THE MYOCARDIUM DURING LONG-TERM STRESS [VLIIANIE ADAPTATSII K KOROTKIM STRESSOVYM VOZDEISTVIIAM NA NARUSHENIE SOKRATITEL'NOI FUNKTSII MYSHTSY SERDTSA PRI DLITEL'NOM STRESSE]
M. V. SHIMKOVICH and F. Z. MEERSON (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Kardiologiia (ISSN 0022-9040), no. 4, 1984, p. 112, 113. In Russian. refs

A85-17137
QUANTITATIVE CHANGES OF BLOOD FORM ELEMENTS UNDER THE COMBINED EFFECT OF HIGH-ALTITUDE MOUNTAIN CONDITIONS AND IONIZING RADIATION [KOLICHESTVENNYE IZMENENIIA FORMENNYKH ELEMENTOV KROVI PRI KOMBINIROVANNOM DEISTVII VYSOKOGOR'IA I IONIZIRUIUSHCHEI RADIATSII]
S. B. DANIIAROV and B. MOLDOTASHEV (Kirgizskii Gosudarstvennyi Meditsinskii Institut, Frunze, Kirgiz SSR) Akademiia Nauk Kirgizskoi SSR, Izvestiia (ISSN 0002-3221), Mar.-Apr. 1984, p. 34-38. In Russian. refs

An analysis was made of the quantitative changes of form elements of the peripheral blood in intact animals (dogs in a chronic experiments and rats in an acute experiment) during adaptation to high-altitude conditions, and of the effect of these conditions on the postradiation recovery period. A high lability of the amount of leukocytes was found during adaptation, along with a less pronounced leukopenia during the irradiation of animals in high-altitude conditions. Also observed was a high rate of postradiation recovery of the number of blood form elements under the effect of natural mountain conditions. B.J.

A85-17138
PHENOTYPE DIFFERENCES OF MECHANISMS OF FUNCTIONAL ADAPTATION TO HIGH-ALTITUDE MOUNTAIN HYPOXIA IN DOGS INDIGENOUS TO LOW-MOUNTAIN AND MEDIUM-MOUNTAIN HEIGHTS [FENOTIPICHESKIE RAZLICHIIA MEKHANIZMOV FUNKTSIONAL'NOI ADAPTATSII K VYSOKOGORNOI GIPOKSII U SOBAK NIZKOGOR'IA I SREDNEGOR'IA]
A. KH. KARASAEVA and O. I. PUSHKARENKO (Akademiia Nauk Kirgizskoi SSR, Institut Fiziologii i Eksperimental'noi Patologii Vysokogor'ia, Frunze, Kirgiz SSR) Akademiia Nauk Kirgizskoi SSR, Izvestiia (ISSN 0002-3221), Mar.-Apr. 1984, p. 39, 40. In Russian.

The intracardia hemodynamics, external respiration, and oxygen-binding components of the blood were investigated in aborigene dogs indigenous to low-mountain (760 m above sea level) an medium-mountain (1800 m) heights. An additional hypoxic load (2800 and 3200 m) revealed fundamental differences in mechanisms of functional adaptation, which differences are considered as a result of modification variability realized in different ecological conditions. B.J.

A85-17139
ECOLOGICAL MORPHOLOGY OF THE HYPERTROPHY AND CAPILLARIZATION OF THE MYOCARDIUM IN MOUNTAIN ABORIGENE DOGS [EKOLOGICHESKAIA MORFOLOGIIA GIPERTROFII I KAPILLIARIZATSII MIOKARDA U ABORIGENOV GOR]
IU. KH.-M. SHIDAKOV (Akademiia Nauk Kirgizskoi SSR, Institut Fiziologii i Eksperimental'noi Patologii Vysokogor'ia, Frunze, Kirgiz SSR) Akademiia Nauk Kirgizskoi SSR, Izvestiia (ISSN 0002-3221), Mar.-Apr. 1984, p. 41-45. In Russian. refs

A comparative analysis is made of hypertrophy and capillarization of the myocardium in dogs that are indigenous to a high-altitude mountain area and dogs that are only temporarily kept in such an area. Variations of the hypertrophy and capillarization of the left and right ventricles were observed during the individual adaptation of the dogs to high-altitude conditions. It is shown that cardiac hypertrophy in aborigene dogs is due to hyperplasia, whereas this hypertrophy in dogs that have been only temporarily kept in high-altitude conditions is due to genuine hypertrophy of muscle fibers. B.J.

A85-17143
DISTINCTIVE FEATURES IN THE DEVELOPMENT OF SYMPATHOMIMETIC HEART CONDITIONS AS A FUNCTION OF ADAPTATION TO INTERRUPTED EXOGENETIC HYPERTHERMIA [OSOBENNOSTI RAZVITIA SIMPATOMIMETICHESKOGO PORAZHENIIA SERDTSA V ZAVISIMOSTI OT ADAPTATSII K PRERYVISTOI EKZOGENNOI GIPERTERMII]
V. I. SOBOLEVSKII and V. V. ELISEEV (Leningradskii Gosudarstvennyi Institut Fizicheskoi Kul'tury, Leningrad, USSR) Voprosy Kurortologii, Fizioterapii i Lechebnoi Fizicheskoi Kul'tury (ISSN 0042-8787), Mar.-Apr. 1984, p. 38-40. In Russian. refs

The results of experiments on 80 white rats subjected to temperatures of 40 C for a period of 42 days are presented. It is found that during the period of adaptation to the hyperthermia the functional tolerance of the heart and circulatory systems was improved, particularly with respect to the damaging effects of the sympathomimetic agent novodrin. Some of the prospects for the use of thermal adaptation treatment for improving resistance to different types of heart disease are examined. I.H.

A85-17144
LYMPHOID TISSUE OF THE SPLEEN AND THYMUS UNDER HYPOXIA - A BIOMETRICAL INVESTIGATION [LIMFOIDNAIA TKAN' SELEZENKI I VILOCHKOVOI ZHELEZY PRI GIPOKSII /BIOMETRICHESKOE ISSLEDOVANIE/]
O. I. FEDULOV (Saratovskii Meditsinskii Institut, Saratov, USSR) Arkhiv Anatomii, Gistologii i Embriologii (ISSN 0004-1947), vol. 86, Feb. 1984, p. 81-85. In Russian. refs

Changes in the lymphoid tissue of the spleen and thymus are studied experimentally in rats following exposure to decreased atmospheric pressure in an altitude chamber. The pressure changes corresponded to altitudes of 5,000 and 7,500 m, and examinations of tissue specimens were made on the 1st, 3rd, 5th, 7th, 14th, 28th, 42nd and 56th days of adaptation. The effects of the hypoxia were measured in terms of changes in mass, changes in the Cortico-Medulular Index (CMI) and in the lymphnode function. It is found that the main changes in these indices occurred between the 7th and 28th days of the adaptation period. The complete results of the experiment are given in a series of tables. I.H.

A85-17145
HEMOCAPILLARY BED OF MAMMAL HEARTS AND THE OXYGEN SUPPLY OF THE MYOCARDIUM IN CONDITIONS OF HYPERTENSION [GEMOKAPILLIARNOE RUSLO SERDTSA MLEKOPITAIUSHCHIKH I SNABZHENIE KISLORODOM MIOKARDA V USLOVIIAKH GIPERTENZII]
V. D. TSVETKOV (Akademiia Nauk SSSR, Institut Biologicheskoi Fiziki, Pushchino, USSR) Arkhiv Anatomii, Gistologii i Embriologii (ISSN 0004-1947), vol. 86, March 1984, p. 5-13. In Russian. refs

A85-17146
CHANGES IN CARDIAC ADRENERGIC NEURAL PLEXUSES UNDER IMMOBILIZATION STRESS IN RATS [IZMENENIIA ADRENERGICHESKIKH NERVNYKH SPLETENII SERDTSA PRI IMMOBILIZATSIONNOM STRESSE U KRYS]
K. L. MARIAN and A. M. BUNIATIAN (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Arkhiv Anatomii, Gistologii i Embriologii (ISSN 0004-1947), vol. 86, March 1984, p. 34-39. In Russian. refs

The results of a luminescent microscopic analysis of the condition of the cardiac neural apparatus in 48 Wistar and August rats subjected to immobilization stress are reported. It is found that the August rats demonstrated a high sensitivity to the stress: 40 percent of the animals died during the first 4 to 17 hours of immobilization. The analysis of frozen sections of the hearts of the August rats showed a 10 to 15 percent decrease in luminescent brightness and density in the right auricle, and a decrease of 30 to 34 percent in the left ventricle compared to that of a control group. The data are interpreted as evidence of known functional disturbances in heart activity caused by immobilization stress: fluctuations in arterial pressure; disturbances in rhythm; and ECG changes. It is suggested that the concentration of catecholamines in the neural terminals of the heart plays an important role in the development of cardiovascular disturbances under immobilization stress. I.H.

A85-17147
CHANGES IN RESPIRATORY MUSCLES AND THEIR MICROCIRCULATORY BED UNDER CHRONIC HYPOXIA AND DURING THE PERIOD OF ITS AFTEREFFECTS [IZMENENIE DYKHATEL'NYKH MYSHTS I IKH MIKROTSIRKULIATORNOGO RUSLA PRI VOZDEISTVII NA ORGANIZM KHRONICHESKOI GIPOKSII I V PERIOD EE POSLEDEISTVIIA]
O. A. RAGIMOVA (Saratovskii Meditsinskii Institut, Saratov, USSR) Arkhiv Anatomii, Gistologii i Embriologii (ISSN 0004-1947), vol. 86, March 1984, p. 68-75. In Russian. refs

Changes in the structure and function of respiratory muscles under hypoxia are studied experimentally in two groups of mice exposed to rarefied atmospheres. The atmospheres correspond to altitudes of 2,500 and 7,500 m, respectively. The major morphological changes brought about by hypoxia over a period of 56 days are described. The essential destructive changes observed were: a rearrangement of the microcirculatory bed with decreasing convolution of the longitudinal capillaries; and a decrease in the number of transverse capillaries. During the period of the aftereffect, the internal and external intercostal muscles were completely restored but structural damage to the diaphragm remained unrepaired. I.H.

A85-17149
ALTERATIONS IN RAT INTESTINAL MESENTERY MICROVASCULATURE AS A RESULT OF ACUTE RADIATION SICKNESS - AN EXPERIMENTAL AND MORPHOLOGICAL STUDY [IZMENENIIA MIKROSOSUDISTOGO RUSLA BRYZHEIKI KRYS PRI KISHECHNOI FORME OSTROI LUCHEVOI BOLEZNI /EKSPERIMENTAL'NO-MORFOLOGICHESKOE /]
A. V. DATSENKO and V. V. SHIKHODYROV (Ministerstvo Zdravookhraneniia SSSR, Institut Biofiziki, Moscow, USSR) Arkhiv Patologii (ISSN 0004-1955), vol. 46, no. 3, 1984, p. 29-34. In Russian. refs

A85-17159
THE USE OF TRADESCANTIA (CLONES 02 AND 4430) IN STUDIES OF RADIATION AND CHEMICAL MUTAGENESIS [ISPOL'ZOVANIE TRADESKANTSII (KLONY 02 I 4430) V ISSLEDOVANIIAKH PO RADIATSIONNOMU I KHIMICHESKOMU MUTAGENEZU]
R. G. OSIPOVA and V. A. SHEVCHENKO (Akademiia Nauk SSSR, Institut Obshchei Genetiki, Moscow, USSR) Zhurnal Obshchei Biologii (ISSN 0044-4596), vol. 45, Mar.-Apr. 1984, p. 226-232. In Russian. refs

A85-17161
METABOLIC PROCESSES IN ERYTHROCYTES UNDER STRESS AND THE EFFECT OF EXTREME ENVIRONMENTAL FACTORS [OBMENNYE PROTSESSY V ERITROTSITAKH PRI STRESSE I EKSTREMAL'NYKH VOZDEISTVIIAKH]
V. I. SHEPOTINOVSKII (Rostovskii Meditsinskii Institut, Rostov-on-Don, USSR) Patologicheskaia Fiziologiia i Eksperimental'naia Terapiia (ISSN 0031-2991), Mar.-Apr. 1984, p. 70-74. In Russian. refs

The literature concerning variations of metabolic processes in erythrocytes under stress and the effect of extreme environmental factors is reviewed. It is found that the literature data confirm the important role of cellular metabolism in supporting functions and homeostasis under the effect of various extreme factors. It is concluded that an analysis of intra-erythrocyte metabolism can be used to interpret the significance of erythrocytes in the adaptation to hypoxia, and in mechanisms underlying gas-transport processes, changes of blood rheological properties, and electrolyte metabolism. B.J.

A85-17162
PERMEABILITY AND DAMAGE OF ERYTHROCYTE MEMBRANES AT TEMPERATURES RANGING FROM -1 TO -9 C ACCORDING TO DATA OF THE NMR-RELATION METHOD [PRONITSAEMOST' I POVREZHDENIE MEMBRAN ERITROTSITOV PRI TEMPERATURAKH OT -1 DO -9 C PO DANNYM METODA IAMR-RELAKSATSII]
B. V. SAKHAROV and V. IA. VOLKOV (Vsesoiuznyi Nauchno-Issledovatel'skii Institut Prikladnoi Mikrobiologii, Serpukhov, USSR) Biofizika (ISSN 0006-3029), vol. 29, Mar.-Apr. 1984, p. 264-267. In Russian. refs

A85-17163
LUMINESCENT PARAMETERS OF NUCLEAR BLOOD CELLS IN THE IMMUNE-RESPONSE PROCESS [LIUMINESTSENTNYE PARAMETRY IADERNYKH KLETOK KROVI V PROTSESSE IMMUNNOGO OTVETA ORGANIZMA]
N. A. KARNAUKHOVA (Akademiia Nauk SSSR, Institut Biologicheskoi Fiziki, Pushchino, USSR) Biofizika (ISSN 0006-3029), vol. 29, Mar.-Apr. 1984, p. 276-279. In Russian. refs

A85-17176
STABILITY OF THE ORGANISM [USTOICHIVOST' ORGANIZMA]
V. LINDENBRATEN (Khabarovskii Gosudarstvennyi Meditsinskii Institut, Khabarovsk, USSR) Nauka i Zhizn' (ISSN 0028-1263), no. 2, 1984, p. 128-131. In Russian. refs

The stability of the organism is defined as its resistance to adverse environmental factors and diseases. The character and manifestations of this stability are discussed, and the possibility of enhancing it is examined. B.J.

A85-17334
AEQUORIN MEASUREMENTS OF FREE CALCIUM IN SINGLE HEART CELLS
P. H. COBBOLD and P. K. BOURNE (Liverpool, University, Liverpool, England) Nature (ISSN 0028-0836), vol. 312, Nov. 29, 1984, p. 444-446. Research supported by the British Heart Foundation and Medical Research Council. refs

Attention is given to measurements made with the Ca-sensitive photoprotein aequorin in single ventricular myocytes which have yielded signals from resting and contracting cells, as well as from cells exposed to media of altered ionic composition, ouabain, and metabolic inhibitors. It is noted that free Ca in metabolically poisoned myocytes is very stable, and that severe injury to the cell occurs before the free Ca concentration rises about 1-3 x 10 to the -7th M; cell damage thereby appearing to be a cause, rather than a consequence, of a rise in free Ca. The technique presently used may help resolve many uncertainties concerning free Ca in heart function. O.C.

A85-17426
THE EFFECT OF A HE-NE LASER IN VARIOUS OSCILLATING MODES ON CORNEA CELLS FOLLOWING IONIZING IRRADIATION [VLIIANIE GELII-NEONOVOGO LAZERA V RAZNYKH REZHIMAKH OBLUCHENIIA NA KLETKI ROGOVITSY POSLE DEISTVIIA IONIZIRUIUSHCHEI RADIATSII]
N. V. BULIAKOVA (Akademiia Nauk SSSR, Institut Evoliutsionnoi Morfologii i Ekologii Zhivotnykh, Moscow, USSR) Akademiia Nauk SSSR, Doklady (ISSN 0002-3264), vol. 279, no. 2, 1984, p. 499-501. In Russian. refs

A85-18152* Albert Einstein Coll. of Medicine, New York.
MECHANISM OF COLOUR DISCRIMINATION BY A BACTERIAL SENSORY RHODOPSIN
J. L. SPUDICH (Albert Einstein College of Medicine, Bronx, NY) and R. A. BOGOMOLNI (California, University, San Francisco, CA) Nature (ISSN 0028-0836), vol. 312, Dec. 6, 1984, p. 509-513. refs
(Contract NIH-GM-27750; NIH-GM-27057; NSG-7151; NSF PCM-83-16139)

A photosensitive protein resembling the visual pigments of invertebrates enables phototactic archaebacteria to distinguish color. This protein exists in two spectrally-distinct forms, one of which is a transient photoproduct of the other and each of which undergoes photochemical reactions controlling the cell's swimming behaviour. Activation of a single pigment molecule in the cell is sufficient to signal the flagellar motor. This signal-transduction mechanism makes evident a color-sensing capability inherent in the retinal/protein chromophore. Author

A85-18273
THE TEMPERATURE DEPENDENCE OF MAGNETIC SUSCEPTIBILITY IN ERYTHROCYTE OXI- AND CARBOXIHEMOGLOBIN [TEMPERATURNAIA ZAVISIMOST' MAGNITNOI VOSPRIIMCHIVOSTI OKSI- I KARBOKSIGEMOGLOBINA V ERITROTSITAKH]
L. A. PIRUZIAN, A. A. KUZNETSOV, V. M. CHIKOV, and I. G. PLOTNIKOVA (Akademiia Nauk SSSR, Institut Khimicheskoi Fiziki, Moscow, USSR) Akademiia Nauk SSSR, Izvestiia, Seriia Biologicheskaia (ISSN 0002-3329), Nov.-Dec. 1984, p. 894-900. In Russian. refs

A85-18274
THE EFFECT OF A CONSTANT MAGNETIC FIELD ON SNAIL EMBRYOGENESIS [DEISTVIE POSTOIANNOGO MAGNITNOGO POLIA NA EMBRIOGENEZ VINOGRADNOI ULITKI]
I. S. ZAKHAROV, P. M. BALABAN, and A. N. KUZNETSOV (Nauchno-Issledovatel'skii Institut po Biologicheskim Ispytaniiam Khimicheskikh Soedinenii, Kupavna, USSR) Akademiia Nauk SSSR, Izvestiia, Seriia Biologicheskaia (ISSN 0002-3329), Nov.-Dec. 1984, p. 942-945. In Russian. refs

A85-18432
INDUCED MODIFICATIONS AND TEMPERATURE RISES IN THE LASER IRRADIATION OF WHOLE BIOLOGICAL SPECIMENS IN VIVO
G. DELFINO, M. KEMALI (CNR, Istituto di Cibernetica, Naples, Italy), S. MARTELLUCCI (Roma II, Universita, Rome, Italy), and J. QUARTIERI (CNR, Istituto di Cibernetica; Napoli, Universita, Naples, Italy) IEEE Journal of Quantum Electronics (ISSN 0018-9197), vol. QE-20, Dec. 1984, p. 1489-1496. refs

A85-18433
HIGH INTENSITY EFFECTS IN BIOLOGICAL AND MEDICAL SAMPLES
A. J. DAGEN (Perkin-Elmer Corp., Danbury, CT), R. R. ALFANO (City College, New York, NY), and C. E. SWENBERG (U.S. Armed Forces Radiobiology Research Institute, Bethesda, MD) IEEE Journal of Quantum Electronics (ISSN 0018-9197), vol. QE-20, Dec. 1984, p. 1496-1501. refs

The Paillotin-Swenberg exciton annihilation theory is described in detail and computer-generated curves of fluorescence kinetics and quantum yield are presented for a variety of energy migration

domains and source intensities. These curves should be valuable to those attempting to ascertain if bimolecular processes are occurring in their biological and medical samples under photoexcitation. C.D.

A85-18902
CIRCULATION AND ACID-BASE BALANCE IN EXERCISING GOATS AT DIFFERENT BODY TEMPERATURES
G. FEISTKORN, A. NAGEL, and C. JESSEN (Giessen, Universitaet, Giessen, West Germany) Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol. 57, Dec. 1984, p. 1655-1661. Sponsorship: Deutsche Forschungsgemeinschaft. refs
(Contract DFG-JE-57/8-4)

The present investigation is concerned with the determination of overall cardiovascular responses and changes of acid-base balance in response to clamped levels of body temperature between 39 and 42 C at constant prolonged exercise (1 h) of moderate intensity (work rate 1.2 W/kg). Two goats were equipped with heat exchangers and trained to run a treadmill while various variables of thermoregulatory effector activity, circulatory function, and acid-base balance were measured. The obtained results support the hypothesis that in a virtually nonsweating species, the stress imposed on the circulatory system by perfusion of heat-loss effector tissues is relatively small. In the current study the combined demands of prolonged moderate exercise and severe hyperthermia on circulation were met without any signs of imminent circulatory failures. This points to the importance of regional adjustments of blood flow in economizing the circulatory response. G.R.

A85-18906
HYPOXIC INSOMNIA - EFFECTS OF CARBON MONOXIDE AND ACCLIMATIZATION
J. R. PAPPENHEIMER (Harvard University, Boston, MA) Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol. 57, Dec. 1984, p. 1696-1703. Research supported by the American Heart Association. refs
(Contract NIH-5-R01-HL-29556)

A description is given of experiments which were designed to determine whether hypoxic insomnia is mediated reflexly by peripheral O2 receptors. Two approaches to the problem are explored. In one series of experiments the daytime sleep of rats is analyzed during exposure to CO in concentrations sufficient to produce moderate cerebral hypoxia without stimulation of breathing via peripheral O2 sensors. In a second set of experiments sleep was analyzed during acclimatization to hypoxia with continued stimulation of peripheral O2 receptors over a period of weeks. The conducted experiments show that peripheral chemoreceptors mediating respiratory responses to low O2 are not involved in hypoxic insomnia. Sleep was severely disrupted by CO without detectable effects on respiratory frequency or pulmonary ventilation. G.R.

A85-18908
REDUCTION OF CHRONIC HYPOXIC PULMONARY HYPERTENSION IN THE RAT BY BETA-AMINOPROPIONITRILE
J. S. KERR, D. J. RILEY, M. M. FRANK, R. L. TRELSTAD, and H. M. FRANKEL (New Jersey, University of Medicine and Dentistry; Rutgers University, New Brunswick, NJ) Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol. 57, Dec. 1984, p. 1760-1766. refs
(Contract NIH-HL-24264; NIH-HL-00443)

The present study is concerned with the contribution of excess vascular connective tissue to pulmonary hypertension, taking into account experiments in which beta-aminopropionitrile (BAPN) was administered to rats exposed to chronic hypoxia. Measurements were conducted of the effect of BAPN on the amount of collagen in the pulmonary artery and cardiac ventricles and on the morphological changes in the pulmonary vascular bed induced by chronic hypoxia. The experiments confirmed that chronic alveolar hypoxia produces pulmonary hypertension and right ventricular hypertrophy in the rat. It is concluded that the hypertension was related to altered structural changes of the pulmonary vascular bed. G.R.

A85-18909
NONUNIFORM BRAIN BLOOD FLOW RESPONSE TO HYPOXIA IN UNANESTHETIZED CATS
J. A. NEUBAUER and N. H. EDELMAN (New Jersey, University of Medicine and Dentistry; Rutgers University, New Brunswick, NJ) Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol. 57, Dec. 1984, p. 1803-1808. refs
(Contract NIH-HL-16022)

In the present investigation, the regional brain blood flow response to hypoxia in awake cats was determined. It was found that the blood flow response within the brain was not uniform. There was a significantly greater increase in the blood flow to the medulla and pons than to the cortex. A test was conducted regarding the hypothesis that regional variations in the brain blood flow response to hypoxia of unanesthetized animals was related to the known differences in density of adrenergic nerve terminals in the larger vessels of the brain. The data obtained suggest that differential sympathetic innervation can explain the nonuniform response of the brain vasculature to hypoxia. G.R.

A85-18911
TEMPERATURE REGULATION DURING TREADMILL EXERCISE IN THE RAT
F. G. SHELLOCK (Cedars-Sinai Medical Center, Los Angeles, CA) and S. A. RUBIN (California, University, Los Angeles, CA) Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol. 57, Dec. 1984, p. 1872-1877. refs

The present investigation is concerned with the colonic and tail-skin temperature response in rats performing treadmill exercise in ambient temperatures above and below their thermoneutral zone to determine the relationship between colonic temperature and exercise intensity comparing incremental vs single-stage exercise. Attention is also given to the conditions in which rats can achieve thermal equilibrium, and the ability of rats to regulate colonic temperature using the tail as the primary thermal effector organ. Agreement was found to within 0.1 C between colonic and either right atrial or carotid artery blood temperatures. Tail-skin temperature was variable at rest and during exercise. G.R.

A85-18982
AUTOMATED ANALYSIS OF BRAIN CORTICES WITH THE HELP OF A TELEVISION IMAGE ANALYZER [AVTOMATIZIROVANNYI ANALIZ KORY GOLOVNOGO MOZGA S POMOSHCH'IU TELEVIZIONNOGO ANALIZATORA IZOBRAZHENIIA]
V. V. ISTOMIN and M. I. SHKLIAROV (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Zhurnal Nevropatologii i Psikhiatrii imeni S. S. Korsakova (ISSN 0044-4588), vol. 84, no. 7, 1984, p. 969-974. In Russian. refs

A85-18983
MORPHOLOGICAL REORGANIZATION IN THE BRAIN CAUSED BY THE REDUCTION OF CATECHOLAMINE LEVELS [MORFOLOGICHESKIE PERESTROIKI V GOLOVNOM MOZGE, VYZVANNYE SNIZHENIEM UROVNIA KATEKHOLAMINOV]
V. A. OTELLIN, R. P. KUCHERENKO, E. G. GILEROVICH, I. P. USOVA, L. A. FEDOSIKHINA, I. P. GRIGOREV, and A. A. NEOKESARIISKII (Akademiia Meditsinskikh Nauk SSSR, Leningrad, USSR) Zhurnal Nevropatologii i Psikhiatrii imeni S. S. Korsakova (ISSN 0044-4588), vol. 84, no. 7, 1984, p. 978-981. In Russian. refs

A85-18984
ULTRASTRUCTURAL CHARACTERISTICS OF CHANGES IN THE TISSUE OF THE CEREBRAL CORTEX IN RESPONSE TO AGING [UL'TRASTRUKTURNYE OSOBENNOSTI IZMENENIIA TKANI KORY GOLOVNOGO MOZGA PRI STARENII]
N. I. PAVLOVSKAIA (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Zhurnal Nevropatologii i Psikhiatrii imeni S. S. Korsakova (ISSN 0044-4588), vol. 84, no. 7, 1984, p. 981-987. In Russian. refs

A microscopic analysis was performed in order to study the effects of aging on tissue taken from the visual, sensorimotor and temporal regions of the brains of seven rats (aged 30-35 months). It is shown that the process of aging is characterized polymorphic structural changes which occur at variable rates. The sensorimotor cortical region experienced the most pronounced destructive changes. The process of aging generally was expressed by alterations in the protein-synthesizing apparatus of the cells. Destructive changes in the neuronal tissue were paralleled by compensatory adaptive reactions and were expressed in an increase in the amount of a particular type of cell organelle and in the formation of various types of contacts between neurons and other cortical structures. I.H.

A85-18985
CHANGES IN THE ULTRASTRUCTURE OF THE HYPOTHALAMUS IN RESPONSE TO AGING [IZMENENIIA UL'TRASTRUKTURY GIPOTALAMUSA PRI STARENII]
L. B. VERBITSKAIA and N. N. BOGOLEPOV (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Zhurnal Nevropatologii i Psikhiatrii imeni S. S. Korsakova (ISSN 0044-4588), vol. 84, no. 7, 1984, p. 987-993. In Russian. refs

Changes in the fine structure of the neurons and synapses of the paraventricular nucleus of the hypothalamus were observed in a microscopic examination of the brains of six rats of advanced ages. It is found that the dendrites were particularly susceptible to the effects of age, and that fine structural changes in neurons were first observable in the mitochondria. Although chromatolytic changes predominated in the majority of the hypothalmic neurons, hyperchronic changes were also observed. Nucleoli and nucleoliform formations of the cytoplasm are found to be the least age-sensitive components of the neuronal system. I.H.

A85-18986
GROWTH CHANGES IN THE EPENDYMA AND EPITHELIUM OF THE VASCULAR PLEXUSES OF THE CEREBRAL VENTRICLES [VOZRASTNYE IZMENENIIA EPENDIMY I EPITELIIA SOSUDISTYKH SPLETENII ZHELUDOCHKOV MOZGA]
A. I. KIKTENKO (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Zhurnal Nevropatologii i Psikhiatrii imeni S. S. Korsakova (ISSN 0044-4588), vol. 84, no. 7, 1984, p. 993-997. In Russian. refs

A85-18987
THE HISTOCHEMICAL CHARACTERISTICS OF THE VASCULOCAPILLARY BED IN THE BRAIN IN RESPONSE TO AGING AND ATHEROSCLEROSIS [GISTOKHIMICHESKAIA KHARAKTERISTIKA SOSUDISTO-KAPILLIARNOGO RUSLA GOLOVNOGO MOZGA PRI STARENII I ATEROSKLEROZE]
V. M. CHERTOK and N. V. MIROSHNICHENKO (Vladivostokskii Meditsinskii Institut, Vladivostok, USSR) Zhurnal Nevropatologii i Psikhiatrii imeni S. S. Korsakova (ISSN 0044-4588), vol. 84, no. 7, 1984, p. 997-1000. In Russian. refs

Brain capillary function was studied in clinically healthy subjects aged 22-64 years, in animals, and individuals aged 45-64 with mild atherosclerosis in the vicinity of the median cerebral artery. Circulation was observed using injections of alkaline phosphatase. It is shown that unlike 'normal' people, patients with atherosclerosis between 45 and 64 years of age show an increase in the volume of deposited blood in the case of a reduction of the working surface of brain capillaries. The average indices of alkaline phosphatase activity indicated a considerable diminution (21.5-23.5 percent) in the intensity of metabolic processes. I.H.

A85-18996
GLUCOCORTICOIDS IN THE REGULATION OF THE METABOLISM AND THE FUNCTION OF THE MYOCARDIUM [GLIUKOKORTIKOIDY V REGULIATSII METABOLIZMA I FUNKTSII MIOKARDA]
P. K. KYRGE (Tartuskii Gosudarstvennyi Universitet, Tartu, Estonian SSR) Uspekhi Sovremennoi Biologii (ISSN 0042-1324), vol. 97, May-June 1984, p. 384-398. In Russian. refs

It is suggested that, owing to specific receptors, glucocorticoids (GCCs) affect RNA and protein induction, although their influence on the synthesis of certain regulatory proteins of the myocardium has been demonstrated only indirectly. The role of GCCs in the regulation of the metabolism and the function of the myocardium is most pronounced during physical exercise in which the heart works with maximum power. GCCs have not only a direct effect on the myocardial metabolism and function but also a certain permissive effect, necessary to achieve the positive inotropic effect of catecholamines. The possible mechanism underlying this permissive effect is discussed. B.J.

A85-18998
TOLERANCE TO AUTOANTIGENS AND AUTOIMMUNITY [TOLERANTNOST' K AUTOANTIGENAM I AUTOIMMUNITET]
V. V. ENDOLOV and N. G. ARTSIMOVICH (Riazanskii Meditsinskii Institut, Ryazan, USSR; Nauchno-Issledovatel'skii Institut po Biologicheskim Ispytaniiam Khimicheskikh Soedinenii, Staraya Kupavna, USSR) Uspekhi Sovremennoi Biologii (ISSN 0042-1324), vol. 97, May-June 1984, p. 426-434. In Russian. refs

Various mechanisms for the formation and elimination of natural immunological tolerance to autoantigens in multicellular organisms are examined. The role of serum blocking factors and suppressor cells in the maintenance and elimination of such tolerance is assessed. Autoimmune processes are considered as a loss of natural tolerance. B.J.

A85-18999
THE ENDOCRINE FUNCTION OF THE THYMUS AND ITS CONNECTION WITH OTHER INTERNAL-SECRETION GLANDS [ENDOKRINNAIA FUNKTSIIA TIMUSA I EGO SVIAZ' S DRUGIMI ZHELEZAMI VNUTRENNEI SEKRETSII]
V. M. CHESNOKOVA, L. N. IVANOVA, and E. V. GRUNTENKO (Akademiia Nauk SSSR, Institut Tsitologii i Genetiki, Novosibirsk, USSR) Uspekhi Sovremennoi Biologii (ISSN 0042-1324), vol. 97, May-June 1984, p. 435-446. In Russian. refs

An analysis is made of data concerning the endocrine properties of the thymus, and a number of thymus polypeptides, possessing hormonal functions, are described. The relationship between the thymus and the endocrine organs in the course of the whole period of ontogeny is described, and the role of the thymus in the formation of the specific functional status of the internal-secretion glands at the early stages of development is characterized in detail. Particular consideration is given to the relationship between the thymus and the hypophyseal-adrenal system and the hypophyseal-gonadal complex. B.J.

A85-19007
THE EFFECT OF AN ARTIFICIAL ALPINE CLIMATE ON THE DEVELOPMENT OF PNEUMOCONIOSIS AND CATECHOLAMINE CONTENT IN THE DRENAL GLANDS OF WHITE RATS [VLIIANIE ISKUSSTVENNOGO GORNOGO KLIMATA NA RAZVITIE PNEVMOKONIOZA I SODERZHANIE KATEKHOLAMINOV V NADPOCHECHNIKAKH BELYKH KRYS]
N. V. GRIDNEVA (Donetskii Meditsinskii Institut, Donetsk, Ukrainian SSR) Gigiena Truda i Professional'nye Zabolevaniia (ISSN 0016-9919), April 1984, p. 22-26. In Russian. refs

The combined effects of hypobaric hypoxia, negative aeroionization and UV radiation on the development of pneumoconiosis and on catecholamine content in the adrenal glands of white rats were studied experimentally. Coal rock dust was administered intratracheally in order to induce slowly progressive nodular pneumoconiosis and accompanying changes in catecholamine content. A month after inhalation of the dust, a 20-day course of adaptation to intermittent hypoxia (-0.5 ata) was

undertaken and the animals were exposed to negative aeroionization and increased UV radiation. It is found that the increased UV radiation inhibited the development of fibrosis and promoted the expulsion of the dust from the lungs. Sympathoadrenal activity was normalized as a result of increased UV radiation. The procedure is recommended as an effective means of preventing pneumoconiosis. I.H.

A85-19009
AN EXPERIMENTAL STUDY OF THE EFFECT OF VIBRATION ON THE REPRODUCTIVE FUNCTION [DEISTVIE VIBRATSII NA REPRODUKTIVNUIU FUNKTSIIU V EKSPERIMENTE]
D. V. BALICHIEVA and G. S. POLTANOVA (Institut Sanitarii, Gigieny i Professional'nykh Zabolevanii, Tashkent, Uzbek SSR) Gigiena Truda i Professional'nye Zabolevaniia (ISSN 0016-9919), May 1984, p. 32-34. In Russian. refs

A85-19010
EXPERIMENTAL STUDY OF THE ROLE OF HISTAMINE IN HEAT-STROKE PATHOLOGY [GISTAMIN V PATOLOGII OSTROGO PEREGREVANIIA, V EKSPERIMENTE]
S. M. SHCHABLENKO and L. L. FILIPCHENKO (Institut Gigieny Truda i Profzabolevanii, Krivoi Rog, Ukrainian SSR) Gigiena Truda i Professional'nye Zabolevaniia (ISSN 0016-9919), June 1984, p. 36, 37. In Russian.

Experiments performed on rabbits showed that histamine plays a definite role in the formation of microcirculatory disorders during heat stroke. This is manifested in the intensifying effect of administered histamine on the degree of circulatory disorder in the internal organs, as well as in pronounced dystrophic changes in the parenchymatous organs of animals that received dimedrol before exposure to heat. The results indicate that antihistamines can be used as part of the treatment of heat stroke. B.J.

A85-19013
REGULATION OF THE LEVEL OF TOXIC SUBSTANCES IN THE AIR OF A WORK AREA WHEN THEIR EFFECT IS COMBINED WITH THE EFFECTS OF GENERAL VARIATION AND ACCOMPANYING NOISE [O REGLAMENTIROVANII UROVNIA TOKSICHNYKH VESHCHESTV V VOZDUKHE RABOCHEI ZONY PRI SOCHETANNOM DEISTVII IKH S OBSHCHEI VIBRATSIEI I SOPUTSTVUIUSHCHIM SHUMOM]
R. IA. SHTERENGARTS (Institut Zheleznodorzhnoi Gigieny, Moscow, USSR) Gigiena Truda i Professional'nye Zabolevaniia (ISSN 0016-9919), May 1984, p. 40-42. In Russian. refs

A85-19015
LOCAL AND SKIN-RESORPTIVE EFFECT OF CHEMICAL SUBSTANCES USED IN THE PRODUCTION OF CHLOROPRENE RUBBER FROM BUTADIENE IN AN EXPERIMENT [MESTNOE I KOZHNO-REZORBTIVNOE DEISTVIE KHIMICHESKIKH VESHCHESTV, PRIMENIAIUSHCHIKHSIA V PROIZVODSTVE KHLOROPRENOVOGO KAUCHUKA IZ BUTADIENA, V EKSPERIMENTE]
F. R. PETROSIAN and M. S. GIZHLARIAN (Nauchno-Proizvodstvennoe Ob'edinenie Nairit, Yerevan, Armenian SSR) Gigiena Truda i Professional'nye Zabolevaniia (ISSN 0016-9919), April 1984, p. 51-53. In Russian. refs

A85-19016
A DETERMINATION OF HEART SIZE IN EXPERIMENTAL ANIMALS USING NUCLEAR-MAGNETIC-RESONANCE TOMOGRAPHY [OPREDELENIE RAZMEROV SERDTSA EKSPERIMENTAL'NYKH ZHIVOTNYKH S POMOSHCH'IU TOMOGRAFII, OSNOVANNOI NA PRINTSIPE IADERNOGO MAGNITNOGO REZONANSA]
IU. N. BELENKOV, N. I. AFONSKAIA, T. S. PUSTOVITOVA, N. V. DEMIN, I. D. FEDINA, E. A. KNORIN, and V. I. KRUTSKIKH (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Kardiologiia (ISSN 0022-9040), vol. 24, June 1984, p. 16-18. In Russian. refs

A85-19017
THE PREVENTION OF MYOCARDIAL CONTRACTILITY DISORDERS UNDER STRESS BY PRELIMINARY ADAPTATION OF ANIMALS TO EXERCISE [PREDUPREZHDENIE NARUSHENII SOKRATITEL'NOI FUNKTSII SERDECHNOI MYSHTSY PRI STRESSE S POMOSHCH'IU PREDVARITEL'NOI ADAPTATSII ZHIVOTNYKH K FIZICHESKOI NAGRUZKE]
F. Z. MEERSON (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) and A. I. SAULIA (Kishinevskii Meditsinskii Institut, Kishinev, Moldavian SSR) Kardiologiia (ISSN 0022-9040), vol. 24, June 1984, p. 19-23. In Russian. refs

Myocardial contractility response to emotional-painful stress (EPS) was studied experimentally in rats adapted to exercise through a regimen of daily swimming (1 hr per day for thirty days). It is shown that EPS decreases the amplitude and the rate of contractions and relaxations of the isolated papillary muscles by 2-3 times, and also reduces myocardial resistance to excesses of Na(+) and H(+) ions. Adaptation to exercise was found to exert the opposite effect by limiting the stress-related reduction in muscle contractility and increasing the resistance to excesses of Na(+) and H(+) ions. Preliminary adaptation to exercise is recommended for the prevention of stress-related cardiac contractility disorders. I.H.

A85-19022
VARIATIONS OF THE ELECTRICAL CHARACTERISTICS OF MEMBRANES IN STATES OF 'STRESS' [FLUKTUATSII ELEKTRICHESKIKH KHARAKTERISTIK MEMBRANY V 'STRESSOVYKH' SOSTOIANIIAKH]
V. N. AKIMOV, V. M. KIM, and A. M. PIATNITSKII (II Moskovskii Gosudarstvennyi Meditsinskii Institut, Moscow, USSR) Biofizika (ISSN 0006-3029), vol. 29, May-June 1984, p. 430-434. In Russian. refs

The general scheme for calculating current and voltage fluctuations in states of stress developed by Akimov et al. (1984) is applied to a theoretical model of membrane processes using current experimental data. Spectra are obtained for the extreme conditions of current and voltage fixation. Estimates of the current fluctuation dispersion and surface viscosity coefficient are given. I.H.

A85-19023
AN INVESTIGATION OF THE RELAXATION OF NONEQUILIBRIUM HEMOGLOBIN STATES BY MOESSBAUER SPECTROSCOPY [ISSLEDOVANIE RELAKSATSII NERAVNOVESNYKH SOSTOIANII GEMOGLOBINA METODOM GR-SPEKTROSKOPII]
V. E. PRUSAKOV, R. A. STUKAN, and R. M. DAVYDOV (Akademiia Nauk SSSR, Institut Khimicheskoi Fiziki, Moscow, USSR) Biofizika (ISSN 0006-3029), vol. 29, May-June 1984, p. 359-364. In Russian. refs

The nonequilibrium hemoglobin states induced by low-temperature (77 K) reduction of MetHb and HbO2 derivatives following electron bombardment were analyed by Moessbauer spectroscopy. Relaxation of the nonequilibrium states was observed upon heating. The correlations between relaxation temperatures and changes in the dynamic structure of the proteins are described on the basis of the spectroscopic data. The observed spectra of the samples are reproduced in graphic form. I.H.

A85-19024
MATHEMATICAL MODELING OF THE EFFECT OF GLUTOCORTICOIDS ON THE MOTION AND THE PROLIFERATION KINETICS OF MAMMALIAN LYMPHOCYTES [MATEMATICHESKOE MODELIROVANIE VLIIANIIA GLIUKOKORTIKOIDOV NA DVIZHENIE I KINETIKU PROLIFERATSII LIMFOTSITOV MLEKOPITAIUSHCHEGO]
N. V. STEPANOVA and T. V. FEOFANOVA (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR) Biofizika (ISSN 0006-3029), vol. 29, May-June 1984, p. 459-464. In Russian. refs

A85-19043
THE SPATIAL ORGANIZATION OF THE MICROCIRCULATORY BED AND ORGAN-TISSUE FUNCTIONAL ELEMENTS OF THE MYOCARDIUM [PROSTRANSTVENNAIA ORGANIZATSIIA MIKROTSIRKULIATORNOGO RUSLA I ORGANNO-TKANEVYKH FUNKTSIONAL'NYKH ELEMENTOV MIOKARDA]
A. S. GAVRISH (Kievskii Nauchno-Issledovatel'skii Institut Kardiologii, Kiev, Ukrainian SSR) Arkhiv Anatomii, Gistologii i Embriologii (ISSN 0004-1947), vol. 87, July 1984, p. 36-42. In Russian. refs

A85-19044
PROTEIN TRANSPORT PATHWAYS FROM THE SYSTEM OF BRONCHIAL VESSELS TO THE LUNGS [PUTI TRANSPORTA BELKA V LEGKIKH IZ SISTEMY BRONKHIAL'NYKH SOSUDOV]
N. A. BELIAKOV, V. B. SERIKOV, and D. N. CHERNIAKOVA (Leningradskii Gosudarstvennyi Institut Usovershenstvovaniia Vrachei; Vsesoiuznyi Nauchno-Issledovatel'skii Institut Pul'monologii, Leningrad, USSR) Arkhiv Anatomii, Gistologii i Embriologii (ISSN 0004-1947), vol. 86, June 1984, p. 42-48. In Russian. refs

A85-19045
THE STRUCTURE OF THE RAT THYROID GLAND UNDER HYPOKINESIA AND AFTER ITS REMOVAL [STRUKTURA SHCHITOVIDNOI ZHELEZY KRYSY PRI GIPOKINEZII I POSLE EE USTRANENIIA]
G. R. MYNZHANOVA (I Leningradskii Meditsinskii Institut, Leningrad, USSR; Semipalatinskii Meditsinskii Institut, Semipalatinsk, Kazakh SSR) Arkhiv Anatomii, Gistologii i Embriologii (ISSN 0004-1947), vol. 86, June 1984, p. 48-58. In Russian. refs

A85-19046
AGE CHANGES IN SUCCINATE DEHYDROGENASE ACTIVITY IN FUNCTIONALLY DIFFERENT YOUNG RAT MUSCLES [VOZRASTNYE IZMENENIIA AKTIVNOSTI SUKTSINATDEGIDROGENAZY V FUNKTSIONAL'NO RAZLICHNYKH MYSHTSAKH U MOLODYKH KRYS]
I. P. REKHACHEVA, I. N. SAPRONENKOVA, S. V. CHUFARINA, V. V. NOVIKOVA, and S. IU. KOZHINA (I Leningradskii Meditsinskii Institut, Leningrad, USSR) Arkhiv Anatomii, Gistologii i Embriologii (ISSN 0004-1947), vol. 87, July 1984, p. 79-82. In Russian. refs

Measurements were made of succinate dehydrogenase (SD) activity in the muscle fibers of rats (ages 60 to 105 days), in order to determine the degree of variation in activity in relation to age and muscle function. It is found that changes in SD activity continued to occur after sexual maturation in three different types of muscle fiber: antigravitational m. triceps brachii; m. triceps brachialis; and m. serratus ventralis. It is suggested that differentiation in muscle fibers continues after sexual maturation and that it acts to stimulate specialization of muscle functions. No distinct boundaries were found between each period of SD activity. Histochemical changes in muscle fibers are found to occur most slowly under continuous static loads and are most pronounced when static and kinetic loads are combined. I.H.

A85-19047
CHANGES IN THE STRUCTURAL COMPONENTS OF THE THYMUS AT VARIOUS LEVELS OF ADAPTATION TO PHYSICAL LOADS [IZMENENIE STRUKTURNYKH KOMPONENTOV VILOCHKOVOI ZHELEZY PRI RAZLICHNOI STEPENI ADAPTATSII ORGANIZMA K FIZICHESKIM NAGRUZKAM]
M. G. TKACHUK (Leningradskii Gosudarstvennyi Institut Fizicheskoi Kul'tury, Leningrad; Akademiia Meditsinskikh Nauk SSSR, Institut Morfologii Cheloveka, Moscow, USSR) Arkhiv Anatomii, Gistologii i Embriologii (ISSN 0004-1947), vol. 86, May 1984, p. 80-84. In Russian. refs

A85-19048
RADIOSENSITIZING AND DAMAGING EFFECT OF HYPERTHERMIA ON VARIOUS BIOLOGICAL SYSTEMS - RADIOSENSITIZING AND DAMAGING EFFECT OF HYPERTHERMIA ON THE HEMOPOIETIC STEM CELLS OF MICE [RADIOSENSIBILIZIRUIUSHCHEE I POVREZHDAIUSHCHEE DEISTVIE GIPERTERMII NA RAZLICHNYE BIOLOGICHESKIE SISTEMY: RADIOSENSIBILIZIRUIUSHCHEE I POVREZHDAIUSHCHEE DEISTVIE GIPERTERMII NA STVOLOVYE KROVETVORNYE KLETKI MYSHEI]
A. G. KONOPLIANNIKOV, O. A. KONOPLIANNIKOVA, A. I. TRISHKINA, and L. V. SHTEIN (Akademiia Meditsinskikh Nauk SSSR, Nauchno-Issledovatel'skii Institut Meditsinskoi Radiologii, Obninsk, USSR) Radiobiologiia (ISSN 0033-8192), vol. 24, May-June 1984, p. 325-329. In Russian. refs

A85-19049
RADIATION-INDUCED CHANGES IN THE CRITICAL ORGANS OF RATS IRRADIATED IN A STATE OF PARABIOSIS [RADIATSIONNYE IZMENENIIA V KRITICHESKIKH ORGANAKH U KRYS, OBLUCHENNYKH V SOSTOIANII PARABIOZA]
S. I. TIMOSHENKO, A. V. BOGATYREV, N. G. NIKANOROVA, T. V. PUSHKAREVA, and G. I. KALMYKOVA (Akademiia Nauk SSSR, Leningradskii Institut Iadernoi Fiziki, Leningrad, USSR) Radiobiologiia (ISSN 0033-8192), vol. 24, May-June 1984, p. 400-403. In Russian. refs

A85-19050
PATTERN OF CHANGE IN THE MINERAL COMPONENT OF BONE DURING FRACTURE [DINAMIKA IZMENENIIA MINERAL'NOGO KOMPONENTA KOSTI PRI PERELOMAKH]
A. A. SVESHNIKOV and N. V. OFITSEROVA (Kurganskii Nauchno-Issledovatel'skii Institut Eksperimental'noi Klinicheskoi Ortopedii i Travmatologii, Kurgan, USSR) Patologicheskaia Fiziologiia i Eksperimental'naia Terapiia (ISSN 0031-2991), May-June 1984, p. 53-57. In Russian. refs

A85-19057
HYGIENIC ASSESSMENT OF THE BIOLOGICAL EFFECT OF NONIOZING RADIATION ACCORDING TO AN IMMUNOLOGICAL CRITERION OF HARMFULNESS [O GIGIENICHESKOM NORMIROVANII BIOLOGICHESKOGO DEISTVIIA NEIOIZIRUIUSHCHIKH IZLUCHENII PO IMMUNOLOGICHESKOMU KRITERIIU VREDNOSTI]
G. V. BATANOV and S. I. TRIFONOV Gigiena i Sanitariia (ISSN 0016-9900), July 1984, p. 52-56. In Russian. refs

A85-19058
IS AN INTEGRAL EVALUATION OF FATIGUE POSSIBLE? [VOZMOZHNA LI INTEGRAL'NAIA OTSENKA UTOMLENIIA?]
V. V. ROZENBLAT (Ural'skii Lesotekhnicheskii Institut, Sverdlovsk, USSR) Gigiena i Sanitariia (ISSN 0016-9900), July 1984, p. 58, 59. In Russian. refs

A recent debate in the Soviet literature concerning the possibility of an integral evaluation of fatigue is critically commented on, with particular emphasis given to the paper of Kutsenko et al. (1982) citing arguments in favor of such a possibility and to Prokhorov's (1983) critical remarks concerning the paper of Kutsenko et al. The present review tends to support the direction outlined by Kutsenko et al. B.J.

A85-19064
METHIONINUM - A DRUG FOR THE POSSIBLE PREVENTION OF THE REMOTE CONSEQUENCES OF IRRADIATION [METIONIN - VOZMOZHNOE SREDSTVO PROFILAKTIKI OTDALENNYKH POSLEDSTVII OBLUCHENIIA]
G. I. MIRETSKII, E. V. DANETSKAIA, M. N. TROITSKAIA, and P. V. RAMZAEV (Ministerstvo Zdravookhraneniia RSFSR, Leningradskii Nauchno-Issledovatel'skii Institut Radiatsionnoi Gigieny, Leningrad, USSR) Gigiena i Sanitariia (ISSN 0016-9900), July 1984, p. 83-85. In Russian. refs

Experiments carried out on white male rats were used to investigate the effect of an excess of methioninum in the diet on

the appearance and development of tumors induced by chronic internal irradiation from a mixture of Cs-137 and Sr-90. Methioninum was found to inhibit the appearance and development of tumors induced in this way and to extend the lifetime of animals subjected to chronic internal irradiation. The prolonged administration of this drug was not found to have any adverse effect on the animals.
B.J.

N85-14424 Harvard Univ., Cambridge, Mass.
OXYGEN DELIVERY DURING EXERCISE: LIMITATIONS TO MAXIMUM FLOW Ph.D. Thesis
R. H. KARAS 1984 154 p
Avail: Univ. Microfilms Order No. DA8419451

A comparative approach has been utilized to address questions of system limitations to maximal rates of oxygen flow during exercise. By combining structural and functional measurements, a mechanistic analysis was performed of factors involved in transporting oxygen from the lungs to the working muscle in four species of animals at exercise intensities ranging from standing quietly on the treadmill to running at speeds which elicit maximum oxygen consumptions. The four species of animals chosen for study (Dogs, Goats, Ponies and Cattle) represent two size classes. One member of each size class is highly specialized for aerobic work and one member is not. It was found that animals increase the delivery of oxygen with increasing exercise intensity primarily by increasing cardiac output (due to an increase in heart rate and a decrease in total peripheral resistance) and that the highly aerobic animals have higher maximal rates of oxygen delivery by virtue of their relatively higher cardiac outputs (due to larger stroke volume) and their higher hematocrits. Dissert. Abstr.

N85-14425# European Space Agency, Paris (France).
LIFE SCIENCES RESEARCH IN SPACE
N. LONGDON, comp. and O. MELITA, comp. Aug. 1984 307 p refs Partly in ENGLISH and FRENCH Proc. of 2nd European Symp., Porz Wahn, West Germany, 4-6 Jun. 1984
(ESA-SP-212; ISSN-0379-6566) Avail: NTIS HC A14/MF A01

Spaceborne research in cell and developmental biology; plant biology bioprocessing radiobiology cardiovascular/respiratory system musculoskeletal systems vestibular and sensorimotor systems and body fluid metabolisms was discussed.

N85-14426# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Inst. for Aerospace Medicine.
SPACELAB MISSION D1 FROG STATOLITH EXPERIMENT STATEX: HARDWARE FAMILY AND EXPERIMENT OPERATIONAL SEQUENCE
J. NEUBERT, A. SCHATZ, and W. BRIEGLEB *In* ESA Life Sci. Res. in Space p 9-12 Aug. 1984 refs
Avail: NTIS HC A14/MF A01

The sample container, stowage locker insert, and temperature chamber of the Spacelab Frog Statolith Experiment (STATEX) are described. The experiment studies the differentiation and morphology of vertebrate gravity sensory organs in near weightlessness with frog embryos and tadpoles. The sample container has a 40 to 60% O2/N2 atmosphere with 100% humidity and a centrifuge. After the experiment the container is cooled to 10 C, to slow down specimen metabolism in the stowage locker. The temperature chamber maintains the samples at 20 C for the 160 hr of the experiments, using a system based on Peletier elements. The STATEX hardware can be used for non-biology experiments, e.g., in fluid physics. Author (ESA)

N85-14427# Hubrecht Lab., Utrecht (Netherlands).
AN AUTOMATIC DEVICE FOR AMPHIBIAN EGG FERTILIZATION IN SPACE: TECHNICAL ASPECTS AND BIOLOGICAL REQUIREMENTS
T. G. BROM, G. A. UBBELS, and H. P. WILLEMSEN (Centrum voor Constructie en Mechanisatie, Nuenen, Netherlands) *In* ESA Life Sci. Res. in Space p 13-17 Aug. 1984 refs Sponsored by Netherlands Agency for Aerospace Programs
Avail: NTIS HC A14/MF A01

An experiment container for Xenopus laevis testes and eggs was developed for a Spacelab experiment to investigate whether amphibian eggs can be fertilized under microgravity conditions; and to investigate the role of gravity in the establishment of the dorso-ventral axis in the developing embryo. Testes and eggs are kept separate for 18 to 22 hr until the start of the experiment. Fertilization and embryonic development take place in the container. The mechanical functions of the automatic container are discussed, as well as the internal conditions important for the biological material, such as biocompatibility of the materials, composition of storage and culture media, temperature, osmolarity, and pH. Author (ESA)

N85-14428# Eidgenoessische Technische Hochschule, Zurich (Switzerland). Lab. fuer Biochemie.
EXPERIMENT 1ES031 ON SPACELAB 1: ARE CELLS SENSITIVE TO GRAVITY?
A. COGOLI, A. TSCHOPP, and P. FUCHS-BISLIN *In* ESA Life Sci. Res. in Space p 19-22 Aug. 1984 refs Sponsored by Federal Swiss Institutes of Technology Board
(Contract SNSF-3.034-81)
Avail: NTIS HC A14/MF A01

Cultures of human lymphocytes were exposed in microgravity to the mitogen concanavalin A. They show an activation 3% that of ground controls. This result favors a hypothesis, based on simulations at low-g and on experiments at high-g, that microgravity depresses, whereas high-g's enhance cell proliferation rate. The g-effects are particularly strong in cells undergoing differentiation.
Author (ESA)

N85-14429# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Inst. for Aerospace Medicine.
FURTHER CELL BIOLOGY EXPERIMENTS WITH PHYSARUM POLYCEPHALUM FOR A REFLIGHT OF BIORACK
V. SOBICK *In* ESA Life Sci. Res. in Space p 23-25 Aug. 1984 refs
Avail: NTIS HC A14/MF A01

The scientific background, hardware, and operational flow of ESA-Biorack experiment A08/16/D Physarum Kinetics are described. Experiments on the spatial organization, assembly, and disassembly of atomyosin fibrils responsible for the contraction and movement of the slime mold on acceleration effects on mitosis and on the nuclear orientation within the Physarum cell are proposed. Author (ESA)

N85-14430# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Inst. for Aerospace Medicine.
INFLUENCE OF SIMULATED WEIGHTLESSNESS ON THE MOTILITY OF THE ACELLULAR SLIME MOLD PHYSARUM POLYCEPHALUM
I. BLOCK, W. BRIEGLEB, and K. E. WOLFARTH-BOTTERMANN (Bonn Univ.) *In* ESA Life Sci. Res. in Space p 27-30 Aug. 1984 refs
Avail: NTIS HC A14/MF A01

The gravisensitivity of single cells not specialized for the reception of gravity was studied under simulated weightlessness, using slime mold. When simulating 0 g on the fast rotating clinostat, a transient frequency increase in oscillating contraction automaticity and the cytoplasmic shuttle streaming is observed. Changes are also seen in the velocity of the cytoplasmic shuttle streaming. About 20 min after the onset of 0 g the slime mold starts to regulate most of these parameters back to normal values, which

is achieved at the earliest 40 min after the beginning of the 0 g-simulation. During this time the velocity of the shuttle streaming is increasing. Stopping the rotation again induces strong reactions, the most prominent of which is a strong decrease in the velocity of the shuttle streaming. Author (ESA)

N85-14431# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Inst. for Aerospace Medicine.

OBSERVATION OF THE CONTRACTILE VACUOLAR SYSTEM OF PARAMECIUM CAUDATUM ON THE FAST RUNNING CLINOSTAT

R. HEMMERSBACH, W. BRIEGLEB, and A. SCHATZ *In* ESA Life Sci. Res. in Space p 31-34 Aug. 1984 refs

Avail: NTIS HC A14/MF A01

The generality of gravisensitivity in cells was examined by observing the behavior of the contractile vacuolar system of Paramecium caudatum under 1g, then under simulated weightlessness, and again under 1g. The paramecia were mounted between two glass slides using a modified agar method. Only 64% of the 22 measured vacuoles change their respective behavior under simulated 0g. Author (ESA)

N85-14432# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Inst. for Aerospace Medicine.

SPONTANEOUS MOTILITY OF GOLDFISH IN ABSENCE OF TERRESTRIAL ZEITGEBERS: SPACE FLIGHT SIMULATION IN A MINE

D. SEIBT *In* ESA Life Sci. Res. in Space p 35-40 Aug. 1984 refs

Avail: NTIS HC A14/MF A01

The reaction of organisms to the absence of zeitgebers was studied in long term experiments with goldfish in a mine with excellent shielding against natural zeitgeber cycles. Patterns in which the circadian organization is partly obscured or not detectable at all are obtained. The patterns are described as a random sequence resulting from stochastic decisions. The implications and methodological problems of this approach are discussed. Author (ESA)

N85-14433# Paris VI Univ. (France). Lab. de Cytologie et Morphogenese Vegetales.

GRAVITY AND CELL DIFFERENTIATION IN LENTIL ROOTS

G. PERBAL and N. DARBELLEY *In* ESA Life Sci. Res. in Space p 43-46 Aug. 1984 refs

Avail: NTIS HC A14/MF A01

The localization of the functional zones of the root tip (meristem, cell elongation zone, zone of gravitropic curvature) was studied in lentil seedlings. Results show that target cells which react to a 2 hr gravitropic stimulus are located in the distal part of the meristem and in the proximal region of the cell elongation zone. It is shown that the gravitropic curvature occurs in the distal part of the meristem because of early differentiation of the cells in its upper half. In the proximal part of the cell elongation zone, bending occurs because of an inhibition of cell growth in the lower half of the horizontally simulated roots. Mitotic activity and cell differentiation in the primary root can be partly regulated by the mechanism responsible for gravitropic response. Author (ESA)

N85-14434# Aarhus Univ. (Denmark). Inst. of Molecular Biology and Plant Physiology.

PLANT CELL CULTURES IN BIOLOGICAL SPACE EXPERIMENTS

O. S. RASMUSSEN, J. CHRISTIANSEN, R. WYNDAELE, and T. H. IVERSEN (Trondheim Univ., Norway) *In* ESA Life Sci. Res. in Space p 49-51 Aug. 1984 refs

Avail: NTIS HC A14/MF A01

Microgravity environment influences on growth and differentiation and regeneration of tobacco protoplasts and callus tissue were studied. Protoplasts from leaves of Nicotiana sanderae, cv Crimson Bedder were isolated. Aliquote samples were placed in the horizontal axis of a slow or a fast rotating clinostat. After 2, 4, or 6 hr protoplasts are transferred to small petri dishes with nutrient medium. Regeneration of cell walls started after 1 to 3 days and is followed by cell division. In order to induce a delay in growth and differentiation of callus tissue, samples were cooled to 6 and 10 C for 5 weeks, considerably reducing growth. Author (ESA)

N85-14435# Trondheim Univ. (Norway). Dept. of Botany.

THE USE OF HORIZONTAL CLINOSTATS IN STUDIES OF PLANT STATOCYTE DEVELOPMENT

G. SLUPPHAUG and T. H. IVERSEN *In* ESA Life Sci. Res. in Space p 53-59 Aug. 1984 refs

Avail: NTIS HC A14/MF A01

The effect of variations in rotation (2rpm and 50rpm) on growth, gravitropic curvatures, and the ultrastructure of the gravity perceiving cells (statocytes) in cress roots was examined. Growth and gravitropic curvatures in previously stimulated roots are higher after rotation on the fast clinostat. After 20 hr rotation of 24 hr old seedlings on both clinostats, the amyloplasts are found scattered around in the statocytes, the amount of statolith starch decreases in the functional statocytes, and the distal ER-complex disintegrates. The effect is most marked after rotation at 2rpm. Rotation at 2rpm influences cell wall morphology. Author (ESA)

N85-14436# Freiburg Univ. (West Germany). Inst. fuer Biologisches 2.

PLANT RESPONSES TO SOLAR UV-B RADIATION

E. WELLMANN, C. J. BEGGS, B. MOEHLE, U. SCHNEIDER-ZIEBERT, and V. STEINMETZ *In* ESA Life Sci. Res. in Space p 61-66 Aug. 1984 refs

Avail: NTIS HC A14/MF A01

Effects on plants of increased solar UV-B due to reduction of the stratospheric ozone layer are reviewed together with protective systems to minimize damage. Screening, growth delay, DNA repair mechanisms, and protection against free radical species are discussed and their occurrence in plants considered. The importance of UV radiation in natural plant morphogenesis is underlined. Author (ESA)

N85-14437# Universitaire Instelling Antwerpen, Wilrijk (Belgium). Dept. of Biology.

TIMING IN DRY SEEDS

J. P. VERBELEN, E. SPRUYT, and J. A. DEGREEF *In* ESA Life Sci. Res. in Space p 67-72 Aug. 1984 refs Sponsored by NFWO

(Contract FKFO-2.0083.83)

Avail: NTIS HC A14/MF A01

Laboratory experiments proved a rhythmic behavior in growth parameters of etiolated bean seedlings grown in strictly constant conditions. The rhythms are endogenous and the shape of the activity curves cannot be altered by changing the moment of sowing. The ATP-synthesis rate and germination vigor were compared as a function of the moment of the onset of imbibition. For both parameters oscillations with a period approximately equal to that of the activity curves obtained for the parameters formerly studied are recorded. The involvement of environmental factors in the learning and the maintenance of this rhythm is discussed. Author (ESA)

N85-14438# Nijmegen Univ. (Netherlands). Dept. of Biochemistry.

BIOPROCESSING IN SPACE

S. L. BONTING *In* ESA Life Sci. Res. in Space p 75-78 Aug. 1984 refs

Avail: NTIS HC A14/MF A01

The technical, biological, and financial aspects of bioprocessing medical products in space using continuous free-flow electrophoresis (CFE) are discussed. Specifications for a CFE apparatus are suggested. Candidate materials, e.g., erythropoietin for anemia and pancreas beta cells for diabetes, are listed. Author (ESA)

N85-14439*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
BIOPROCESSING IN SPACE
A. TSCHOPP, A. COGOLI, M. L. LEWIS, and D. R. MORRISON *In* ESA Life Sci. Res. in Space p 79-81 Aug. 1984 refs Prepared in cooperation with Eidgenoessische Technische Hochschule, Zurich
(Contract SNSF-3.034-81)
Avail: NTIS HC A14/MF A01

Attachment to a substrate and survival of human embryonic kidney cells (HEK) was tested in an incubator installed in the flight-deck of the space shuttle Challenger. The HEK cells produce the enzyme urokinase and are candidates for electrophoretic separation. Attachment of the cells to a substrate is mandatory for survival. Analysis of the samples shows that cells adhere, spread and survive in 0 g conditions as well as the ground controls at 1 g. Author (ESA)

N85-14440# Marburg Univ. (West Germany). Klinik und Poliklinik fuer Nuklearmedizin.
RADIOBIOLOGICAL STUDIES ON EGG SYSTEMS EXPOSED TO HEAVY NUCLEI OF COSMIC GALACTIC RADIATION
E. H. GRAUL, W. RUETHER, and H. HOEFFKEN *In* ESA Life Sci. Res. in Space p 87-93 Aug. 1984 refs
Avail: NTIS HC A14/MF A01

The influence of space flight environment, especially HZE-particles (particles with high charge z and energy loss) of cosmic radiation was studied in the eggs of Artemia salina, the brine shrimp Tribolium confusum, the flour beetle, and Carausius morosus the stick insect. In Artemia and Tribolium, passage of each single heavy ion through a mosaic blastula egg, without regeneration, damages an area large enough to disturb either embryogenesis or further development of the larva, or the integrity of the adult individual. Reduced vitality is observed in the flight control group. In Carausius, highest damage rate occurs 25 days after oviposition, when the extremities and head antennae are formed. Morphological damage results from irradiation at later stages, but the particles do not penetrate the whole egg. Author (ESA)

N85-14441# Johann-Wolfgang-Goethe-Univ., Frankfurt am Main (West Germany). Inst. fuer Botanisches.
PRELIMINARY RESULTS OF ADVANCED BIOSTACK EXPERIMENTS WITH PLANT SEEDS AND SPORES
A. R. KRANZ *In* ESA Life Sci. Res. in Space p 95-98 Aug. 1984 refs
(Contract BMFT-1-ES-027)
Avail: NTIS HC A14/MF A01

A Spacelab Biostack experiment on dosimetry of cosmic rays at different positions in the space shuttle determination of the biological effectiveness of individual HZE-particles, and registration of interactions with other environmental factors are introduced. Plant investigations are used to improve track and hit analysis in monocellular spores and multicellular seeds of eukaryotic plants to determine radiobiological inactivation induced by HZE-tracks and HZE-fission stars and to indicate early and late biological damage in somatic and genetic effective cells. Biological objects are sandwiched between nuclear track detectors of varying sensitivity against cosmic heavy ions. Applying computerized microscopy, the energy deposition of individual ions in single cells of embryonic seed tissues and in spore cells is estimated precisely. Investigation of early and late developmental damage, chromosome aberrations, and gene mutations in ground control, backup, and flight units verifies the somatic and genetic effectiveness of heavy ions in space. Author (ESA)

N85-14442# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Inst. for Aerospace Medicine.
THE RADIOBIOLOGICAL ADVANCED BIOSTACK EXPERIMENT ON SPACELAB 1
H. BUECKER, G. HORNECK, J. U. SCHOTT, G. REITZ, M. SCHAEFER, and R. FACIUS *In* ESA Life Sci. Res. in Space p 99-103 Aug. 1984 refs Sponsored by Bundesministerium fuer Forschung und Technologie
Avail: NTIS HC A14/MF A01

A project to investigate the radiobiological properties of the heavy ions of cosmic radiation in order to assess their significance for radiation protection standards in manned spaceflight is outlined. Radiation tests were carried out on insect eggs and plastic detectors. Evaluations of the physical and biological subsystems indicate that the experimental material endured the space flight satisfactorily. Author (ESA)

N85-14443# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Biophysics Div.
SPACELAB 1 EXPERIMENT: MICROORGANISMS IN SPACE HARD ENVIRONMENT
G. HORNECK, H. BUECKER, G. REITZ, H. REQUARDT, K. DOSE (Mainz Univ., West Germany), K. D. MARTENS (Mainz Univ.), A. BIEGER (Mainz Univ.), H. D. MENNIGMANN (Frankfurt Univ.), and P. WEBER (Frankfurt Univ.) *In* ESA Life Sci. Res. in Space p 105-110 Aug. 1984 refs
Avail: NTIS HC A14/MF A01

A Spacelab experiment to determine the response of a resistant microbial system to free space and to selected components of the environment is described. An exposure tray was mounted on the pallet, with 316 dry samples of B. subtilis spores. Post-flight analyses include studies of survival, growth delay, mutation induction, reparability of UV damage, and photochemical changes in DNA and protein. Exposure to space vacuum reduces viability counts to 50%, increases mutation frequencies by a factor of 10, and produces cross-linking between DNA and proteins. Space vacuum and solar UV irradiation act synergistically in inactivation. The photoproducts isolated from DNA and protein of spores exposed to solar UV and vacuum, differ quantitatively and qualitatively from those produced by solar UV at 1 bar.
Author (ESA)

N85-14444# Society for Phytotechnology, Vienna (Austria).
PLANT GROWTH IN SPACE
O. RUTHNER *In* ESA Life Sci. Res. in Space p 111-115 Aug. 1984
Avail: NTIS HC A14/MF A01

Phytotechnological methods to safeguard the viability of spaceborne human beings and animals are discussed. Plants can be used for the generation of energy through special plants for the production of biomass in transparent growth rooms and for the production of human and animal food in gas and light-tight growth chambers, using Ruthner plant production systems based on plant and light lattices. Author (ESA)

N85-14462# European Inst. of Environmental Cybernetics, Athens (Greece). Hypokinetic Physiology Lab.
GENERAL RESISTANCE OF ORGANISM OF RATS UNDER HYPOKINESIA
Y. G. ZORBAS and V. R. BOBYLEV *In* ESA Life Sci. Res. in Space p 203-206 Aug. 1984 refs
Avail: NTIS HC A14/MF A01

Resistance of 250 male mongrel rats under 90-days of hypokinesia was studied. General resistance was evaluated by body weight loss, hypothalamo-hypopheseo-adrenal system (HHAS) state, and sensitivity to ionizing radiation. The hypokinetic syndrome is manifested in a three-phase structure reaction characterized by a change in the general condition of organism, body weight loss, and activity of the HHAS. It is concluded that hypokinesia induces substantial changes in the general resistance of organism of rats and their sensitivity to ionizing radiation conditions. Author (ESA)

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AEROSPACE MEDICINE

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

N85-14476# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany).
OVERVIEW OF GERMAN MICROGRAVITY ACTIVITIES IN THE FIELD OF LIFE SCIENCE
W. G. FRINGS, H. S. ANTON, and F. DAHL *In* ESA Life Sci. Res. in Space p 281-284 Aug. 1984
Avail: NTIS HC A14/MF A01

The planning of the German Spacelab Mission D2 and European participation in the Columbus space station are outlined. Biology and medicine projects are listed. Author (ESA)

N85-14478# Connecticut Univ., Farmington. School of Medicine.
TOXICOLOGY AND METABOLISM OF NICKEL COMPOUNDS Progress Report, 1 Dec. 1983 - 30 Nov. 1984
F. W. SUNDERMAN, JR. 15 Jul. 1984 18 p refs
(Contract DE-AC02-76EV-03140)
(DE84-014919; DOE/EV-03140/8) Avail: NTIS HC A02/MF A01

The toxicology of nickel compounds (e.g., NiCl2, Ni3S2, Ni(CO)4) was investigated in rats. The following new knowledge was acquired: renal cytosol from (63) NiCl2 treated rats contains at least ten (63) Ni binding proteins and polypeptides with molecular weights ranging from 168,000 to less than 4,000 daltons; parenteral administration of NiCl2 to rats transiently diminishes hepatic concentrations of reduced and oxidized glutathione and enhances lipid peroxidation; tetraethylenepentamine is equally effective as diethyldithiocarbamate as an antidote for acute Ni(CO)4 poisoning in rats; Ni2-induction of heme oxygenase activity in rat kidney is sustained for only 3 days of repeated treatments and thereafter gradually decreases, indicating adaptive tolerance for Ni2 toxicity; carcinogenesis bioassays of 17 nickel compounds by IR administration to rats demonstrate close correlation between the induction of erythrocytosis at 1 to 4 months post-injection and the subsequent incidence of renal cancers; immunoreactive erythropoietin concentration is increased in kidney extracts of rats following IR injection of Ni3S2, supporting the role of erythropoietin in Ni3S2-induced erythrocytosis. DOE

N85-15347*# National Aeronautics and Space Administration, Washington, D. C.
STRUCTURE AND FUNCTIONS OF FUNGAL CELL SURFACES
Y. NOZAWA Apr. 1984 23 p refs Transl. into ENGLISH from Shinkin to Shinkinsho (Japan), v. 18, no. 3, 1977 p 147-155 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASW-3541)
(NASA-TM-77439; NAS 1.15:77439) Avail: NTIS HC A02/MF A01 CSCL 06C

A review with 24 references on the biochemistry, molecular structure, and function of cell surfaces of fungi, especially dermatophytes: the chemistry and structure of the cell wall, the effect of polyene antibiotics on the morphology and function of cytoplasmic membranes, and the chemical structure and function of pigments produced by various fungi are discussed. Author

N85-15348*# National Aeronautics and Space Administration, Washington, D. C.
THE STRUCTURE AND FUNCTION OF FUNGAL CELLS
Y. NOZAWA Apr. 1984 22 p refs Transl. into ENGLISH from Shinkin to Shinkinsho (Japan), v. 18, no. 4, 1977 p 270-278 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASW-3541)
(NASA-TM-77443; NAS 1.15:77443) Avail: NTIS HC A02/MF A01 CSCL 06C

The structure and function of fungal cell walls were studied with particular emphasis on dermatophytes. Extraction, isolation, analysis, and observation of the cell wall structure and function were performed. The structure is described microscopically and chemically. Author

A85-16810* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
A REVIEW OF HUMAN PHYSIOLOGICAL AND PERFORMANCE CHANGES ASSOCIATED WITH DESYNCHRONOSIS OF BIOLOGICAL RHYTHMS
C. M. WINGET, C. W. DEROSHIA (NASA, Ames Research Center, Biomedical Research Div., Moffett Field, CA), C. L. MARKLEY, and D. C. HOLLEY (San Jose State University, San Jose, CA) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 55, Dec. 1984, p. 1085-1096. refs
(Contract NCC2-197; NIH-S06-RR-0819204)

This review discusses the effects, in the aerospace environment, of alterations in approximately 24-h periodicities (circadian rhythms) upon physiological and psychological functions and possible therapies for desynchronosis induced by such alterations. The consequences of circadian rhythm alteration resulting from shift work, transmeridian flight, or altered day lengths are known as desynchronosis, dysrhythmia, dyschrony, jet lag, or jet syndrome. Considerable attention is focused on the ability to operate jet aircraft and manned space vehicles. The importance of environmental cues, such as light-dark cycles, which influence physiological and psychological rhythms is discussed. A section on mathematical models is presented to enable selection and verification of appropriate preventive and corrective measures and to better understand the problem of dysrhythmia. Author

A85-16813
EFFECTS OF HEAT ACCLIMATION ON ATROPINE-IMPAIRED THERMOREGULATION
M. A. KOLKA, L. LEVINE, B. S. CADARETTE, P. B. ROCK, M. N. SAWKA, and K. B. PANDOLF (U.S. Army, Research Institute of Environmental Medicine, Natick, MA) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 55, Dec. 1984, p. 1107-1110. refs

This study is concerned with the effects of heat acclimation during exercise-heat exposure following atropine administration. Healthy male subjects were tested on four separate occasions, including two times prior to a heat acclimation program and two times after completion of that program. The testing consisted of an exercise-heat exposure. The obtained results provide evidence that heat acclimation can increase the length of time men can exercise at a low work intensity in a hot-dry environment after atropine injection. The injection of atropine depressed sweating, resulting in increased heat storage which effectively reduced the time that the subjects could remain in the exercise-heat condition. G.R.

A85-16818
CARBONIC ANHYDRASE INHIBITORS FOR PREVENTION OF SPACE MOTION SICKNESS - AN AVENUE OF INVESTIGATION
N. F. MARTIN (Washington Hospital Center; George Washington University, Medical Center, Washington, DC) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 55, Dec. 1984, p. 1148-1150. refs

Space motion sickness (SMS) is an important medical problem facing NASA's Space Shuttle program. Two theories that have been advanced to explain SMS are the 'fluid shift theory' and the 'vestibulo-ocular sensory conflict theory'. The 'fluid shift theory' pre-supposes an active or passive shift of body fluid to the central nervous system (CNS) and vestibulo-auditory mechanisms. In contrast, the 'sensory conflict theory' hypothesizes that unfamiliar accelerational and gravitational inputs from the middle ear conflict with visual inputs and lead to SMS. Carbonic anhydrase inhibitors

(CAHI) are known to suppress active production of CSF and may be able to inhibit production of perilymph in the semi-circular canals. Therefore, CAHI may be able to diminish the hypothesized fluid shift to the CNS and inner ear under the fluid shift theory. It is suggested that carbonic anhydrase inhibitors merit clinical investigation to test their usefulness for prophylaxis of space motion sickness and to test the veracity of the fluid shift theory. Author

A85-16935
QUANTITATIVE MEASUREMENT OF THE RESOLVING POWER OF HUMAN HEARING [KOLICHESTVENNOE IZMERENIE RAZRESHAIUSHCHEI SPOSOBNOSTI SLUKHA CHELOVEKA]
V. V. POPOV and A. IA. SUPIN (Akademiia Nauk SSSR, Institut Evoliutsionnoi Morfologii i Ekologii, Moscow, USSR) Akademiia Nauk SSSR, Doklady (ISSN 0002-3264), vol. 278, no. 4, 1984, p. 1012-1016. In Russian.

It is shown that the resolving power of human hearing can be fully characterized by the dependence of threshold contrast on the density of the comb-shaped spectrum or (in the simplified version) by the maximum density of the comb-shaped spectrum, perceived at a 100-percent modulation depth. It is demonstrated that this quantity amounts to 20-25/kHz for human hearing, corresponding to a 50-40 Hz interval between combs. B.J.

A85-17045
THE EFFECT OF MOUNTAIN CONDITIONS ON IMMUNOLOGICAL RESISTANCE IN YOUNG PERSONS [VLIIANIE GORNYKH USLOVII NA IMMUNOLOGICHESKUIU REZISTENTNOST' ORGANIZMA LITS MOLODOGO VOZRASTA]
P. O. VIAZITSKII, V. K. TOVKAN, G. V. LITVINENKO, and A. M. POLOVOI Voenno-Meditsinskii Zhurnal (ISSN 0026-9050), Sept. 1984, p. 31-33. In Russian.

The effect of mountain climate (3000 m above sea level) on the condition of specifc and nonspecific immunity in healthy persons 18-20 years of age was investigated. The nonspecifc immunological resistance did not change under such conditions. However, a short-term stay in mountain conditions was found to produce an increase in specific immunoreactivity owing to a reduction in the glucocorticoid activity of the adrenal cortex. B.J.

A85-17046
MARKEDNESS OF VESTIBULAR-VEGETATIVE RESPONSES IN FLIGHT PERSONNEL WITH CERTAIN TYPES OF DISEASES [VYRAZHENNOST' VESTIBULO-VEGETATIVNYKH REAKTSII U LETNOGO SOSTAVA PRI NEKOTORYKH ZABOLEVANIIAKH]
O. A. NAKAPKIN Voenno-Meditsinskii Zhurnal (ISSN 0026-9050), Sept. 1984, p. 44, 45. In Russian. refs

An analysis is made of the markedness of vestibular-vegetative responses in flight personnel with certain types of chronic diseases which do not hamper the performance of flight tasks. These diseases include CNS, gastrointestinal, and myocardial diseases, and cochlear neuritis. It is shown that the vestibular-vegetative stability in such cases can be reduced with a sufficient preservation of the compensatory capabilities of the body. It is recommended that a second medical examination should be administered to pilots 2-3 days after the occurrence of a vestibular-vegetative response of any degree of markedness. B.J.

A85-17047
FEATURES CHARACTERIZING THE MEDICAL CARE OF MILITARY PERSONNEL IN THE ARCTIC [NEKOTORYE OSOBENNOSTI MEDITSINSKOGO OBESPECHENIIA LICHNOGO SOSTAVA V ZAPOLIAR'E]
V. P. ZAKHAROV Voenno-Meditsinskii Zhurnal (ISSN 0026-9050), Sept. 1984, p. 56-59. In Russian. refs

A85-17103
THE QUESTION OF RETINAL VISUAL ACUITY IN NORMAL EYES AS DETERMINED BY A RETINOMETER WITH A WIDENED RANGE OF MEASUREMENT [K VOPROSU O RETINAL'NOI OSTROTE ZRENIIA NORMAL'NYKH GLAZ PRI ISPOL'ZOVANII RETINOMETRA S RASSHIRENNYM DIAPAZONOM IZMERENIIA]
M. A. PENKOV and A. G. ARNAUTOV (Khar'kovskii Meditsinskii Institut, Kharkov, Ukrainian SSR) Oftal'mologicheskii Zhurnal (ISSN 0030-0675), no. 1, 1984, p. 16-18. In Russian. refs

A85-17104
DISEASE PREVENTION IN SEAMEN [PROFILAKTIKA ZABOLEVANII RABOTNIKOV MORSKOGO FLOTA]
V. N. EVSTAFEV and O. IU. NETUDYKHATKA (Ministerstvo Zdravookhraneniia SSSR, Nauchno-Issledovatel'skii Institut Gigieny Vodnogo Transporta, Odessa, Ukrainian SSR) Sovetskoe Zdravookhranenie (ISSN 0038-5239), no. 3, 1984, p. 17-20. In Russian.

The results of an analysis of morbidity data for a group of Soviet seamen are presented. A brief description of the work and exercise patterns of the group is given in order to characterize their activities in terms of scientifically measurable indices. On the basis of the analyzed data, general recommendations are offered for ways of improving the health of workers at sea and some specific areas for improvement are identified. These areas include sanitation on-board ship, increased medical efficiency in ships' dispensaries, and the improvement of work and recreation conditions. I.H.

A85-17105
CIRCULATING IMMUNE COMPLEXES IN THE BLOOD SERUM OF PSYCHIATRIC PATIENTS AND IN HEALTHY SUBJECTS [TSIRKULIRUIUSHCHIE IMMUNNYE KOMPLEKSY V SYVOROTKE KROVI PSIKHICHESKI BOL'NYKH I ZDOROVYKH]
T. P. VETLUGINA, G. V. LOGVINOVICH, S. N. MASLENNIKOVA, and O. A. VASILEVA (Akademiia Meditsinskikh Nauk, Tomsk, SSSR) Zhurnal Nevropatologii i Psikhiatrii imeni S. S. Korsakova (ISSN 0044-4588), vol. 84, no. 3, 1984, p. 422-426. In Russian. refs

A85-17106
THE NATURE OF THE SO-CALLED ASYMPTOMATIC PERIOD OF DISEASE [O SUSHNOSTI TAK NAZYVAEMYKH BESSIPTOMNYKH PERIODOV BOLEZNI]
D. S. SARKISOV (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Arkhiv Patologii (ISSN 0004-1955), vol. 46, no. 4, 1984, p. 3-11. In Russian. refs

The structural and functional changes which occur in the human body before the appearance of symptoms of disease are discussed, on the basis of the results of clinical studies. It is shown that structural changes (changes in tissue) occur first in cell membranes and are followed by alterations in cell processes. Synchronous with destructive alterations many adaptive, regenerative, and hyperplastic changes also occur which prevent significant disruptions in homeostasis: the higher adaptive potential of the host, the longer clinical health is maintained in spite of the existing condition. It is shown that the first clinical symptoms of disease appear when compensatory reactions are no longer able to match the destructive changes and resulting functional disorders. I.H.

A85-17108
THE QUESTION OF A BIOCHEMICAL ESTIMATE OF THE EFFECT OF HIGH AND LOW TEMPERATURES ON THE BODY [K VOPROSU O BIOKHIMICHESKOI OTSENKE VLIIANIIA NA ORGANIZM VYSOKIKH I NIZKIKH TEMPERATUR]
A. I. BARKALAIA and M. A. VERKHOTIN (Akademiia Nauk SSSR, Institut Biofiziki, Moscow, USSR) Gigiena Truda i Professional'nye Zabolevaniia, March 1984, p. 31-34. In Russian. refs

The activity of lactate dehydrogenase (LDH) isoenzymes in human blood serum is investigated experimentally. The range of temperatures used in the study was -5-100 C with a special

water-cooled suit for temperatures above 30 C. It is found that temperatures in the upper part of the range increased the activity of H-subunits in the LDH isoenzymes. High temperature in combination with physical activity increased the activity of M-subunits. It is suggested that increased LDH activity under such conditions is an indication of the development of hypoxia in the myocardium and skeletal muscles. In response to temperatures in the lower part of the range, LDH isoenzyme activity in the myocardium increased significantly, while activity in the skeletal muscles was diminished. I.H.

A85-17110
A COMPARISON OF THE HISTOLOGICAL STRUCTURE OF THE GLIOMAS WITH DENSITOMETRY DATA FROM COMPUTER TOMOGRAPHY [SOPOSTAVLENIE GISTOLOGICHESKOGO STROENIIA GLIOM S DANNYMI DENSITOMETRII PRI KOMP'IUTERNOI TOMOGRAFII]
A. G. MELIKIAN, V. I. GOLUBEV, and S. K. LOBANOV (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Voprosy Neirokhirurgii (ISSN 0042-8817), Mar.-Apr. 1984, p. 3-9. In Russian. refs

A85-17111
A COMPUTER-TOMOGRAPHIC IMAGE OF THE BRAIN VENTRICLES OF PATIENTS WITH SEVERE CRANIOCEREBRAL TRAUMA [KOMP'IUTERNO-TOMOGRAFICHESKAIA KARTINA ZHELUDOCHKOV GOLOVNOGO MOZGA U BOL'NYKH S TIAZHELOI CHEREPNO-MOZGOVOI TRAVMOI]
S. M. ABDERAKHMAN (Donetskii Meditsinskii Institut, Donetsk, Ukrainian SSR) Voprosy Neirokhirurgii (ISSN 0042-8817), Mar.-Apr. 1984, p. 24-27. In Russian.

A85-17112
THE MEASUREMENT OF OVERALL BRAIN BLOOD FLOW IN MAN USING A HYDROGEN CLEARANCE METHOD [IZMERENIE SUMMARNOGO MOZGOVOGO KROVOTOKA U CHELOVEKA METODOM VODORODNOGO KLIRENCA]
I. T. DEMCHENKO, V. A. KHILKO, V. N. SEMERNIA, B. V. GAIDAR, and IU. E. MOSKALENKO (Akademiia Nauk SSSR, Institut Evoliutsionnoi Fiziologii i Biokhimii; Voenno-Meditsinskaia Akademiia, Leningrad, USSR) Voprosy Neirokhirurgii (ISSN 0042-8817), Mar.-Apr. 1984, p. 38-41. In Russian. refs

A method of measuring the overall cerebral blood flow in man is described. The method is based on the rate of hydrogen clearance in the jugular vein, as determined by platinum sounding electrodes implanted in the neck. It is pointed out that hydrogen clearance curves have many elements and it is necessary to use a stochastic method for plotting the data. The use of an initial inclination method in approximate analysis of the plotted curves is also possible. The values obtained for overall cerebral blood flow in an experimental examination of patients with severe craniocerebral trauma are found to be in good agreement with data from the literature. I.H.

A85-17113
AN ULTRASONIC METHOD FOR STUDYING THE INTRACRANIAL DYNAMICS OF BLOOD IN NORMAL AND PATHOLOGICAL STATES [UL'TRAZVUKOVOI METOD ISSLEDOVANIIA VNUTRICHEREPNOI GEMOLIKVORODINAMIKI V NORME I PATOLOGII]
L. G. SIMONOV, IU. S. IOFFE, A. E. RAZUMOVSKII, and B. P. SIMERNITSKII (Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem; Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR; Ministerstvo Zdravookhraneniia RSFSR, Nauchno-Issledovatel'skii Institut Skoroi Pomoshchi, Moscow, USSR) Voprosy Neirokhirurgii (ISSN 0042-8817), Mar.-Apr. 1984, p. 42-48. In Russian. refs

A noninvasive ultrasonic system for brain examination is described. The system uses frontally-positioned sensors to record signals as they are reflected from immobile structures and from the occipital bone. The signals are registered graphically on a video monitor. The system permits the blood dynamics of both cerebral hemispheres to be studied separately, thus yielding information which is more precise than data obtained by conventional techniques. The results of an experimental examination performed with the technique indicate that there is a statistically significant discrepancy between the index of pulse-fading ultrasonic waves in the cerebral regions of healthy individuals and in patients with lesions or damage to cerebral functions. The results of the ultrasonic experiment were confirmed by conventional invasive techniques. I.H.

A85-17114
DISORDERS OF SPECIALIZED SENSITIVITY (OF THE AUDITORY, VESTIBULAR, OLFACTORY, AND GUSTATORY ANALYZERS) IN THE CASE OF ACROMEGALY AND CERTAIN HYPOPHYSEAL DISEASES [NARUSHENIIA SPETSIALIZIROVANNOI CHUVSTVITEL'NOSTI (SLUKHOVOGO, VESTIBULIARNOGO, OBONIATEL'NOGO I VKUSOVOGO ANALIZATOROV) PRI AKROMEGALII I NEKOTORYKH GIPOFIZARNYKH ZABOLEVANIIAKH]
A. KEKHAIOV, E. BOZADZHIEVA, G. SAVOV, R. RAICHEV, L. DIANKOV, E. PLATONOVA, G. KIRILOV, M. GOSHEVA, KH. KHRISTOV, and V. ANKOV (Meditsinska Akademiia, Sofia, Bulgaria) Problemy Endokrinologii, vol. 30, Mar.-Apr. 1984, p. 34-36. In Russian.

A85-17116
THE STATE OF VESTIBULAR FUNCTION IN THE DEAF AND THE HARD-OF-HEARING (ACCORDING TO A STUDY OF MEMBERS OF THE UKRAINIAN SOCIETY FOR THE DEAF) [SOSTOIANIE VESTIBULIARNOI FUNKTSII U GLUKHIKH I SLABOSLYSHASHCHIKH /PO DANNYM OBSLEDOVANIIA CHLENOV UKRAINSKOGO OBSHCHESTVO GLUKHIKH/]
V. G. BAZAROV, L. A. SAVCHUK, and V. I. LUTSENKO (Kievskii Nauchno-Issledovatel'skii Institut Otolaringologii, Kiev, Ukrainian SSR) Zhurnal Ushnykh, Nosovykh i Gorlovykh Boleznei (ISSN 0044-4650), Mar.-Apr. 1984, p. 1-8. In Russian. refs

A85-17117
AUDIOLOGICAL CHARACTERIZATION OF THE HEARING FUNCTION OF VERY OLD PEOPLE IN AZERBAIDZHAN [AUDIOLOGICHESKAIA KHARAKTERISTIKA SLUKHOVOI FUNKTSII U DOLGOZHITELEI AZERBAIDZHANA]
CH. IA. KIAZIMOV (Poliklinika No. 1, Baku, Azerbaidzhan USSR) Zhurnal Ushnykh, Nosovykh i Gorlovykh Boleznei (ISSN 0044-4650), Mar.-Apr. 1984, p. 15-17. In Russian. refs

A85-17118
COMPUTER TOMOGRAPHY IN THE DIAGNOSIS OF ACOUSTIC-NERVE NEURINOMA AND OTHER NEOPLASMS OF THE CEREBELLOPONTILE ANGLE [KOMP'IUTERNAIA TOMOGRAFIIA V DIAGNOSTIKE NEVRINOM SLUKHOVOGO NERVA I DRUGIKH NOVOOBRAZOVANII MOSTOMOZZHECHKOVOGO UGLA]
A. N. KISHKOVSKII, A. A. GOROKHOV, and S. V. KUZNETSOV (Voenno-Meditsinskiia Akademiia, Leningrad, USSR) Zhurnal Ushnykh, Nosovykh i Gorlovykh Boleznei (ISSN 0044-4650), Jan.-Feb. 1984, p. 41-45. In Russian. refs

A85-17119
PROBLEMS IN THE PATHOGENESIS OF LABYRINTH DYSFUNCTIONS [NEKOTORYE VOPROSY PATOGENEZA LABIRINTNYKH DISFUNKTSII]
N. A. SHVARTSMAN (Orenburgskii Meditsinskii Institut, Orenburg, USSR) Zhurnal Ushnykh, Nosovykh i Gorlovykh Boleznei (ISSN 0044-4650), Mar.-Apr. 1984, p. 48-55. In Russian. refs

The concept of periodic cochleovestibular paroxysms is described, and a pathogenetic method of therapy based on this concept is considered. It is concluded that muscle spasms of the tympanic cavity play a significant role in the genesis of cochleovestibular dysfunctions of peripheral origin. Muscle-relaxation techniques should be used in the treatment of this condition. B.J.

A85-17121
VITAMIN D AND BONE-TISSUE COLLAGEN (REVIEW) [VITAMIN D I KOLLAGEN KOSTNOI TKANI /OBZOR/]
V. B. SPIRICHEV and V. A. ISAEVA (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) *Voprosy Meditsinskoi Khimii* (ISSN 0042-8809), vol. 30, Mar.-Apr. 1984, p. 5-17. In Russian. refs

A survey is presented of published data and the authors' original results concerning the condition of bone collagen (BC) for various amounts of vitamin D in the body, and the possible role of vitamin D in the metabolism and specific functions of BC. Particular consideration is given to the excretion of oxyproline in the urine; the total content, fractional composition, and degree of mineralization of BC for various amounts of vitamin D; and the biosynthesis of BC for various amounts of vitamin D. B.J.

A85-17123
CONCENTRATION OF ACID-STABLE INHIBITORS (METABOLITES OF THE INTER-ALPHA-INHIBITOR TRYPSIN IN BLOOD PLASMA) IN THE URINE OF HEALTHY PERSONS AND PATIENTS WITH NEPHROTIC SYNDROME [KONTSENTRATSIIA KISLOTOSTABIL'NYKH INGIBITOROV - PROIZVODNYKH INTER-ALPHA-INGIBITORA TRIPSINA PLAZMY KROVI - V MOCHE ZDOROVYKH LIUDEI I BOL'NYKH S NEFROTICHESKIM SINDROMOM]
O. G. OGLOBLINA, L. R. POLIANTSEVA, and T. S. PASKHINA (Akademiia Meditsinskikh Nauk SSSR; I Moskovskii Meditsinskii Institut, Moscow, USSR) *Voprosy Meditsinskoi Khimii* (ISSN 0042-8809), vol. 30, Mar.-Apr. 1984, p. 104-108. In Russian. refs

A85-17125
VESTIBULAR SYMPTOMALOGY OF UNILATERAL DEAFNESS DUE TO NEURINOMA OF THE VIII PAIR OF CRANIOCEREBRAL NERVES [VESTIBULIARNAIA SIMPTOMATIKA PRI ODNOSTORONNEI TUGOUKHOSTI, OBUSLOVLENNOI NEVRINOMOI VIII PARY CHEREPNO-MOZGOVYKH NERVOV]
E. I. PETROVA (II Moskovskii Gosudarstvennyi Meditsinskii Institut, Moscow, USSR) and N. S. ALEKSEEVA (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Vestnik Otorinolaringologii (ISSN 0042-4668), Jan.-Feb. 1984, p. 18-21. In Russian. refs

A85-17126
A COMPARISON OF CHANGES IN CERTAIN ENZYMOLOGICAL AND IMMUNOLOGICAL INDICES AND ELECTROCARDIOGRAPHIC DATA DURING MYOCARDIAL INFARCTION COMPLICATED BY GENUINE CARDIOGENIC SHOCK AND ACUTE LEFT VENTRICULAR INSUFFICIENCY [SOPOSTAVLENIE IZMENENII NEKOTORYKH ENZIMOLOGICHESKIKH I IMMUNOLOGICHESKIKH POKAZATELEI, DANNYKH ELEKTROKARDIOTOPOGRAMMY PRI INFARKTE MIOKARDA, OSLOZHENENNOM ISTINNYM KARDIOGENNYM SHOKOM I OSTROI LEVOZHELUDOCHKOVOI NEDOSTATOCHNOST'IU]
A. I. GRITSIUK, L. L. SIDOROVA, and E. N. AMOSOVA (Kievskii Meditsinskii Institut, Kiev, Ukrainian SSR) Kardiologiia (ISSN 0022-9040), no. 4, 1984, p. 16-21. In Russian. refs

A85-17127
HEMODYNAMIC EFFECTS OF ISOMETRIC LOAD IN PATIENTS WITH CORONARY HEART DISEASE [IZMENENIIA GEMODINAMIKI PRI IZOMETRICHESKOI NAGRUZKE, U BOL'NYKH ISHEMICHESKOI BOLEZN'IU SERDTSA]
E. B. GELFGAT and R. I. SAMEDOV (Ministerstvo Zdravookhraneniia Azerbaidzhanskoi SSR, Nauchno-Issledovatel'skii Institut Kardiologii, Baku, Azerbaidzhan SSR) Kardiologiia (ISSN 0022-9040), no. 4, 1984, p. 38-43. In Russian. refs

A85-17128
A DIFFERENTIAL APPROACH TOWARD THE DEVELOPMENT OF PHYSIOLOGICAL STANDARDS AND THEIR VALUE IN PREVENTIVE CARDIOLOGY [DIFFERENTSIROVANNYI PODKHOD K RAZRABOTKE FIZIOLOGICHESKIKH NORMATIVOV I EGO ZNACHENIE DLIA PROFILAKTICHESKOI KARDIOLOGII]
R. G. OGANOV, A. N. BRITOV, I. A. GUNDAROV, E. N. KONSTANTINOV, A. T. SHATALOV, and A. D. DEEV (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Kardiologiia (ISSN 0022-9040), no. 4, 1984, p. 52-56. In Russian. refs

A new approach to the evaluation of physiological standards for programs of preventive cardiac therapy is proposed. Recommendations are offered for a statistical analysis of the constant, variable, and unique elements of cardiac disease. It is suggested that in carrying out programs for the prevention of cardiovascular diseases, the susceptibility of different physical types to the development of related diseases should be taken into account. I.H.

A85-17129
NUTRITION AND THE RISK FACTORS OF CORONARY HEART DISEASE IN MEN OF THE CHUKOT AUTONOMOUS REGION [PITANIE I FAKTORY RISKA ISHEMICHESKOI BOLEZNI SERDTSA U MUZHCHIN CHUKOTSKOGO AVTONOMNOGO OKRUGA]
N. G. KHALTAEV, E. V. KLOCHKOVA, A. V. TIKHONOV, M. A. AKHMETELI, A. I. VERBITSKAIA, V. A. POLESSKII, and T. I. ASTAKHOVA (Akademiia Meditsinskikh Nauk SSSR, Moscow; Akademiia Meditsinskikh Nauk SSSR, Novosibirsk, USSR) Kardiologiia (ISSN 0022-9040), no. 4, 1984, p. 62-67. In Russian. refs

A85-17130
AN EVALUATION OF THE STABILITY AND PROGNOSTIC VALUE OF IDENTIFYING CERTAIN RISK FACTORS FOR CORONARY HEART DISEASE IN 50-59-YEAR-OLD MEN [OTSENKA STABIL'NOSTI I PROGNOSTICHESKOI ZNACHIMOSTI VYIAVLENIIA NEKOTORYKH FAKTOROV RISKA ISHEMICHESKOI BOLEZNI SERDTSA U MUZHCHIN 50-59 LET]
E. V. KOKURINA, V. I. METELITSA, A. L. CHUBUKOVA, T. P. OSTROVSKAIA, I. P. ILIUSHINA, A. A. ALEKSANDROV, and V. N. ZHUKOV (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Kardiologiia (ISSN 0022-9040), no. 4, 1984, p. 70-76. In Russian. refs

A85-17131
CORONARY HEART DISEASE IN MEN ENGAGED IN STRESSFUL MENTAL WORK (RESULTS FROM A REPEATED EXAMINATION OVER SIX YEARS) [ISHEMICHESKAIA BOLEZN' SERDTSA U MUZHCHIN, ZANIATYKH NAPRIAZHENNYM UMSTVENNYM TRUDOM /REZUL'TATY POVTORNOGO OBSLEDOVANIIA CHEREZ SIX LET/]
N. A. KRUCHININA and S. V. CHERNIGOVSKAIA (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR) Kardiologiia (ISSN 0022-9040), no. 4, 1984, p. 76-80. In Russian. refs

A85-17132
ATTITUDES TOWARD HEALTH IN MIDDLE-AGED MEN IN A CORONARY HEART DISEASE PREVENTION PROGRAM [OTNOSHENIE K VOPROSAM ZDOROV'IA U MUZHCHIN SREDNEGO VOZRASTA V PROGRAMME PO PROFILAKTIKE ISHEMICHESKOI BOLEZNI SERDTSA]
A. V. BAUBINENE, A. A. GOSHTAUTAS, R. L. DAKNIS, S. B. DOMARKENE, R. I. KRISHCHIUNAITE, A. K. KUZMITSKENE, R. P. PROKHORSKAS, M. Z. RUGIAVICHIUS, and M. L. TRAKUMAITE (Kaunasskii Meditsinskii Institut, Kaunas, Lithuanian SSR) Kardiologiia (ISSN 0022-9040), no. 4, 1984, p. 81-84. In Russian. refs

A85-17133
FEATURES OF THE CONDITION OF THE RENIN-ANGIOTENSIN SYSTEM IN WOMEN WITH HYPERTENSION [OSOBENNOSTI SOSTOIANIIA SISTEMY RENIN-ANGIOTENZIN U ZHENSHCHIN, BOL'NYKH GIPERTONICHESKOI BOLEZN'IU]
E. I. BARANOVA and N. P. MASLOVA (I Leningradskii Meditsinskii Institut, Leningrad, USSR) Kardiologiia (ISSN 0022-9040), no. 4, 1984, p. 109, 110. In Russian. refs

A85-17135
PHYSICAL-EXERCISE TESTS FOR ISCHEMIC HEART DISEASE - CRITERIA, ACHIEVEMENTS, AND PROSPECTS [PROBY S FIZICHESKIMI NAGRUZKAMI PRI ISHEMICHESKOI BOLEZNI SERDTSA - KRITERII, DOSTIZHENIIA I PERSPEKTIVY]
V. P. LUPANOV (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Kardiologiia (ISSN 0022-9040), no. 4, 1984, p. 119-124. In Russian. refs

Physical-exercise-test methods using EKG evaluation for the diagnosis of ischemic heart disease are described. New criteria for myocardial ischemia are proposed, and accepted criteria are reevaluated. Methods of EKG recording are examined, and a computerized technique for the processing of test results is assessed. B.J.

A85-17136
THE PROBABILITY CHARACTERISTICS OF ELECTROCARDIOSIGNALS [O VEROIATNOSTNYKH KHARAKTERISTIKAKH ELEKTROKARDIOSIGNALA]
V. P. BAKALOV and M. M. MIRRAKHIMOV (Kirgizskii Nauchno-Issledovatel'skii Institut Kardiologii, Frunze, Kirgiz SSR) Akademiia Nauk Kirgizskoi SSR, Izvestiia (ISSN 0002-3221), Mar.-Apr. 1984, p. 27-33. In Russian. refs

A85-17140
AN EVALUATION OF CORRECTION FOR MITRAL REGURGITATION BY COMPUTER ECHOCARDIOGRAPHY IN THE EARLY POST OPERATIVE PERIOD [OTSENKA KORREKTSII MITRAL'NOI REGURGITATSII METODOM KOMP'IUTERNOI EKHOKARDIOGRAFII V RANNEM POSLEOPERATSIONNOM PERIODE]
I. V. BORISOVA (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Sovetskaia Meditsina, no. 4, 1984, p. 7-11. In Russian. refs

A85-17141
SINUSOIDAL MODULATED CURRENTS IN THE TREATMENT OF PATIENTS WITH BRONCHIAL ASTHMA [SINUSOIDAL'NYE MODULIROVANNYE TOKI V LECHENII BOL'NYKH BRONKHIAL'NOI ASTMOI]
N. A. PAPAKINA (Tsentral'nyi Nauchno-Issledovatel'skii Institut Kurortologii i Fizioterapii, Moscow, USSR) Voprosy Kurortologii, Fizioterapii i Lechebnoi Fizicheskoi Kul'tury (ISSN 0042-8787), Mar.-Apr. 1984, p. 16-18. In Russian.

A85-17142
HYDROCORTISONE AND ALDOSTERONE CONTENT OF THE BLOOD OF PATIENTS UNDERGOING MAGNETIC FIELD TREATMENTS FOR CORONARY HEART DISEASE [SODERZHANIE KORTIZOLA I AL'DOSTERONA V KROVI BOL'NYKH ISHEMICHESKOI BOLEZN'IU SERDTSA PRI LECHENII PEREMENNYM MAGNITNYM POLEM]
IU. T. PONOMAREV, E. I. SOROKINA, A. S. BOBKOVA, O. B. DAVYDOVA, E. G. KOROVKINA, and K. A. KACHKINBAEV (Tsentral'nyi Nauchno-Issledovatel'skii Institut Kurortologii i Fizioterapii, Moscow, USSR) Voprosy Kurortologii, Fizioterapii i Lechebnoi Fizicheskoi Kul'tury (ISSN 0042-8787), Mar.-Apr. 1984, p. 33-35. In Russian. refs

A85-17148
IMMUNOLOGICAL CHARACTERISTICS OF THE DISTRIBUTION OF COLLAGEN TYPES I, II, III, AND IV IN NORMAL INTIMA AND IN ASSOCIATION WITH ATHEROSCLEROSIS OF THE MAJOR ARTERIES AND THE AORTA IN MAN [IMMUNOMORFOLOGICHESKAIA KHARAKTERISTIKA RASPREDELENIIA KOLAGENA I, III, IV, V TIPOV V NORMAL'NOI INTIME I PRI ATEROSKLEROZE KRUPNYKH ARTERII I AORTY CHELOVEKA]
B. V. SHEKHONIN, S. P. DOMOGATSKII, A. V. RUDIN, and V. S. RUKOSUEV (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Arkhiv Patologii (ISSN 0004-1955), vol. 46, no. 3, 1984, p. 18-24. In Russian. refs

A85-17151
CONDITION OF SPECIFIC FUNCTIONS OF THE FEMALE BODY IN ATHLETIC ACTIVITY [SOSTOIANIE SPETSIFICHESKIKH FUNKTSII ZHENSKOGO ORGANIZMA PRI ZANIATIIAKH SPORTOM]
B. A. NIKITIUK (Gosudarstvennyi Tsentral'nyi Institut Fizicheskoi Kul'tury, Moscow, USSR) Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), March 1984, p. 19-21. In Russian. refs

A85-17152
MYONOMETRY - A PHYSIOLOGICAL METHOD FOR DETERMINING THE RELATIONSHIP BETWEEN MUSCLE UNITS (MYONS) THAT VARY IN 'SIZE' IN THE MUSCLES OF ATHLETES [MIONOMETRIIA - FIZIOLOGICHESKII METOD DLIA OPREDELENIIA SOOTNOSHENIIA RAZNYKH PO 'RAZMERU' MYSHECHNYKH EDINITS (MIONOV) V MYSHTSAKH SPORTSMENOV]
IA. M. KOTS (Gosudarstvennyi Tsentral'nyi Institut Fizicheskoi Kul'tury, Moscow, USSR) and U. A. NURZHA Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), March 1984, p. 21-23. In Russian. refs

A85-17153
INVESTIGATION OF THE POSSIBILITY OF USING HEAT-MEASURING INSTRUMENTATION TO ASSESS THE PHYSIOLOGICAL FUNCTIONAL CONDITION OF ATHLETES [ISSLEDOVANIE VOZMOZHNOSTEI PRIMENENIIA TEPLOMETRICHESKOI APPARATURY DLIA OTSENKI FUNKTSIONAL'NOGO SOSTOIANIIA ORGANIZMA SPORTSMENA]
V. M. PRUDNIKOV (Akademiia Nauk Ukrainskoi SSR, Institut Tekhnicheskoi Teplofiziki, Kiev, Ukrainian SSR) and N. N. KONDAK (Kievskii Gosudarstvennyi Institut Fizicheskoi Kul'tury, Kiev, Ukrainian SSR) Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), March 1984, p. 23, 24. In Russian. refs

A85-17154
DIURNAL RHYTHMS OF BRAIN CIRCULATION IN YOUNG ATHLETES [SUTOCHNYE RITMY KROVOOBRASHCHENIIA GOLOVNOGO MOZGA U IUNYKH SPORTSMENOV]
V. V. MELNIKOV (Dobrovol'noe Sportivnoe Obshchestvo Spartak, Kostroma, USSR) Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), March 1984, p. 28, 29. In Russian. refs

A85-17155
DETERMINATION OF PHYSICAL WORK CAPACITY IN PERSONS OF DIFFERENT AGE - THE PWC TEST [OPREDELENIE FIZICHESKOI RABOTOSPOSOBNOSTI U LITS RAZLICHNOGO VOZRASTA-PROBA PWC]
Z. B. BELOTSERKOVSKII and O. V. KOZYREVA (Gosudarstvennyi Tsentral'nyi Institut Fizicheskoi Kul'tury, Moscow, USSR) Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), March 1984, p. 51-53. In Russian. refs

The paper examines methodological questions associated with the testing of physical work capacity by a modified PWC170 test. A quantitative evaluation of the test level is presented for persons of different age (80 females and 43 males, 30 to 59 years of age). B.J.

A85-17156
COMPARATIVE ANALYSIS OF EFFECTS OF STATIC (ISOMETRIC) AND DYNAMIC (ISOKINETIC) EXERCISE TRAINING [SRAVNITEL'NYI ANALIZ EFFEKTOV STATICHESKOI /IZOMETRICHESKOI/ I DINAMICHESKOI /IZOKINETICHESKOI/ SILOVYKH TRENIROVOK]
D. IU. BRAVAIA (Gosudarstvennyi Tsentral'nyi Institut Fizicheskoi Kul'tury, Moscow, USSR) Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), Feb. 1984, p. 18-20. In Russian. refs

A85-17157
DIURNAL EKG VARIATIONS IN ATHLETES [IZMENENIE ELEKTROKARDIOGRAMMY U SPORTSMENOV V TECHENIE DNIA]
V. V. KOGAN-IASNYI, I. B. GITEL, and L. N. FATIUGOVA (Moskovskii Gorodskoi Vrachebno-Fizkul'turnyi Dispanser No. 1, Moscow, USSR) Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), Feb. 1984, p. 14-16. In Russian. refs

A85-17158
METHODS FOR INVESTIGATING PHYSICAL WORK CAPACITY IN CONDITIONS OF HYPERTHERMIA [METODY ISSLEDOVANIIA FIZICHESKOI RABOTOSPOSOBNOSTI V USLOVIIAKH GIPERTERMII]
S. V. KIRSANOV (Gosudarstvennyi Tsentral'nyi Institut Fizicheskoi Kul'tury, Moscow, USSR) Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), Feb. 1984, p. 12, 13. In Russian.

A complex approach to the study of energetic and actuation mechanisms of athletic work capacity in conditions of hyperthermia is described. The approach combines methods for the measurement of energy expenditures; heat production; the intensity of total, convective-radiative, evaporative, and respiratory heat transfer; body and skin temperature; and changes of body mass, enthalpy, heart rate, respiration rate, and the efficiency of muscular activity. Also used are methods of ergospirography and metabolography. An experimental validation of the proposed approach has been carried out. B.J.

A85-17735
EFFECTS OF AGE ON DOPAMINE AND SEROTONIN RECEPTORS MEASURED BY POSITRON TOMOGRAPHY IN THE LIVING HUMAN BRAIN
D. F. WONG, H. N. WAGNER, JR., R. F. DANNALS, J. M. LINKS, J. J. FROST, H. T. RAVERT, A. A. WILSON, K. H. DOUGLASS (Johns Hopkins Medical Institutions, Baltimore, MD), A. E. ROSENBAUM (Johns Hopkins University, Baltimore, MD), A. GJEDDE (Copenhagen, University, Copenhagen, Denmark) et al. Science (ISSN 0036-8075), vol. 226, Dec. 21, 1984, p. 1393-1396. refs
(Contract PHS-NS-15080; PHS-MH-00053)

D2 dopamine and S2 serotonin receptors were imaged and measured in healthy human subjects by positron emission tomography after intravenous injection of C-11-labeled 3-N-methylspiperone. Levels of receptor in the caudate nucleus, putamen, and frontal cerebral cortex declined over the age span studied (19 to 73 years). The decline in D2 receptor in males was different from that in females. Author

A85-18719
INTERNATIONAL INVESTIGATION REGARDING THE SLEEP-RELATED BEHAVIOR OF FLIGHT CREWS DURING THEIR EMPLOYMENT IN WORLDWIDE LINE ROUTE TRAFFIC [INTERNATIONALE UNTERSUCHUNG ZUM SCHLAFVERHALTEN VON FLUGBESATZUNGEN WAEHREND IHRES EINSATZES IM WELTWEITEN LINIENVERKEHR]
A. GUNDEL, A. SAMEL, and M. VEJVODA (Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Institut fuer Flugmedizin, Cologne, West Germany) DFVLR-Nachrichten (ISSN 0011-4901), vol. 43, Nov. 1984, p. 32-34. In German.

One of the most frequent complaints made by members of flight crews participating in long-range flights is related to problems regarding sleep, taking into account difficulties experienced in falling asleep and an awakening at an unusually early hour. The factors which contribute to disturbances regarding the sleep of pilots are considered on the basis of the flights conducted between Frankfurt/Main and San Francisco. These factors are essentially related to the desynchronization between the biologic rhythm and local time, the long times of operational service, and an employment during the night. Aspects of international cooperation in the reported studies are discussed, taking into account organizations in the U.S., Germany, Great Britain, and Japan. The objectives of the studies include a comparison of the quality of sleep at home and at the location of the flight destination, a comparison of the disturbances of sleep experienced after flights in an eastern and a western direction, and an evaluation of sleep-related strategies of single flight crew members. G.R.

A85-18901
SPACELAB - THE COMING OF AGE OF SPACE PHYSIOLOGY RESEARCH
J. B. WEST (California, University, La Jolla, CA) Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol. 57, Dec. 1984, p. 1625-1631. refs

Spacelab is a cylindrical pressurized laboratory which was built by the European Space Agency (ESA) to be one of the payloads of the Space Shuttle. Spacelab 4, which is scheduled to fly in January 1986, is dedicated to life sciences. It will include 24 experiments in the fields of vestibular, cardiovascular, pulmonary, renal, and endocrine, blood, bone, and muscle physiology. Four experiments in gravitational biology will also be conducted. Plans have been announced for subsequent life science Spacelabs through 1991. In this context, a brief review is provided of the field of space physiology, and some of the opportunities in this challenging new environment are indicated. The characteristics of space physiology are examined, taking into account weightlessness and its profound effects on the human and animal body. The development of the Manned Space Program is briefly considered, giving attention to the American program, the Soviet program, the joint Soviet-U.S. program, and Spacelab. G.R.

A85-18903
EFFECT OF CENTRAL HYPERVOLEMIA ON CARDIAC PERFORMANCE DURING EXERCISE
L. M. SHELDAHL, L. S. WANN, P. S. CLIFFORD, F. E. TRISTANI, L. G. WOLF, and J. H. KALBFLEISCH (Wisconsin, Medical College, Milwaukee; U.S. Veterans Administration, Medical Center, Wood, WI) Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol. 57, Dec. 1984, p. 1662-1667. Sponsorship: U.S. Veterans Administration. refs
(Contract USVA-7876-01P)

A shift in body posture from the upright to the supine position causes an increase in central blood volume and as a consequence an increase in resting stroke volume through the Frank-Starling mechanism. The present investigation is concerned with the effect of different levels of central blood volume on cardiac performance during submaximal exercise, taking into account the response of young subjects at rest and during exercise in the upright posture on land, the supine posture on land, and the upright posture in water to the shoulders. Twelve healthy young men were studied. Water immersion (WI) was found to significantly increase both end-diastolic diameter (LVd) and end-systolic diameter (LVs) during moderate levels of exercise in water compared with upright exercise on land. Although mean heart rates in water and on land were similar at rest and during moderate exercise, at heavy exercise mean heart rate was lower in water. G.R.

A85-18904
EFFECT OF A 42.2-KM FOOTRACE AND SUBSEQUENT REST OR EXERCISE ON MUSCULAR STRENGTH AND WORK CAPACITY
W. M. SHERMAN (Texas A & M University, College Station, TX; Ball State University, Muncie, IN; Ohio University, Athens, OH), L. E. ARMSTRONG, T. M. MURRAY, F. C. HAGERMAN, D. L. COSTILL, R. C. STARON (Ball State University, Muncie, IN; Ohio University, Athens, OH), and J. L. IVY (Texas, University, Austin, TX; Ball State University, Muncie, IN; Ohio University, Athens, OH) Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol. 57, Dec. 1984, p. 1668-1673. refs

A85-18905
EFFECT OF HYPEROSMOLALITY ON CONTROL OF BLOOD FLOW AND SWEATING
S. M. FORTNEY, C. B. WENGER, J. R. BOVE, and E. R. NADEL (John B. Pierce Foundation Laboratory; Yale University, New Haven, CT) Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol. 57, Dec. 1984, p. 1688-1695. refs
(Contract NIH-ES-00354; NIH-HL-17732; NIH-HL-20634)

The present investigation had the objective to examine the effects of hyperosmolality on the control of sweating and cutaneous blood flow during exercise. It was attempted to identify thermoregulatory responses which result from increases in plasma osmolality as separate from responses which result from decreases in blood volume. Five healthy men participated in the study. It was found that hyperosmolality, either through its effects on the state of hydration of specific hypothalamic cells or through an intermediate action such as the release of hormones involved in the regulation of fluid balance, imposes significant limitations upon the heat-dissipating mechanisms. First, the onset of sweating is delayed through an upward shift in the sweating threshold. Second, cutaneous blood flow is reduced at any body temperature, also through an upward shift in threshold. G.R.

A85-18907
EFFECT OF SLIGHTLY LOWERED BODY TEMPERATURES ON ENDURANCE PERFORMANCE IN HUMANS
V. HESSEMER (Mainz, Universitaet, Mainz; Giessen, Universitaet, Giessen, West Germany), D. LANGUSCH, K. BRUECK, R. H. BOEDEKER, and T. BREIDENBACH (Giessen, Universitaet, Giessen, West Germany) Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol. 57, Dec. 1984, p. 1731-1737. Sponsorship: Deutsche Forschungsgemeinschaft. refs
(Contract DFG-BR-184/16)

It is known that endurance training produces adaptive thermoregulatory modifications such as enhanced sweating sensitivity, lowered threshold temperatures for sweating, forearm skin vasodilation, and shivering. The present investigation has the objective to demonstrate the influence of experimentally lowered body temperatures on prolonged submaximum exercise performance as it is frequently executed under various contest conditions. In addition to thermoregulatory and physical exercise parameters, beta-H-endorphin immunoreactive material in plasma was determined as psychophysiological indicator. Frederickson and Geary (1982) had reported that beta-endorphin is released from the pituitary into the blood under physical or emotional stress. Eight well-trained young male rowers participated in the study. It was found that the subjects actually chose higher work rates throughout the exercise period when after precooling their body temperatures were slightly lower and the thermoregulatory strain was reduced. G.R.

A85-18910
TIME COURSE OF LOSS OF ADAPTATIONS AFTER STOPPING PROLONGED INTENSE ENDURANCE TRAINING
E. F. COYLE, W. H. MARTIN, III, D. R. SINACORE, M. J. JOYNER, J. M. HAGBERG, and J. O. HOLLOSZY (Washington University, St. Louis, MO; Texas, University, Austin, TX) Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol. 57, Dec. 1984, p. 1857-1864. refs

The present investigation was concerned with the effects of detraining for 12 wk on maximal O2 uptake, stroke volume (SV) during exercise, skeletal muscle mitochondrial marker enzyme levels and myoglobin concentration, and capillary density in skeletal muscle. It is found that both a decrease in maximum SV and a decrease in maximum arterial-mixed venous O2 difference contribute to the decrease in maximal O2 uptake when highly trained individuals detrain. The decrease in maximum arterial-mixed venous O2 difference appears to be associated with a decrease in muscle mitochondria, since capillary density did not change. G.R.

A85-18912
MODIFICATION OF THE CUTANEOUS VASCULAR RESPONSE TO EXERCISE BY LOCAL SKIN TEMPERATURE
W. F. TAYLOR, J. M. JOHNSON, D. S. OLEARY, and M. K. PARK (Texas, University, San Antonio, TX) Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol. 57, Dec. 1984, p. 1878-1884. refs
(Contract NIH-HL-20663)

The present investigation has the objective to evaluate cutaneous vascular responses to the initiation of leg exercise at several levels of local skin temperature. Six moderately active men, aged 24-38 yr, participated in the experiments. It was found that the local temperature alters the reflex cutaneous vascular response to the onset of exercise. Cutaneous vascular responsiveness is not, however, abolished, as reductions in forearm vascular conductance (FVC) with exercise are observed at a local temperature as high as 42 C. FVC responses at that temperature are, however, attenuated. The reflex responsiveness of the cutaneous vasculature is optimized as a local temperature near 39 C. G.R.

A85-18976
CHANGES IN BRAIN HEMODYNAMICS AS A RESULT OF CHRONIC VERTEBROBASILAR DEFICIENCY [IZMENENIIA MOZGOVOI GEMODINAMIKI PRI KHRONICHESKOI VERTEBRAL'NO-BAZILIARNOI NEDOSTATOCHNOSTI]
V. P. DANILIUK and F. B. DAVYDOVA (Gorodskaia Klinicheskaia Bol'nitsa No. 4, Odessa, Ukrainian SSR) Zhurnal Nevropatologii i Psikhiatrii imeni S. S. Korsakova (ISSN 0044-4588), vol. 84, no. 4, 1984, p. 516-519. In Russian. refs

A85-18977
AN UNUSUAL TREMOR IN PATIENTS WITH LOCAL BRAIN INJURY [NEOBYCHNYI TREMOR U BOL'NOGO S LOKAL'NYM PORAZHENIEM GOLOVNOGO MOZGA]
A. M. ELNER, G. A. GABIBOV, and E. F. LOBKOVA (Akademiia Nauk SSSR, Institut Problem Peredachi Informatsii; Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Zhurnal Nevropatologii i Psikhiatrii imeni S. S. Korsakova (ISSN 0044-4588), vol. 84, no. 4, 1984, p. 530-533. In Russian. refs

A85-18978
THE STRUCTURE OF NOCTURNAL SLEEP AND ITS IMPAIRMENT IN MIDDLE-AGED AND ELDERLY SUBJECTS [STRUKTURA NOCHNOGO SNA PRI EGO NARUSHENIIAKH U LITS SREDNOGO I POZHILOGO ROSTA]
N. A. VLASOV and I. S. IADGAROV (I Moskovskii Meditsinskii Institut, Moscow, USSR) Zhurnal Nevropatologii i Psikhiatrii imeni S. S. Korsakova (ISSN 0044-4588), vol. 84, no. 4, 1984, p. 573-577. In Russian. refs

A85-18979
NIGHT POLYGRAPHIC EXAMINATIONS UNDER SLEEP DEPRIVATION TREATMENT FOR DEPRESSIVE ILLNESSES [NOCHNYE POLIGRAFICHESKIE ISSLEDOVANIIA PRI LECHENII DEPRESSIVNYKH BOL'NYKH DEPRIVATSIEI SNA]
A. M. VEIN and R. G. AIRAPETOV (I Moskovskii Meditsinskii Institut, Moscow, USSR) Zhurnal Nevropatologii i Psikhiatrii imeni S. S. Korsakova (ISSN 0044-4588), vol. 84, no. 4, 1984, p. 577-581. In Russian. refs

A85-18980
THE EFFECT OF SLEEP DEPRIVATION ON THE EVOKED VISUAL POTENTIALS AND EVOKED AUDITORY TRUNK POTENTIALS IN EPILEPSY PATIENTS [VLIIANIE DEPRIVATSII SNA NA ZRITEL'NYE VYZANNYE POTENTSIALY I VYZVANNYE SLUKHOVYE STVOLOVYE POTENTSIALY U BOL'NYKH EPILEPSIEI]
L. T. URUMOVA, G. A. KOVALENKO, A. I. TSUNIKOV, and L. I. SUMSKII (Moskovskii Meditsinskii Stomatologicheskii Institut, Moscow, USSR) Zhurnal Nevropatologii i Psikhiatrii imeni S. S. Korsakova (ISSN 0044-4588), vol. 84, no. 6, 1984, p. 828-830. In Russian. refs

A85-18981
CHANGES IN PAROXYSMAL ACTIVITY, EEG SPECTRAL CHARACTERISTICS, AND VISUAL EVOKED POTENTIALS FOLLOWING SLEEP DEPRIVATION IN PATIENTS WITH EPILEPSY AND SYNCOPE [IZMENENIIA PAROKSIZMAL'NOI AKTIVNOSTI, SPEKTRAL'NYKH KHARAKTERISTIK EEG I ZRITEL'NYKH VYZVANNYKH POTENTSIALOV POSLE DEPRIVATSII SNA U BOL'NYKH EPILEPSIEI I OBMOROKAMI]
A. M. VEIN, R. G. BINIAURISHVILI, T. S. ELIGULASHVILI, and Z. I. KUZMINA (I Moskovskii Meditsinskii Institut, Moscow, USSR) Zhurnal Nevropatologii i Psikhiatrii imeni S. S. Korsakova (ISSN 0044-4588), vol. 84, no. 6, 1984, p. 831-837. In Russian. refs

A85-18988
THE CONDITION OF THE CAPILLARY BEDS OF MAMILLARY BODIES IN THE REAR SECTION OF THE HYPOTHALAMUS IN YOUNG AND OLD PATIENTS WITH HYPERTENSION [SOSTOIANIE KAPILLIARNOGO RUSLA MAMILLIARNYKH TEL ZADNEGO OTDELA GIPOTALAMUSA PRI GIPERTONICHESKOI BOLEZNI U LITS MOLODOGO I POZHILOGO VOZRASTA]
A. G. PETRENKO (Zaporozhskii Meditsinskii Institut, Zaporozhe, Ukrainian SSR) Zhurnal Nevropatologii i Psikhiatrii imeni S. S. Korsakova (ISSN 0044-4588), vol. 84, no. 7, 1984, p. 1001-1004. In Russian. refs

A85-18989
THE CONNECTION BETWEEN THE SEVERITY OF DEMENTIA AND EXPRESSED PATHOMORPHOLOGICAL CHANGES IN THE CEREBRAL CORTEX OF THE BRAIN IN SENILE PATIENTS AND IN PATIENTS WITH ALZHEIMER'S DISEASE [SVIAZ' MEZHDU STEPEN'IU TIAZHESTI DEMENTSII I VYRAZHENNOST'IU PATOMORFOLOGICHESKIKH IZMENENII V KORE GOLOVNOGO MOZGA PRI STARCHESKOM SLABOUMII I BOLEZNI AL'TSGEIMERA]
V. F. SHEFER (Ministerstvo Zdravookhraneniia RSFSR, Leningradskii Nauchno-Issledovatel'skii Psikhonevrologicheskii Institut, Leningrad, USSR) Zhurnal Nevropatologii i Psikhiatrii imeni S. S. Korsakova (ISSN 0044-4588), vol. 84, no. 7, 1984, p. 1004-1006. In Russian. refs

A85-18990
CASE STUDY OF AN EXTREMELY EARLY FORM OF ALZHEIMER'S DISEASE [K KAZUISTIKE SVERKHRANNEI FORMY BOLEZNI AL'TSGEIMERA]
A. A. SEVERNYI, O. I. LEVITE, and I. N. SOKOLOV (Akademiia Meditsinskikh Nauk SSSR; Moskovskaia Klinicheskaia Psikhiatricheskaia Bol'nitsa No. 1, Moscow, USSR) Zhurnal Nevropatologii i Psikhiatrii imeni S. S. Korsakova (ISSN 0044-4588), vol. 84, no. 7, 1984, p. 1007-1012. In Russian. refs

A85-18991
CONCENTRATION OF CERTAIN AMINO ACIDS, IONIZED FORMS OF CALCIUM, AND ACETYLCHOLINESTERASE IN THE CEREBRAL CORTEX IN THE CASE OF SENILE DEMENTIA [SODERZHANIE NEKOTORYKH AMINOKISLOT, IONIZIROVANNYKH FORM KAL'TSIIA I ATSETILKHOLINESTERAZY V KORE GOLOVNOGO MOZGA PRI STARCHESKOM SLABOUMII]
G. A. PAVLOVA (Ministerstvo Zdravookhraneniia R SFSR, Leningradskii Nauchno-Issledovatel'skogo Psikhonevrologicheskii Institut, Leningrad, USSR) Zhurnal Nevropatologii i Psikhiatrii imeni S. S. Korsakova (ISSN 0044-4588), vol. 84, no. 7, 1984, p. 1012-1016. In Russian. refs

A85-18992
THE PLASTICITY OF HUMAN CEREBROCORTICAL SYNAPSES UNDER HYPOXIA - A MORPHOMETRIC STUDY [PLASTICHNOST' SINAPSOV KORY GOLOVNOGO MOZGA CHELOVEKA PRI GIPOKSII - MORFOMETRICHESKOE ISSLEDOVANIE]
V. V. SEMCHENKO, S. S. STEPANOV, and A. IU. SAVCHENKO (Omskii Meditsinskii Institut, Omsk, USSR) Zhurnal Nevropatologii i Psikhiatrii imeni S. S. Korsakova (ISSN 0044-4588), vol. 84, no. 7, 1984, p. 1038-1042. In Russian. refs

The synaptic architectronics of the neocortical molecular layer were studied in nine patients with brain tumors and intracranial hypertension corresponding to different degrees of cerebral hypoxia. It is demonstrated that under hypoxic conditions synapses acquire definite plastic properties which are manifested in hypertrophy of the active zones of the contacts and in the formation of interneuronal links. The reorganization of synaptic architectronics is found to play a significant compensatory role in maintaining human cerebral functions under hypoxic conditions. I.H.

A85-18993
THE ROLE OF THE BRAIN STEM IN THE REGULATION OF POSTURE SYNERGY [OB UCHASTII STVOLA GOLOVNOGO MOZGA V REGULIATSII POZNOI SINERGII]
A. M. ELNER (Akademiia Nauk SSSR, Institut Problem Peredachi Informatsii, Moscow, USSR) Zhurnal Nevropatologii i Psikhiatrii imeni S. S. Korsakova (ISSN 0044-4588), vol. 84, no. 7, 1984, p. 1042-1045. In Russian.

The activity of leg and trunk muscles in involuntary movements of the arm was studied in 56 patients with local cerebral lesions. Symptoms of primary or secondary brain dysfunction were identified in 41 of the patients, and all movements were performed from a vertical position. On the basis of a comparison with results from previous studies it is shown that the synergy associated with involuntary movements from an upright position is impaired by local lesions on the motor portion of the frontal lobe and when damage to other portions of the lobe is combined with brain stem damage. It is suggested that the trunk structures of the brain involved in the regulation of posture synergy are located in the pons varolii. I.H.

A85-18994
MYALGIC TRIGGER ZONES OF MUSCULUS GASTROCNEMIUS IN THE CASE OF LUMBAR OSTEOCHONDROSIS (CLINICO-PATHOMORPHOLOGICAL AND ELECTROMYOGRAPHIC ANALYSIS) [ALGICHESKIE TRIGGERNYE ZONY IKRONOZHNOI MYSHTSY PRI POIASNICHNOM OSTEOOKHONDROZE /KLINIKO-PATOMORFOLOGICHESKII I ELEKTROMIOGRAFICHESKII ANALIZ/]
IA. IU. POPELIANSKII, E. I. BOGDANOV, and F. A. KHABIROV (Kazanskii Meditsinskii Institut, Kazan, USSR) Zhurnal Nevropatologii i Psikhiatrii imeni S. S. Korsakova (ISSN 0044-4588), vol. 84, no. 7, 1984, p. 1055-1061. In Russian. refs

A85-18995
STENOSING STRATIFICATIONS (STRATIFYING ANEURYSMS) OF THE MAIN ARTERIES OF THE BRAIN - THEIR ETIOLOGY, PATHOGENESIS, AND DIAGNOSIS (REVIEW) [STENOZIRUIUSHCHIE RASSLOENIIA /RASSLAIVAIUSHCHIE ANEVRIZMY/ MAGISTRAL'NYKH ARTERII GOLOVNOGO MOZGA; IKH ETIOLOGIIA, PATOGENEZ, DIAGNOSTIKA /OBZOR/]
D. E. MATSKO and A. A. NIKONOV Zhurnal Nevropatologii i Psikhiatrii imeni S. S. Korsakova (ISSN 0044-4588), vol. 84, no. 7, 1984, p. 1074-1079. In Russian. refs

A85-18997
THE ROLE OF GLUCONEOGENESIS IN PHYSICAL ACTIVITY [ROL' GLIUKONEOGENEZA PRI FIZICHESKOI DEIATEL'NOSTI]
A. V. SMIRNOV (Voenno-Meditsinskaia Akademiia, Leningrad, USSR) Uspekhi Sovremennoi Biologii (ISSN 0042-1324), vol. 97, May-June 1984, p. 399-412. In Russian. refs

A survey of available data leads to the conclusion that gluconeogenesis plays a significant and sometimes a decisive role in the maintenance of work capacity in the case of heavy physical loads. This role is connected with the utilization of lactate in the liver and kidneys, the prevention of lactate and ammonia production in the muscles, the resynthesis of glucose, the redistribution of carbohydrates in working muscles, and the excretion of nitrogen-containing decomposition products. Individual functions of the type mentioned above are carried out by the interaction of gluconeogenesis with the glucose-alanine cycle and glutamine metabolism. B.J.

A85-19000
A PHYSICAL-EXERCISE TEST FOR PATIENTS WHO HAVE SUFFERED A MYOCARDIAL INFARCTION [TEST S FIZICHESKOI NAGRUZKOI U BOL'NYKH, PERENESSHIKH INFARKT MIOKARDA]
A. P. GOLIKOV, S. P. LEVSHUNOV, L. S. ZINGERMAN, R. A. CHARCHOGLIAN, and N. N. ESIN (Moskovskii Nauchno-Issledovatel'skii Institut Skoroi Pomoshchi, Moscow, USSR) Sovetskaia Meditsina, no. 5, 1984, p. 83-87. In Russian. refs

A85-19001
THE OPTIMIZATION OF WORK IN OCCUPATIONS INVOLVING LOCAL MUSCULAR EXERCISE [OPTIMIZATSIIA TRUDOVOI DEIATEL'NOSTI PRI RABOTAKH, SVIAZANNYKH S LOKAL'NYMI MYSHECHNYMI NAGRUZKAMI]
IU. V. MOIKIN, N. IU. TARASENKO, B. V. ANANEV, V. N. DUMKIN, V. R. KUCHMA, A. I. MIRONOV, A. S. POBEREZHSKAIA, and O. I. IUSHKOVA (Akademiia Meditsinskikh Nauk SSSR; I Moskovskii Meditsinskii Institut, Moscow, USSR) Gigiena Truda i Professional'nye Zabolevaniia (ISSN 0016-9919), June 1984, p. 4-8. In Russian. refs

A85-19002
CHANGES IN PHYSIOLOGICAL INDICATORS AND METABOLIC PROCESSES IN FEMALE WORKERS AT CONVEYER BELTS [IZMENENIE FIZIOLOGICHESKIKH POKAZATELEI I OBMENNYKH PROTSESSOV U RABOTNITS KONVEIERNYKH LINII]
V. A. MURZA, A. I. IUOZULINAS, E. P. TSIUNENE, N. I. MACHIULITE, and R. I. CHEPULIS (Institut Epidemiologii, Mikrobiologii i Gigieny, Vilnius, Lithuanian SSR) Gigiena Truda i Professional'nye Zabolevaniia (ISSN 0016-9919), June 1984, p. 9-12. In Russian.

A85-19003
COMPARATIVE DYNAMICS OF PHYSIOLOGICAL INDICATORS IN MALE AND FEMALE GRINDERS [SRAVNITEL'NAIA DINAMIKA FIZIOLOGICHESKIKH POKAZATELEI U ZHENSHCHIN I MUZHCHIN V PROFESSII SHLIFOVSHCHIKA]
T. M. KHUDAVERDIEVA (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Gigiena Truda i Professional'nye Zabolevaniia (ISSN 0016-9919), June 1984, p. 12, 13. In Russian.

A85-19004
HYGIENIC AND SANITARY CHARACTERISTICS OF THE WORKING CONDITIONS OF WOMEN IN THE PRODUCTION OF RUBBER TECHNICAL PRODUCTS [GIGIENICHESKIE OSOBENNOSTI I OZDOROVLENIE USLOVII TRUDA ZHENSHCHIN-RABOTNITS PROIZVODSTVA REZINOTEKHNICHESKIKH IZDELII]
E. K. GOROBETS (Institut Gigieny Truda i Profzabolevanii, Kiev, Ukrainian SSR) Gigiena Truda i Professional'nye Zabolevaniia (ISSN 0016-9919), April 1984, p. 11-15. In Russian. refs

A85-19005
FEATURES CHARACTERIZING THE REGULATION OF PHYSIOLOGICAL FUNCTIONS DURING ADAPTATION TO EXPEDITION SHIFT WORK [OSOBENNOSTI REGULIATSII FIZIOLOGICHESKIKH FUNKTSII PRI ADAPTATSI K EKSPEDITSIONNO-VAKHTOVOMU RUDU]
S. G. KRIVOSHCHEKOV, G. M. DOMAKHINA, and G. M. DIVERT (Akademiia Meditsinskikh Nauk SSSR, Novosibirsk, USSR) Gigiena Truda i Professional'nye Zabolevaniia (ISSN 0016-9919), April 1984, p. 15-19. In Russian. refs

Complex dynamic reactions were observed in the cardiovascular, muscular, and thermoregulatory systems of shift workers in extreme environmental conditions during and after a two-week work shift. It is shown that the observed change from adrenergic to cholinergic regulation of metabolic functions, and the reduction of physiological activity reflect the adaptation of the body to periodic exposure to extreme environments, and can result in a number of symptoms during strenuous physical exercise. the most well-defined changes were observed in the function and regulation of the cardiovascular system. I.H.

A85-19012
AN X-RAY ANALYSIS OF CHANGES IN THE HAND BONES IN CAR BODY GRINDERS DUE TO THE EFFECT OF LOCAL LOW-FREQUENCY VIBRATION [RENTGENOLOGICHESKAIA OTSENKA KOSTNYKH IZMENENII KISTEI OT VOZDEISTVIIA LOKAL'NOI NIZKOCHASTOTNOI VIBRATSII U SHLIFOVSHCHIKOV AVTOMOBIL'NYKH KUZOVOV]
E. A. GRIGORIAN and V. N. DRUZHININ (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Gigiena Truda i Professional'nye Zabolevaniia (ISSN 0016-9919), April 1984, p. 40-42. In Russian. refs

A85-19014
PROSPECTS FOR USING IMMUNOLOGICAL-STATUS INDICATORS FOR THE OCCUPATIONAL SELECTION OF BUS DRIVERS [O PERSPEKTIVAKH ISPOL'ZVOVANIIA POKAZATELEI IMMUNOLOGICHESKOGO STATUSA DLIA PROFESSIONAL'NOGO OTBORA VODITELEI]
L. R. SHAMSUTDINOVA, M. I. ERMAN, A. N. USTINENKO, I. M. REMEZ, IA. A. KHINTSENBERG, and I. IA. KVIATKOVSKAIA (Rizhskii Meditsinskii Institut, Riga, Latvian SSR) Gigiena Truda i Professional'nye Zabolevaniia (ISSN 0016-9919), April 1984, p. 47, 48. In Russian.

A85-19018
A RADIONUCLIDE ASSESSMENT OF MYOCARDIAL PERFUSION DURING INTENSIVE EXERCISE IN PATIENTS WHO HAVE SUFFERED MYOCARDIAL INFARCTION [RADIONUKLIDNAIA OTSENKA PERFUZII MIOKARDA V PROTSESSE INTENSIVNYKH FIZICHESKIKH TRENIROVOK BOL'NYKH, PERENESSHIKH INFARKT MIOKARDA]
M. V. EROFEEV, A. A. KRAMER, and L. F. NIKOLAEVA (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Kardiologiia (ISSN 0022-9040), vol. 24, June 1984, p. 42-45. In Russian. refs

A85-19019
CHANGES IN EXERCISE TOLERANCE IN PATIENTS WITH ANGINA TREATED WITH OBSIDIAN, CORINFAIR AND ISOPTIN BOTH AS SINGLE AGENTS AND TOGETHER [IZMENENIE TOLERANTNOSTI K FIZICHESKOI NAGRUZKE U BOL'NYKH SO STENOKARDIEI PRI RAZDEL'NOM I SOCHETANNOM PRIMENENII OBZIDANA, KORINFARA, IZOPTINA]
R. A. KATSENOVICH, S. Z. KOSTKO, U. A. ARIFDZHANOVA, KH. A. KHASHIMOV, M. A. VAKHIDOVA, Z. Z. IUNUSOV, A. SH. KASYMKHODZHAEV, and G. K. KIIAKBAEV (Ministerstvo Zdravookhraneniia Uzbekskoi SSR, Nauchno-Issledovatel'skii Institut Kardiologii, Tashkent, Uzbek SSR) Kardiologiia (ISSN 0022-9040), vol. 24, June 1984, p. 69-73. In Russian. refs

A85-19020
CHANGES IN CIRCULATORY PARAMETERS IN HEALTHY SUBJECTS AT VARIOUS LEVELS OF PHYSICAL EXERCISE AND AS A FUNCTION OF INITIAL HEMODYNAMIC TYPE [IZMENENIE POKAZATELEI KROVOOBRASHCHENIIA U ZDOROVYKH LITS PRI RAZNYKH UROVNIAKH FIZICHESKOI NAGRUZKI V ZAVISIMOSTI OT ISKHODNOGO TIPA *GEMODINAMIKI*]
G. I. SIDORENKO, V. M. ALKHIMOVICH, and A. I. PAVLOVA (Belorusskii Nauchno-Issledovatel'skii Institut Kardiologii, Minsk,Belorussian SSR) Kardiologiia (ISSN 0022-9040), vol. 24, June 1984, p. 79-84. In Russian. refs

The main parameters of hemodynamics were determined for 78 normal subjects at rest and during bicycle ergometry tests at 300, 600, and 1200 kg/min. Measurements were made with a bipolar chest rheograph. A total of three diffrent types of circulation were identified: eukinetic, hyperkinetic, and hypokinetic. Each circulation type is correlated with normal constant level of energy required for the complete circulation of one liter of blood and with mean blood pressure. The various mechanisms for maintaining an adequate level of mean hemodynamic pressure during exercise are identified. I.H.

A85-19021
IMMUNOLOGICAL ASPECTS OF INFECTIOUS DISEASES [IMMUNOLOGICHESKIE ASPEKTY INFEKTSIONNYKH BOLEZNEI]
D. K. BASHIROVA Kazanskii Meditsinskii Zhurnal, vol. 65, May-June 1984, p. 161-167. In Russian.

A85-19026
PROBLEMS IN MEDICAL-PSYCHOLOGICAL CARE IN ATHLETIC TRAINING [VOPROSY MEDIKO-PSIKHOLOGICHESKOGO OBESPECHENIIA UCHEBNO-TRENIROVOCHNOGO PROTSESSA]
I. P. VOLKOV (Leningradskii Gosudarstvennyi Institut Fizicheskoi Kul'tury, Leningrad, USSR) Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), July 1984, p. 5-7. In Russian.

A85-19027
INVESTIGATION OF PHYSICAL WORK CAPACITY IN ATHLETES ACCORDING TO THE PWC170 TEST [OB IZUCHENII FIZICHESKOI RABOTOSPOSOBNOSTI U SPORTSMENOV PO TESTU PWC170]
R. A. SVANISHVILI (Tbilisskii Meditsinskii Institut, Tbilisi, Georgian SSR) Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), July 1984, p. 16, 17. In Russian. refs

A85-19028
CHANGES IN THE ECHOCARDIOGRAMS OF ATHLETES UNDER THE EFFECT OF PHYSICAL LOADS [IZMENENIIA EKHOKARDIOGRAMMY SPORTSMENA POD VOZDEISTVIEM FIZICHESKIKH NAGRUZOK]
G. E. KALUGINA Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), July 1984, p. 18, 19. In Russian. refs

A85-19029
EFFECT OF ATHLETIC ACTIVITY ON THE FUNCTIONAL CONDITION OF THE AORTA (ACCORDING TO FOURIER ANALYSIS) [VLIIANIE ZANIATII SPORTOM NA FUNKTSIONAL'NOE SOSTOIANIE AORTY /PO DANNYM ANALIZA FUR'E/]
S. V. KHRUSHCHEV (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) and D. IA. KOSTENBERG (Saratovskii Meditsinskii Institut, Saratov, USSR) Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), July 1984, p. 19-21. In Russian.

A85-19030
BIOCHEMICAL CONTROL IN FIGURE-SKATING COMPETITIONS [BIOKHIMICHESKII KONTROL' V USLOVIIAKH SOREVNOVATEL'NOI DEIATEL'NOSTI FIGURISTOV]
N. K. TSEPKOVA and A. A. CHETVERUKHIN (Vsesoiuznyi Nauchno-Issledovatel'skii Institut Fizicheskoi Kul'tury, Moscow, USSR) Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), July 1984, p. 21-23. In Russian. refs

A85-19033
ANALYSIS OF THE CAUSES OF THE VARIABILITY OF ACIDOTIC SHIFTS IN THE CASE OF INTENSE MUSCULAR ACTIVITY IN ATHLETES [K ANALIZU PRICHIN VARIATIVNOSTI ATSIDOTICHESKIKH SDVIGOV PRI NAPRIAZHENNOI *MYSHECHNOI DEIATEL'NOSTI U SPORTSMENOV*]
V. M. KALININ (Kemerovskii Tekhnologicheskii Institut Pishchevoi Promyshlennosti, Kemerovo, USSR) Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), April 1984, p. 26, 27. In Russian. refs

A85-19034
THE USE OF A HYPOXIC GAS MIXTURE IN TEH TRAINING OF GYMNASTS [ISPOL'ZOVANIE GIPOKSICHESKOI GAZOVOI SMESI V TRENIROVOCHNOM PROTSESSE GIMNASTOV]
N. P. KRASNIKOV, V. A. GLYBCHENKO, and A. I. KANEVSKII (Simferopol'skii Gosudarstvennyi Universitet, Simferopol, Ukrainian SSR) Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), April 1984, p. 27-29. In Russian. refs

A study performed on 10 gymnasts 18-22 years of age has led to the recommenation that hypoxic gas mixtures be periodically included in the training procedure with the aim of improving the functional capacities and aerobic-anaerobic efficiency of gymnasts. The use of a standard load on a bicycle ergometer in different periods of training makes it possible to identify functional changes *in the external-breathing and circulatory systems.* B.J.

A85-19035
FEATURES OF THE INTERRELATIONSHIP OF REGULATION PARAMETERS OF THE CHRONOTROPIC AND INOTROPIC HEART FUNCTIONS IN ATHLETES [OSOBENNOSTI VZAIMOSVIAZI PARAMETROV REGULIATSII KHRONO- I *INOTROPNOI FUNKTSII SERDTSA U SPORTSMENOV*]
V. V. AKSENOV (Cheliabinskii Gosudarstvennyi Institut Fizicheskoi Kul'tury, Chelyabinsk, USSR) Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), April 1984, p. 29. In Russian.

A85-19036
OPTICAL MULTIVIBRATION AS A METHOD FOR THE MEDICAL MONITORING OF PEOPLE ENGAGING IN PHYSICAL EXERCISE AND ATHLETICS [SVETOVAIA MUL'TIVIBRATSIIA KAK METOD VRACHEBNOGO KONTROLIA ZA ZANIMAIUSHCHIMISIA FIZKUL'TUROI I SPORTOM]
M. F. SAUTKIN, A. P. POLIAKOV, and V. G. RESHETOV (Riazanskii Meditsinskii Institut, Ryazan, USSR) Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), July 1984, p. 31, 32. In Russian.

A85-19037
THE PROBLEM OF THE ATHLETIC TRAINING OF WOMEN WITH ALLOWANCE FOR THE FEATURES OF THE ADAPTATION OF THEIR BODIES TO INTENSE PHYSICAL LOADS [PROBLEMA SPORTIVNOI PODGOTOVKI ZHENSHCHIN S UCHETOM OSOBENNOSTEI ADAPTATSII IKH ORGANIZMA K BOL'SHIM FIZICHESKIM NAGRUZKAM]
V. I. PIVOVAROVA, A. R. RADZIEVSKII, and S. K. FOMIN (Kievskii Gosudarstvennyi Institut Fizicheskoi Kul'tury, Kiev, Ukrainian SSR) Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), July 1984, p. 35, 36. In Russian.

A85-19038
CONTROL OF THE ADAPTATION OF THE SKELETON OF ATHLETES TO PHYSICAL LOADS [UPRAVLENIE ADAPTATSIEI SKELETA SPORTSMENOV K FIZICHESKIM NAGRUZKAM]
B. A. NIKITIUK (Gosudarstvennyi Tsentral'nyi Institut Fizicheskoi Kul'tury, Moscow, USSR) Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), July 1984, p. 38-40. In Russian. refs

A85-19039
MATHEMATICAL MODEL FOR THE COMPARATIVE ANALYSIS OF ATHLETIC SKILL IN HIGH-SPEED FORMS OF ATHLETICS [MATEMATICHESKAIA MODEL' SRAVNITEL'NOGO ANALIZA MASTERSTVA SPORTSMENOV V SKOROSTNYKH VIDAKH SPORTA]
IU. P. LISOVETS, A. S. POSPELOV, G. R. SAIDKHUZHIN, and T. V. KHOLSHCHEVNIKOVA (Gosudarstvennyi Tsentral'nyi Institut Fizicheskoi Kul'tury, Moscow, USSR) Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), July 1984, p. 51-53. In Russian.

A85-19040
ACTIVITY OF THE ATHLETE AS AN OBJECT OF CONTROL [DEIATEL'NOST' SPORTSMENA KAK OB'EKT UPRAVLENIIA]
V. V. KUZOVENKOV (Moskovskii Institut Elektronnoi Tekhniki, Moscow, USSR) Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), April 1984, p. 54, 55. In Russian. refs

A85-19041
PREDICTION OF TEMPORARY INABILITY TO WORK IN THE CASE OF VEGETOVASCULAR DYSTONIA IN FEMALE WORKERS OF LOCAL INDUSTRY [PROGNOSTICHESKAIA OTSENKA VREMENNOI NETRUDOSPOSOBNOSTI PRI VEGETOSOSUDISTOI DISTONII U RABOTNITS MESTNOI PROMYSHLENNOSTI]
A. K. ZINKOVSKII and A. E. TSIKULIN (Kalininskii Meditsinskii Institut, Kalinin, USSR) Zdravookhranenie Rossiiskoi Federatsii (ISSN 0490-1177), no. 7, 1984, p. 21-24. In Russian.

A85-19042
DISTINCTIVE FEATURES OF THE FORMATION OF THE HEPATIC ARTERIES IN MAN AND THEIR PRACTICAL VALUE [OSOBENNOSTI FORMIROVANIIA ARTERII PECHENI CHELOVEKA I IKH PRAKTICHESKOE ZNACHENIE]
I. IU. IULCHIEV (I Leningradskii Meditsinskii Institut, Leningrad, USSR) Arkhiv Anatomii, Gistologii i Embriologii (ISSN 0004-1947), vol. 86, June 1984, p. 31-35. In Russian. refs

A85-19051
A METHODOLOGICAL APPROACH TO THE STUDY OF THE HEALTH STATUS OF A POPULATION EXPOSED TO THE EFFECTS OF URBAN NOISE [METODICHESKIE PODKHODY K IZUCHENIIU SOSTOIANIIA ZDOROV'IA O NASELENIIA, PODVERGAIUSHCHEGOSIA VOZDEISTVIIU GORODSKOGO SHUMA]
I. L. KARAGODINA, A. I. LEVIN, and L. G. ORLOVA (Moskovskii Nauchno-Issledovatel'skii Institut Gigieny, Moscow, USSR) Gigiena i Sanitariia (ISSN 0016-9900), June 1984, p. 5-8. In Russian. refs

A comprehensive methodological approach has been developed for the study of the general health status of populations exposed to the continuous effects of noise. The physical parameters of the noise and the selection of criteria for human noise tolerance among different population groups are discussed. Some of the detrimental effects of noise on the central nervous system, cardiovascular system, and the hearing apparatus of the human body are taken into account in the analysis. I.H.

A85-19054
THE PHYSIOLOGICAL EFFECT OF A COMPLEX OF LOW-INTENSITY INDUSTRIAL FACTORS AND MONOTONY ON STUDENTS OF A TECHNICAL SCHOOL [VLIIANIE KOMPLEKSA PROIZVODSTVENNYKH FAKTOROV MALOI INTENSIVNOSTI I MONOTONII NA ORGANIZM UCHASHCHIKHSIA TEKHNICHESKOGO UCHILISHCHA]
I. I. KRUGLOVA (Ministerstvo Zdravookhraneniia SSSR, Nauchno-Issledovatel'skii Institut Gigieny Detei i Podrostkov, Moscow, USSR) Gigiena i Sanitariia (ISSN 0016-9900), July 1984, p. 25-28. In Russian.

A85-19059
RESPONSE TO A. A. PROKHOROV'S COMMENT CONCERNING THE PAPER OF G. I. KUTSENKO ET AL.: 'A METHOD FOR THE QUANTITATIVE INTEGRAL EVALUATION OF FATIGUE' [OTVET NA ZAMECHANIIA A. A. PROKHOROVA PO POVODU STAT'I G. I. KUTSENKO I SOAVT: 'METODIKA KOLICHESTVENNOI INTEGRAL'NOI OTSENKI UTOMLENIIA']
G. I. KUTSENKO, E. I. SOSHNIKOV, and B. N. MINCHIN (Vsesoiuznyi Nauchno-Issledovatel'skii Institut Sotsial'noi Gigieny i Organizatsii Zdravookhraneniia, Moscow, USSR) Gigiena i Sanitariia (ISSN 0016-9900), June 1984, p. 63, 64. In Russian.

A85-19060
AGE-RELATED FEATURES OF THE STATUS OF FACTORS OF NATURAL IMMUNITY AND THE BLOOD SYSTEM IN MINERS WORKING IN SHIFTS [VOZRASTNYE OSOBENNOSTI SOSTOIANIIA FAKTOROV ESTESTVENNOGO IMMUNITETA I SISTEMY KROVI U SHAKHTEROV PODZEMNYKH PROFESSII, RABOTAIUSHCHIKH POSMENNO]
S. A. KLESHCHENOGOV (Akademiia Meditsinskikh Nauk SSSR, Novokuznetsk, USSR) Gigiena i Sanitariia (ISSN 0016-9900), June 1984, p. 69-71. In Russian. refs

A85-19063
TRACE-ELEMENT METABOLISM DURING HEAVY PHYSICAL WORK [OBMEN MIKROELEMENTOV PRI TIAZHELOI FIZICHESKOI RABOTE]
V. V. NASOLODIN (Iaroslavskii Gosudarstvennyi Universitet, Yaroslavl, USSR) Gigiena i Sanitariia (ISSN 0016-9900), June 1984, p. 81-83. In Russian. refs

Changes in the blood concentrations of iron and copper under the effect of muscle tension of varying intensity were studied in blacksmiths working an eight-hour day and in various types of athletes (skiers and medium-distance runners). The iron and copper concentration in the blood of healthy persons under physical load was found to depend mainly on the duration of the muscular work performed. A physical load lasting up to 10 minutes is accompanied by the redistribution of the trace elements, which is expressed in a reduction of iron and copper level in the plasma and a simultaneous increase in their concentration in the blood cells. The positive effects of an addition of iron, copper, and manganese to the diet on the ability to perform physical work is discussed. B.J.

A85-19065
PROPHYLAXIS OF VITAMIN-C DEFICIENCY IN SHIP SPECIALISTS [PROFILAKTIKA C-VITAMINNOI NEDOSTATOCHNOSTI U SUDOVYKH SPETSIALISTOV]
V. S. NOVIKOV, A. A. MASTRIUKOV, and V. P. PETROV Gigiena i Sanitariia (ISSN 0016-9900), June 1984, p. 85-87. In Russian. refs

A85-19066
PRELIMINARY RESULTS OF THE DIRECT ELECTROSTIMULATION OF DAMAGED OPTIC NERVES [PREDVARITEL'NYE REZUL'TATY PRIAMOI ELEKTROSTIMULATSII PORREZHDENNYKH ZRITEL'NYKH NERVOI]
V. A. KHILKO, A. N. SHANDURINA, IU. K. MATVEEV, M. I. KONDRATEVA, E. B. LYSKOV, A. V. PANIN, and A. V. NIKOLSKII (Voenno-Meditsinskaia Akademiia; Akademiia Meditsinskikh Nauk SSSR, Leningrad, USSR) Voprosy Neirokhirurgii (ISSN 0042-8817), May-June 1984, p. 35-45. In Russian. refs

The results of a clinical investigation of the effectiveness of a method for direct electrostimulation of optic nerves in 22 patients with pathological optic nerve damage are reported. The electrostimulation was produced by electrodes implanted under the optic nerve sheath during surgery to repair pathological nerve damage (tumors of the hyphosis, arachnoiditis, and trauma damage). The range of current strength was 1-800 microamperes. Electrostimulation was continued for 3-4 weeks after surgery. It is found that electrostimulation has positive therapeutic effects in three-fourths of the patients studied. In one third of the patients of this group, vision was completely restored. I.H.

A85-19067
THE POSSIBILITY OF PREVENTING ORTHOSTATIC INSTABILITY IN SPINAL CORD INJURIES [VOZMOZHNOSTI BOR'BY S ORTOSTATICHESKOI NEUSTOICHIVOST'IU PRI POVREZHDENIIAKH SPINNOGO MOZGA]
V. A. MOISEEV (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Voprosy Neirokhirurgii (ISSN 0042-8817), May-June 1984, p. 45-48. In Russian. refs

The hemodynamics of 10 patients with high (cervical) spinal cord injuries was studied experimentally during movement to a vertical position. The patients were fitted with antioverexertion gear (AOG) which consisted of inflatable rubber cuffs wrapped around the abdomen, thighs, and knees. The AOG cuffs were inflated to a pressure of +50 mm Hg, and measurements were taken of arterial pressure, volumetric blood flow rate in the upper limb, cardiac output, and stroke volume. Peripheral and vascular resistances were calculated from a formula. It is found that the movement of the patients to a vertical position without the AOG was accompanied by sharp drops in arterial pressure, stroke volume, and peripheral resistance. Orthostatic collapse developed after 3-4 minutes. The use of AOG was found to prevent drops in the hemodynamic parameters, and made it possible for patients to stay in an erect position for 10 minutes or longer. AOG is recommended for the training of spinal cord injury victims with pronounced orthostatic instability. I.H.

A85-19068
COAGULATION PROPERTIES OF THE BLOOD IN THE PRESENCE OF SEVERE CEREBROCRANIAL INJURY [KOAGULIATSIONNYE SVOISTVA KROVI PRI TIAZHELOI CHEREPNO-MOZGOVOI TRAVME]
V. N. ALEKSANDROV, V. V. ZVEREV, L. F. KARMOLINA, and G. N. BUDIAKOVA (Moskovskii Meditsinskii Stomatologicheskii Institut, Moscow, USSR) Voprosy Neirokhirurgii (ISSN 0042-8817), May-June 1984, p. 19-23. In Russian. refs

A85-19069
CHANGES OF HOMEOSTASIS INDICATORS IN HEALTHY PERSONS DURING ACCLIMATIZATION OT TIEN SHAN MOUNTAIN CONDITIONS [IZMENENIE POKAZATELEI GEMOSTAZA U ZDOROVYKH LIUDEI V PROTSESSE AKKLIMATIZATSII K VYSOKOGOR'IU TIAN'-SHANIA]
O. N. NARBEKOV, A. G. RACHKOV, and L. G. RACHKOVA (Kirgizkii Gosudarstvennyi Meditsinskii Institut, Frunze, Kirgiz SSR) Zdravookhranenie Kirgizii, May-June 1984, p. 19-21. In Russian.

A85-19070
RESPONSES TO SINGLE CLIMATE-THERAPY PROCEDURES IN PATIENTS WITH HYPERTENSION AND ISCHEMIC HEART DISEASE IN MEDIUM-HEIGHT MOUNTAIN CONDITIONS [OTVETNYE REAKTSII NA ODNOKRATNYE KLIMATOTERAPEVTICHESKIE PROTSEDURY U BOL'NYKH GIPERTONICHESKOI BOLEZN'IU I ISHEMICHESKOI BOLEZN'IU SERDTSA V USLOVIIAKH SREDNOGOR'IA]
O. I. LIPKINA (Kirgizskii Nauchno-Issledovatel'skii Institut Kurortologii i Fizioterapii, Kirgiz SSR) Zdravookhranenie Kirgizii, May-June 1984, p. 27-30. In Russian.

A85-19076
CLASSIFICATION OF CLINICAL FORMS OF VESTIBULAR DYSFUNCTION [KLASSIFIKATSIIA KLINICHESKIKH FORM VESTIBULIARNOI DISFUNKTSII]
I. B. SOLDATOV and N. S. KHRAPPO (Kuibyshevskii Meditsinskii Institut, Kuibyshev, USSR) Zhurnal Ushnykh, Nosovykh i Gorlovykh Boleznei (ISSN 0044-4650), May-June 1984, p. 56-61. In Russian. refs

The main terms and principles (etiological, nosological, and pathogenic) in a classification of clinical forms of vestibular disorders are examined. The use of such a classification to facilitate the differential diagnosis of vestibular dysfunctions is considered. B.J.

A85-19077
CURRENT PROBLEMS IN THE PHYSICAL THERAPY OF PATIENTS WITH BRAIN-CIRCULATION AILMENTS [SOVREMENNYE PROBLEMY FIZIOTERAPII BOL'NYKH S SOSUDISTYMI ZABOLEVANIIAMI GOLOVNOGO MOZGA]
N. I. STRELKOVA (Tsentral'nyi Nauchno-Issledovatel'skii Institut Kurortologii i Fizioterapii, Moscow, USSR) Voprosy Kurortologii, Fizioterapii i Lechebnoi Fizicheskoi Kul'tury (ISSN 0042-8787), May-June 1984, p. 1-6. In Russian. refs

A85-19079
PHYSICAL TREATMENT METHODS FOR FEMALE URINARY STRESS INCONTINENCE [LECHENIE FIZICHESKIMI METODAMI NEDERZHANIIA NOCHI PRI NAPRIAZHENII U ZHENSHCHIN]
V. A. EPIFANOV, F. A. IUNUSOV, and B. V. EREMIN (Moskovskii Meditsinskii Stomatologicheskii Institut, Moscow, USSR) Voprosy Kurortologii, Fizioterapii i Lechebnoi Fizicheskoi Kul'tury (ISSN 0042-8787), May-June 1984, p. 47-49. In Russian. refs

A85-19080
CONTENT OF IMMUNOGLOBINS IN THE BLOOD OF HEALTHY PERSONS SUBJECT TO VARIOUS WEATHER-RELATED EFFECTS [SODERZHANIE IMMUNOGLOBULINOV V KROVI ZDOROVYKH LITS PRI RAZLICHNYKH METEOROLOGICHESKIKH VOZDEISTVIIAKH]
K. U. KASENOV (Aktiubinskii Meditsinskii Institut, Aktyubinsk, Kazakh SSR) and ZH. S. SUNDETOV Voprosy Kurortologii, Fizioterapii i Lechebnoi Fizicheskoi Kul'tury (ISSN 0042-8787), May-June 1984, p. 57-59. In Russian.

The Mancini method was used to investigate variations of the content of G, A, and M types of immunoglobin in the blood of 250 healthy males 18-28 years of age for different types of weather conditions. It is shown that blood levels of IgA and IgM are most sensitive to weather effects, while IgG is not very sensitive. Low temperatures and the passage of cold fronts condition the lowering of the blood levels of IgA and IgB. The study was undertaken in the general framework of the investigation of adaptation to Arctic conditions. B.J.

A85-19081
LIPID TRANSPORT IN THE BODY UNDER HYPOKINESIA AND PROTEIN DEFICIENCY [TRANSPORT LIPIDOV V ORGANIZME PRI GIPOKINEZII I BELKOVOI NEDOSTATOCHNOSTI]
T. SH. SHARMANOV (Akademiia Meditsinskikh Nauk SSSR, Alma-Ata, Kazakh SSR) Ukrainskii Biokhimicheskii Zhurnal, vol. 56, May-June 1984, p. 293-301. In Russian. refs

The mechanisms of lipid transport in blood serum and bile are discussed, with reference to clinical and experimental results. It is shown that the main region of interaction between lipid transport systems is located in the endoplasmic reticulum of the hepatocytes. The main mechanisms of lipid accretion in the liver under conditions of alimentary protein deficiency are identified as: (1) disruption in the formation of very-low-density lipoproteins; and (2) the inhibition of the process of cholesterol oxidation into bile acids. The inhibition mechanism is the result of decreases in substrate supply and in microsomal monooxigenase content. It is found that changes in the locomotory regime may be a factor in determining diet composition: prolonged hypokinesia requires an increase in the consumption of proteins, thereby intensifying cholesterol oxidation in microsomes and lowering the level of atherogenic blood serum lipoproteins. I.H.

A85-19082
THE ACTUAL NUTRITION, ENERGY CONSUMPTION, AND SOME INDICES OF THE HEALTH STATUS OF WOMEN ENGAGED IN INTELLECTUAL ACTIVITY [FAKTICHESKOE PITANIE, ENERGOTRATY I NEKOTORYE POKAZATELI SOSTOIANIIA ZDOROV'IA ZHENSHCHIN, ZANIATYKH UMSTVENNYM TRUDOM]
V. I. SMOLIAR, L. F. GRACHEVA, and G. A. DUNAEVSKII (Nauchno-Issledovatel'skii Institut Gigieny Pitaniia, Kiev, Ukrainian SSR) Voprosy Pitaniia (ISSN 0042-8833), May-June 1984, p. 33-35. In Russian. refs

N85-14445# *Tours Univ. (France). Lab. de Biophysique.*
ULTRASONIC STUDY OF EARLY CARDIOVASCULAR ADAPTATION TO ZERO GRAVITY
L. POURCELOT, P. ARBEILLE, J. M. POTTIER, F. PATAT, P. MIGNIER, A. GUELL (Service de Neurologie, Toulouse), and C. GHARIB (Universite C. Bernard, Lyon) *In* ESA Life Sci. Res. in Space p 119-123 Aug. 1984 refs
Avail: NTIS HC A14/MF A01

Cardiovascular examination was performed on 1 subject in microgravity aboard Salyut 7. An ultrasound measuring system was developed. Cardiac output, heart rate, stroke volume, and left ventricle diameters increase. Stability of myocardial contractility, disturbances in venous flow and vascular compliance, changes in peripheral resistance, and good autoregulation of the cerebral blood flow are noted. The increase of the cardiac output without major modification of the cerebral and femoral flows suggests that renal and/or the hepato-digestive circulation increases during microgravity exposure. The great modifications of the venous return requires a better study of the flow in the vena cava.
Author (ESA)

N85-14446# *Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Inst. for Aerospace Medicine.*
LEFT HEART VENTRICULAR FUNCTION DURING A 7 DAY ZERO-G SIMULATION (6 DEG HEAD DOWN TILT)
F. BAISCH and L. BECK *In* ESA Life Sci. Res. in Space p 125-132 Aug. 1984 refs
Avail: NTIS HC A14/MF A01

Ultrasound measurements of cardiac dimensions were performed on 12 volunteers during a 7 day 6 deg head down tilt (HDT) 0-g simulation. From the uniform increase in left ventricle dimensions in the remobilization phase, it is deduced that a shift in the contractile state of the left ventricle takes place during the HDT bedrest period. To noninvasively quantify this contractile change, ventricle function curves obtained by reducing preload in an LBNP maneuver are proposed. The high correlation coefficients between pre ejection period /dp/dt max and between left ventricular ejection time/sv in animal experiments under different contractile states validate this proposal. Author (ESA)

N85-14447# Rome Univ. (Italy). Postgraduate School of Aerospace Medicine.
THREE-DIMENSIONAL BALLISTOCARDIOGRAPHY IN WEIGHTLESSNESS (EXPERIMENT 1ES 028)
A. SCANO, E. RISPOLI, F. STROLLO, G. BRAZZODURO, F. PRANDI, and G. CAMA *In* ESA Life Sci. Res. in Space p 133-139 Aug. 1984 refs
Avail: NTIS HC A14/MF A01

A technique for recording triaxial ballistocardiographs (BCG) and electrocardiographs in microgravity was developed. Analysis of tracings shows the overall amplitude increase in microgravity of BCG-Z systolic waves (longitudinal) and the variation of the ratio of their dimensions which makes the tracing M-shaped; BCG-Y (transversal) shows modifications less constant than the previous ones. Therefore microgravity clearly affects the BCG, and its effects continue for over 6 days after re-entry. Author (ESA)

N85-14448# Clinical Research Centre, London (England).
MINIATURE PERSONAL PHYSIOLOGICAL TAPE RECORDER (EXPERIMENT 1ES 30)
H. L. GREEN, F. D. STOTT, and O. PETRE-QUADENS (Univ. Instelling Antwerpen, Belgium) *In* ESA Life Sci. Res. in Space p 141-144 Aug. 1984 refs
Avail: NTIS HC A14/MF A01

A miniature 24 hr tape recorder was used to record electrocardiograph (ECG), electro-oculogram (EOG) and electroencephalogram (EEG) data, during the first Spacelab mission to start a data base on the payload specialists who are primarily scientists with no test pilot experience. The second objective was to prove the feasibility of a working scientist wearing the equipment without it reducing his normal mobility and activity. Analysis of ECG recordings do not show any significant differences in flight compared with those obtained on normal subjects on the ground. The wearing of the recorder and ECG electrodes causes no inconvenience but the EOG wires can be a nuisance. Considerable difficulty was experienced with the EEG electrodes, resulting in limited data being obtained. Author (ESA)

N85-14449# Copenhagen Univ. (Denmark). Lab. of Human Physiology.
CARDIAC OUTPUT MEASURED BY MASS SPECTROSCOPY
F. BONDE-PETERSEN *In* ESA Life Sci. Res. in Space p 145-148 Aug. 1984 refs
Avail: NTIS HC A14/MF A01

Cardiac output for a subject rebreathing a mixture of oxygen, argon and acetylene from a rubber bag fitted with a three-way stopcock and a mouthpiece was measured. Argon was used to assess volume and mixing problems. As acetylene dissolves physically in blood, its disappearance rate is flow limited, i.e., it is a measure of the lung capillary flow and hence the cardiac output. Freon-22 can also be used as the soluble gas, and if carbon monoxide is added the diffusion capacity for CO can be calculated. Lung tissue blood volume can be calculated from the differences between argon distribution and that of the soluble gas. Oxygen consumption is calculated from the disappearance rate of oxygen.
Author (ESA)

N85-14450# Karolinska Inst., Stockholm (Sweden). Dept. of Medical Engineering.
CARDIAC OUTPUT MEASUREMENT WITH SOLUBLE GASES
D. LINNARSSON and H. LARSSON *In* ESA Life Sci. Res. in Space p 149-150 Aug. 1984 refs
Avail: NTIS HC A14/MF A01

A method for selective rebreathing is presented and its application to pulmonary blood flow determination in patients is shown. Twenty-two patients with valvular heart disease were studied during rest and light exercise in the supine position. Comparison with an invasive reference method show good correlation between the invasive and the rebreathing methods. However, a systematic deviation which could be related to the

nonideal ventilation-perfusion relationships in the lungs of the patients is found. Author (ESA)

N85-14451# Deutsche Sporthochschule, Cologne (West Germany).
PHYSICAL PERFORMANCE CAPACITY AFTER A 7 DAY HEAD-DOWN TILT (-6 DEG)
J. STEGEMANN, D. ESSFELD, and U. HOFFMANN *In* ESA Life Sci. Res. in Space p 151-157 Aug. 1984 refs
Avail: NTIS HC A14/MF A01

Physical performance capacity in 6 healthy male subjects before and on the 1st and 7th day after a continuous 7-day head-down tilt was studied. Pseudo-random binary sequences (PRBS) of work load were used as testing signals during upright bicycle ergometer exercise. From the PRBS tests, the frequency responses of oxygen uptake (V'O2) and heart rate were computed at 9 harmonic frequencies (fundamental frequency: 0,0135 rad/sec). After the simulated weightlessness, the V'O2 kinetics is found to be impaired at harmonic frequencies above 0.068 rad/sec. Author (ESA)

N85-14452# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Inst. for Aerospace Medicine.
LEG VOLUME CHANGES. RESPONSES TO LOWER BODY NEGATIVE PRESSURE (LBNP) DURING 7 DAYS OF ZERO-G SIMULATION (6 DEG HEAD-DOWN TILT (HDT))
E. W. MUELLER, H. HOHLWECK, G. PLATH, and F. BAISCH *In* ESA Life Sci. Res. in Space p 159-162 Aug. 1984 refs
Avail: NTIS HC A14/MF A01

During a 7 day 0-g simulation via 6 deg head down tilt, lower body negative pressure experiments were done. Leg volume was determined with an ultrasound plethysmography equipment. During the phase of plasma volume reduction leg tissue stiffness increases. The method can measure leg volume changes simultaneously at several positions. With LBNP or occlusion cuffs, the lower extremities can be tested dynamically. Changes of compliance can be assessed. Since it is possible to leave the light weight transducers on the leg for 1 day the accuracy of the method may be improved, to follow the time course of leg volume changes. This would be useful in spaceflight for determination of the absolute volume shift during launch and landing. Author (ESA)

N85-14453# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Inst. for Aerospace Medicine.
HEART RATE VARIABILITY DURING 7 DAY HEAD-DOWN TILT (6 DEG)
A. SAMEL and F. BAISCH *In* ESA Life Sci. Res. in Space p 163-167 Aug. 1984 refs
Avail: NTIS HC A14/MF A01

Heart rate variability, body temperature, and changes in the excretion rates of hormones during simulation of weightlessness over 7 days were measured. Peak to peak intervals of heart rate show a significant increase on the first day of simulation and a significant decrease on the first 2 days after simulation. The excretion of hormones alters distinctly during the simulation period. It is concluded that these alterations are induced by parasympathetic activities. Author (ESA)

N85-14454# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Inst. for Aerospace Medicine.
COMPARISON OF SIMULATION OF WEIGHTLESSNESS BY HEAD DOWN TILT (HDT) AND WATER IMMERSION (WI)
H. LOELLGEN (Medical Clinic St. Vincenz-Hospital, Limburg, West Germany), K. E. KLEIN, J. BEIER, J. R. HORDINSKY, F. BAISCH, G. VONNIEDING (Federal Bureau of Health, Berlin), and H. JUST (Freiburg Univ., West Germany) *In* ESA Life Sci. Res. in Space p 169-174 Aug. 1984 refs
Avail: NTIS HC A14/MF A01

During 6 deg head down tilt (HDT) and water immersion (WI) central hemodynamics was analyzed by a semifloating pulmonary artery catheter in a group of volunteers. Echocardiography (HDT) and radionuclide angiography (WI) were also performed. During WI, cardiac and stroke volume index increase, but remain constant during HDT; right heart pressures are more elevated during WI than during HDT. Ejection fraction is constant during HDT but rises during WI depending on the depth of immersion. The HDT seems to be more appropriate to simulate microgravity. Echocardiography should be applied in space and invasive measurements are also possible. Author (ESA)

N85-14455# Hamburg Univ. (West Germany). Dept. of Ophthalmology.
INTRAOCULAR FLUID DYNAMICS IN MICROGRAVITY
J. DRAEGER, K. HANKE, R. BERGER, and E. RUMBERGER *In* ESA Life Sci. Res. in Space p 175-177 Aug. 1984 refs
Avail: NTIS HC A14/MF A01

Alterations in systemic circulation due to fluid shift in microgravity, which raise intraocular pressure (IOP) were simulated by head down tilt. Series of tonometry were performed using a handheld applanation tonometer: (1) short time postural change up to -90 deg head down and back; (2) tonometry in -10 deg head down over 2 hr.; (3) repetition of 2 after dehydration of the patients; (4) two 7-day bedrest studies in -6 deg head down tilt; (5) tonometry during lower body negative pressure; and (6) tonometry during Valsalva-maneuver. Immediately on tilting, the IOP changes with hydrostatic pressure. After 1 hr the raised IOP returns to normal. The IOP seems to change parallel to venous pressure. Author (ESA)

N85-14456# Graz Univ. (Austria). Inst. fuer Physiologisches.
MEASUREMENT OF BLOOD AND PLASMA DENSITY WITH THE MECHANICAL OSCILLATOR TECHNIQUE
T. KENNER and H. HINGHOFER-SZALKAY *In* ESA Life Sci. Res. in Space p 179-182 Aug. 1984 refs
Avail: NTIS HC A14/MF A01

The mechanical oscillator technique to determine mass and density of test fluids in the absence of gravity is described. The technique is based on the determination of the autooscillation frequency of a mass-spring system. The mass of the oscillator which has a given volume depends on the density of the test fluid. Mechanical densimetry was used for the continuous recording of blood density in anesthetized animals and for the measurement of blood and plasma samples from human beings during different experimental conditions. Author (ESA)

N85-14457# Copenhagen Univ. (Denmark). Lab. of Human Physiology.
THE INFLUENCE OF ANGIOTENSIN ON THE MAINTENANCE OF VENOUS TONE. THE EFFECT OF LOWER BODY NEGATIVE PRESSURE (LBNP) AND ANGIOTENSIN BLOCKADE
F. BONDE-PETERSEN, P. MALSAKER, B. ELMANN-LARSEN, and O. HENRIKSEN (Hvidovre Hospital, Copenhagen) *In* ESA Life Sci. Res. in Space p 183-184 Aug. 1984 refs Sponsored by Danish Space Board
Avail: NTIS HC A14/MF A01

The effect of lower body negative pressure (LBNP) was studied in 6 normal male subjects during systemic Angiotensin II blockage with Captopril. The protocol included measurements of heart rate, blood pressure (BP) peripheral venous pressure (PVP) and peripheral venous compliance (PVC) using air-plethysmography (left arm) and strain-gage plethysmography (right leg). Administration of 100 mg Captopril decreases PVC in arm and leg, and during LBNP venous pooling also decreases. The same protocol was used to study BP hemostasis. The results from the two studies imply that during LBNP, systemic blockade of Angiotensin II enhances the sympatheticoadrenal activation and the release of vasopressin creating a decrease in PVC. If the compliance in the hepato-splanchnic area is increased simultaneously, this might explain decreased orthostatic tolerance during LBNP.
Author (ESA)

N85-14458# Copenhagen Univ. (Denmark). Lab. for Human Physiology.
HEMODYNAMICS AND PLASMA ARGININE VASOPRESSIN DURING WATER IMMERSION IN NORMAL MAN
P. NORSK, F. BONDE-PETERSEN, and J. WARBERG *In* ESA Life Sci. Res. in Space p 187-190 Aug. 1984 refs
(Contract DSB-1112-33/83; DSB-1112-32/83)
Avail: NTIS HC A14/MF A01

To examine the influence of increase in central venous pressure (CVP) on plasma concentration of arginine vasopressin (plasma AVP), 7 healthy males were studied during control in the erect sitting position wearing a water regulated thermosuit, and during water immersion to the neck (WI) for 6 hr. The WI induces an increase in CVP, sustained during the whole 6 hr period, while plasma AVP is suppressed compared with control. Systolic arterial pressure increases due to immersion, while diastolic arterial pressure is unchanged. Heat rate decreases. There is no change in plasma osmolality when comparing control and WI. A pronounced osmotic diuresis, natriuresis and kaliuresis occurs, due to WI counteracting the acute increase in plasma volume. It is concluded that an isoosmotic increase in CVP suppresses plasma AVP.
Author (ESA)

N85-14459# Copenhagen Univ. (Denmark). Inst. of Medical Physiology C.
ENDOCRINE RESPONSES TO NONHYPOTENSIVE GRAVITATIONAL STRESS: VASOPRESSIN AND ALDOSTERONE
J. WARBERG, P. BIE, A. ASTRUP, N. H. SECHER (Glostrup County Hospital, Denmark), and K. SANDERJENSEN (Glostrup County Hospital, Denmark) *In* ESA Life Sci. Res. in Space p 191-192 Aug. 1984 refs Sponsored by Danish Space Agency
Avail: NTIS HC A14/MF A01

Young males were subjected to slow passive tilting to 20 deg or 40 deg which did not induce hypotension and the plasma concentrations of arginine vasopressin (pAVP) and aldosterone (pALDO) were determined together with intraarterial blood pressure (BP) and central venous pressure (CVP). Tilting to 20 deg has no effect on BP, pAVP and pALDO whereas 40 deg tilt causes a moderate increase in BP and pAVP together with a pronounced increase in pALDO. The CVP is lowered markedly and proportionately with the degree of tilting. Intravenous infusions of AVP have no effect on systemic vascular pressures but cause a pronounced decrease in subcutaneous blood flow. It is concluded that nonhypotensive gravitational stress is associated with increased ALDO secretion and lowered CVP but has little effect on AVP release. Modest increases in pAVP cause subcutaneous vasoconstriction without affecting systemic vascular pressures.
Author (ESA)

N85-14460# Copenhagen Univ. (Denmark). Dept. of Medical Physiology C.
ENDOCRINE RESPONSES TO HYPOTENSIVE GRAVITATIONAL STRESS: CATECHOLAMINES, PANCREATIC POLYPEPTIDE, AND VASOPRESSIN
P. BIE, J. WARBERG, N. H. SECHER (Glostrup County Hospital, Denmark), N. J. CHRISTENSEN (Glostrup County Hospital, Denmark), K. SANDERJENSEN (Glostrup County Hospital, Denmark), and J. GIESE (Glostrup County Hospital, Denmark) *In* ESA Life Sci. Res. In Space p 193-195 Aug. 1984 refs Sponsored by Danish Space Agency
Avail: NTIS HC A14/MF A01

The effect of slow passive head-up tilting to 60 deg was studied in 7 young, healthy volunteers with catheters in a brachial artery and in the superior vena cava. Pressures were measured continuously and arterial plasma samples were analyzed with respect to sympathetic (adrenaline, noradrenaline) and parasympathetic (pancreatic polypeptide) activity as well as to water balance hormones: vasopressin, angiotensin II and aldosterone. Central venous pressure decreases upon tilting and remains almost constant until tilting is terminated. During the first part of the tilting period, blood pressure is maintained, pulse pressure decreases, and heart rate increases. After 19 min tilting had to be terminated due to dizziness, nausea, paleness and decreases in blood pressure, pulse pressure and heart rate.
Author (ESA)

N85-14461# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Inst. for Aerospace Medicine.
GLUCOSE TOLERANCE IN TRAINED AND UNTRAINED SUBJECTS DURING HEAD-DOWN TILT (6 DEG)
H. M. WEGMANN, F. BAISCH, and G. SCHAEFER *In* ESA Life Sci. Res. in Space p 197-201 Aug. 1984 refs
Avail: NTIS HC A14/MF A01

Prior to, during, and after a 7-day bedrest study (6 deg head-down tilt) 4 highly trained athletes (A) and 4 nontrained subjects (NA) were subjected to a standard 2 hr oral glucose tolerance test. Responses of blood glucose, of plasma insulin and C-peptide were evaluated at 30 min intervals after ingestion. Insulin responses to glucose load are markedly elevated during and 2 days after bedrest compared with pre-bedrest responses. However, elevations in NA are significantly more pronounced. Changes in glucose responses due to bedrest are minor. The response patterns of C-peptide suggest that the observed elevations of insulin during bedrest are caused by higher secretion rates rather than by a diminished clearance from the circulatory system.
Author (ESA)

N85-14463# Brussels Univ. (Belgium). Service d'Orthopedie-Traumatologie.
BONE STRUCTURE AND MICROGRAVITY [STRUCTURE OSSEUSE ET MICROGRAVITE]
M. HINSENKAMP *In* ESA Life Sci. Res. in Space p 209-214 Aug. 1984 refs In FRENCH
Avail: NTIS HC A14/MF A01

Space flight effects of bone tissue are reviewed. Lack of mechanical stress is probably the main cause of demineralization in weightlessness. Hormonal and vascular factors are not thought to play a major role in bone changes, but may lower tissue response thresholds to mechanical stress variations. In flight measurement of bone stress, especially in the lower limbs, is suggested.
Author (ESA)

N85-14464# Cologne Univ. (West Germany). Inst. fuer Anatomisches.
LOSS OF BONE SUBSTANCE IN CONSEQUENCE OF AMPUTATION AS A MODEL FOR THE ADAPTATION TO MICROGRAVITY
B. KUMMER *In* ESA Life Sci. Res. in Space p 215-217 Aug. 1984 refs
Avail: NTIS HC A14/MF A01

Bone readaptation after demineralization caused by prolonged weightlessness was simulated using a computer program based on Pauwels theory. The proximal ends of two femora from amputed legs were used to represent stages of adaptation to reduced mechanical stresses. The analysis of the shape of their cross-sections and the distribution of the dense material shows very good parallels with pictures obtained with the computer model. Results suggest that the mathematical function describes, at least qualitatively, the process of functional adaptation of the bone with a sufficient approximation.
Author (ESA)

N85-14465# Limburg State Univ., Maastricht (Netherlands). Dept. of Biochemistry.
VITAMIN K AND THE METABOLIC STATE OF BONE
C. VERMEER *In* ESA Life Sci. Res. in Space p 219-224 Aug. 1984 refs Sponsored by Netherlands Division for Health Research TNO
(Contract MD-82145)
Avail: NTIS HC A14/MF A01

In vivo synthesis of GIA-containing proteins, particularly the bone protein osteocalcin, is discussed. The function of osteocalcin is not completely understood, but evidence indicates that it mediates the regulation of the deposition of calcium phosphate in bone. Since carboxylases from different types of tissue display different substrate specificities, substrate analogs might be found

that preferentially inhibit one type of carboxylase. Whether the inhibition or stimulation of the carboxylase in bone tissue might be a remedy against the loss of bone mass during osteoporosis or under microgravity conditions is not known. Author (ESA)

N85-14466# Mainz Univ. (West Germany). Dept. of Physiology.
THE EUROPEAN VESTIBULAR EXPERIMENTS IN THE SPACELAB 1 MISSION
R. VONBAUMGARTEN *In* ESA Life Sci. Res. in Space p 227-228 Aug. 1984 refs
Avail: NTIS HC A14/MF A01

Measurements of the otolith system threshold, of adaptation of the vestibular system to the space environment, and of the effects of optokinetic and of semicircular canal function undisturbed by concomittant otolithic stimulation were carried out on Spacelab. A vestibular helmet contained electronic amplifiers for recording the electro-oculogram, respiration and blood volume pulse, and the heating and cooling devices and pumps for gas calorization of both ears. A visor in front of the left eye contained a television monitor for optokinetic stimulation with prerecorded vertically or horizontally moving stripe patterns, and, in front of the right eye, a charged coupled device television camera to record movements and position of the right eye with infrared illumination in complete darkness. Caloric nystagmus is reported. Author (ESA)

N85-14467# Royal Air Force Inst. of Aviation Medicine, Farnborough (England).
THRESHOLDS OF PERCEPTION OF WHOLE BODY LINEAR OSCILLATION: MODIFICATION BY SPACEFLIGHT
A. J. BENSON *In* ESA Life Sci. Res. in Space p 229-235 Aug. 1984 refs
Avail: NTIS HC A14/MF A01

Thresholds for the detection of linear oscillatory motion at 0.3 Hz in the X, Y and Z body axes were made during the flight of Spacelab-1 and on the ground pre and post-flight, using the method of limits with a single staircase procedure. Measures obtained on 3 crew members in-flight exhibit thresholds greater, by a factor of 1.5 to 4.3, than those obtained pre-flight. Post-flight, two crew members have significantly elevated X and Y axis thresholds whereas the other two crew members have lowered thresholds in X, Y and Z axes. Thresholds returned to pre-flight levels by the second post-flight day. Author (ESA)

N85-14468*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
THE ADAPTATION OF VESTIBULO-SPINAL REFLEXES AS A FUNCTION OF SPACEFLIGHT AND THEIR RELATIONSHIP TO SPACE MOTION SICKNESS
M. F. RESCHKE, D. J. ANDERSON (Michigan Univ., Ann Arbor), J. L. HOMICK, J. T. BAKER, S. J. WOOD, and W. G. CROSIER *In* ESA Life Sci. Res. in Space p 237-245 Aug. 1984 refs
Avail: NTIS HC A14/MF A01

The hypothesis that exposure to prolonged free fall is a form of sensorymotor rearrangement rather than a direct change in otolith sensitivity or sensory compensation for a reduced otolith input is discussed. Data from Spacelab-1 experiment 1NS-104 are presented to support an otolith reinterpretation hypothesis. This experiment measured vestibulo-spinal reflex changes as a function of sustained free fall. Findings indicate that when a monosynaptic reflex (H-reflex), measured from the major postural muscles (soleus) is used, adaptation to space flight includes a change in how the central nervous system interprets a fall. In a normal gravity environment a sudden unexpected fall produces a potentiated H-reflex. After 7 days inflight, an equivalent fall does not potentiate the reflex. Postflight a greatly increased reflex is observed in those crewmen most susceptible to space motion sickness.
Author (ESA)

N85-14469# Technische Univ., Munich (West Germany). Dept. of Otolaryngology.
CALORIC STIMULATION OF THE VESTIBULAR SYSTEM IN MICROGRAVITY
H. SCHERER, A. H. CLARKE, and U. BRAND (Swedish Airforce) *In* ESA Life Sci. Res. in Space p 247-249 Aug. 1984 refs
Avail: NTIS HC A14/MF A01

The caloric experiment carried out during the Spacelab 1 mission tested Barany's theory of convection in microgravity. Contrary to expectation, a caloric nystagmus is elicited in both test subjects. The intensity of the response is comparable to that found on Earth, although during the first few days in space the vestibulo-ocular reflex is partly suppressed by the adaptation to the microgravity conditions. It is indicated that investigation of the interplay between semicircular canal and otolith receptors is necessary to clarify fully the mechanisms in the peripheral vestibular system. Author (ESA)

N85-14470# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Inst. for Aerospace Medicine.
INNER EAR CHARACTERISTICS DURING 7 DAY ANTIORTHOSTATIC BEDREST (6 DEG HEAD DOWN TILT)
G. AUST, H. DENZ, and F. BAISCH *In* ESA Life Sci. Res. in Space p 251-255 Aug. 1984 refs
Avail: NTIS HC A14/MF A01

The responses to bithermal monaural caloric stimulation with water at 30 and 44 C, and the pure tone hearing threshold were measured in male volunteers before, during and after 0 g simulation by 6 deg head down tilt (HDT). Nystagmus frequency and slow phase velocity are lower than at control level after 20 hr in HDT position. From thereon they increase and reach an average value above control at the end of the HDT period; 30 hr later they are still elevated, but are normal again 4 days after termination of HDT. Hearing thresholds improve 20 hr after beginning of HDT. However, they are above control on day 3 during and at the end of the HDT period. Similar values are measured 30 hr later.
Author (ESA)

N85-14471# Forschungsinstitut fuer Anthropotechnik, Wachtberg (West Germany).
VISUAL-VESTIBULAR INTERACTION IN HUMAN MOTION PERCEPTION
G. DOERFEL and H. DISTELMAIER *In* ESA Life Sci. Res. in Space p 257-260 Aug. 1984 refs
Avail: NTIS HC A14/MF A01

Human ability to perceive differences between optically and mechanically presented motion information was investigated. Difference perception improves with increased differences and larger acceleration values, but subjects have difficulties especially in perceiving small differences with smaller acceleration values. Even when visual and mechanical acceleration values were identical subjects sometimes get the impression of existing differences, which might be interpreted as perceptual noise according to signal detection theory. Using signal detection theory for classifying subjects with respect to motion information discrimination ability reveals large interindividual differences. Mean acceleration value at the perceptual threshold is 0.5 m/sec/sec within the perceptual range investigated. Author (ESA)

N85-14472# Stirling Univ. (Scotland). Dept. of Psychology.
MEDICATION INTERFERENCE WITH SPACE RESEARCH: AN EXAMPLE FROM A MASS-DISCRIMINATION EXPERIMENT ON SPACELAB 1
H. E. ROSS and E. SCHWARTZ (DFVLR, Cologne) *In* ESA Life Sci. Res. in Space p 261-264 Aug. 1984 refs Sponsored by ESA, UK Royal Society and UK Medical Research Council
Avail: NTIS HC A14/MF A01

The effects of anti motion sickness drugs on mass discrimination were tested to determine whether the use of these drugs in space could contaminate an experiment on the effect of weightlessness on mass discrimination. A significant deterioration in performance is found for oral scopolamine/dextroamphetamine and transdermal

scopolamine. The deterioration is much less than that found under microgravity, so medication cannot account for the results of parabolic flights or of Spacelab. However, medication taken predominantly in the early days of a mission could interfere with the measurement of adaptation to weightlessness. Author (ESA)

N85-14474# Clinical Research Centre, London (England).
SLEEP PHYSIOLOGY IN WEIGHTLESSNESS (EXPERIMENT 1ES 030)
O. QUADENS (Univ. Instelling Antwerpen, Belgium), H. L. GREEN, and S. F. D. STOTT *In* ESA Life Sci. Res. in Space p 271-274 Aug. 1984 refs
Avail: NTIS HC A14/MF A01

Four channel recorders were used to record the electrocardiogram (EKG) the muscle activity (EMG) and eye movements (EOG) during the Spacelab 1 mission. The EKG was recorded during the entire mission, the EOG and the EMG during the first two sleep periods only. The EKG shows minor changes as a function of weightlessness whereas the EOG shows an important increase in the number of eye movements during night zero as compared to the pre and postflight baseline data. The electroencephalogram was recorded with the same recorder during parabolic flights. It shows a significant increase in the theta frequency band during the acrophase of the parabolas.
Author (ESA)

N85-14479 Ohio State Univ., Columbus.
THE EFFECT OF PROPRANOLOL ON THE TRAINING RESPONSE TO ENDURANCE EXERCISE IN NORMAL HUMAN ADULTS Ph.D. Thesis
P. A. CLEARY 1984 93 p
Avail: Univ. Microfilms Order No. DA8418928

Endurance exercise results in adaptive changes in the cardiopulmonary system in both normal subjects and in patients with coronary artery disease. Sustained beta adrenergic stimulation has been postulated as one of the key mechanisms responsible for cardiopulmonary conditioning. To better test this hypothesis, fourteen healthy men and women, ages 22-45 years, underwent ten weeks of vigorous aerobic conditioning. Eight received 160 mg propranolol therapy (40mg q 6 hrs) and six received no drug therapy during the conditioning period. Four graded maximal exercise tests on bicycle ergometers were administered before starting drugs or training (Test 1); following three days of oral propranolol/no drug therapy (Test 2); after ten weeks of propranolol therapy and training (Test 3); following removal of beta blockade after the ten weeks training period (Test 4). The overall improvement for both groups was statistically similar between Test 1 and Test 4. Thus, it appears that while beta adrenergic blockade does not attenuate exercise conditioning, it nevertheless has a significant effect on the degree to which certain training responses are manifested in normal subjects. Dissert. Abstr.

N85-14480# Brookhaven National Lab., Upton, N. Y. Medical Research Center.
IN VIVO NEUTRON ACTIVATION ANALYSIS: BODY COMPOSITION STUDIES IN HEALTH AND DISEASE
K. J. ELLIS and S. H. COHN 1984 14 p refs Presented at the 5th Intern. Conf. on Nucl. Methods in Environ. and Energy Res., Mayaquez, Puerto Rico, 2 Apr. 1984
(Contract DE-AC02-76CH-00016)
(DE84-014092; BNL-34753; CONF-840408-15) Avail: NTIS HC A02/MF A01

In vivo analysis of body elements by neutron activation which is an important tool in medical research is discussed. It provides a direct in vivo quantitative measure of body composition of human beings. Basic physiological differences related to age, sex, race, and body size were assessed by this technique. The diagnosis and management of patients with various metabolic disorders and diseases was demonstrated. In vivo neutron activation analysis (IVNAA) of calcium, phosphorus, sodium, chlorine, nitrogen, hydrogen, and potassium was utilized. These elements serve as the basis for a four compartment model of body composition: protein, water, mineral ash, and fat. Variations in these compartments are demonstrated in clinical research programs investigating obesity, anorexia, cancer, renal failure, osteoporosis, and normal aging. The IVNAA provides an approach to the evaluation of clinical diagnosis, efficacy of therapeutic regimens, and monitoring of the aging process. DOE

N85-14481# California Univ., Livermore. Lawrence Livermore Lab.
CLINICAL MEASUREMENTS USING FIBER OPTICS AND OPTRODES
F. P. MILANOVICH, T. B. HIRSCHFELD, F. T. WANG, S. M. KLAINER (ST and E Technical Services, Inc., San Ramon, Calif.), and D. WALT (Tufts Univ., Medford, Mass.) Jul. 1984 9 p refs Presented at the SPIE Ann. Tech. Symp., San Diego, Calif., 21 Aug. 1984
(Contract W-7405-ENG-48)
(DE84-015043; UCRL-90769; CONF-840872-7) Avail: NTIS HC A02/MF A01

Fiber optics, optrodes, and fluorescence spectroscopy were combined to form the new technology of remote fiber fluorimetry (RFF). Both in-vivo and in-vitro clinical measurements can be made by using this technique. The optrode, and fiber termination with preselected chemical or physical properties, is attached to the distal end of the optical fiber so that specific, in-situ measurements can be made. Some RFF systems for pH, blood pressure, oxygen, and carbon dioxide are being completed, and other optrodes are in the development stages. DOE

N85-14482# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Forschungsbereich Flugmechanik/Flugfuehrung.
THE APPLICATION OF BASIC CONTROL LAWS TO HUMAN MEDICINE
F. THOMAS Jul. 1984 94 p refs In GERMAN; ENGLISH summary
(DFVLR-MITT-84-13) Avail: NTIS HC A05/MF A01; DFVLR, Cologne DM 19

Proposals for complementary medical and aptitude checks for aerospace personnel expected to remain in service over extended periods of time (decades) were worked out. Laws such as those governing a regulation system (feedback phenomenon) were sought in medical and biological disciplines. The human organism is compared to a multi-entry regulation system of high rank where accumulated toxins are perturbations leading to organ damage. Diseases resulting from perturbed regulation are mostly of chronic type. Diagnosis methods were developed from the response of the system to an electrical perturbation signal. Author (ESA)

N85-14483# Karolinska Inst., Stockholm (Sweden). Lab. for Clinical Stress Research.
CATECHOLAMINE EXCRETION AND SUBJECTIVE RATINGS OF TENSION DURING AUTOGENIC TRAINING AND MENTAL STRESS
L. TORSVALL, G. NILSSON, R. NILSSON, A. SCHIOELER, G. B. SUNDBY, and T. AAKERSTEDT Dec. 1983 10 p refs
(REPT-172; ISSN-0280-2783) Avail: NTIS HC A02/MF A01

Ten female students served as their own controls in an investigation of acute effects of autogenic training, and stress reactions with preceding relaxation. Dependent variables were urinary catecholamine excretion and subjective ratings of tension, while the mental stressor consisted of a color word conflict test. Results show a significant increase of adrenaline and noradrenaline excretion and subjective tension during the stress situation. Pairwise t-tests reveal that the stress response of the catecholamines is greater after relaxation. The intraindividual correlations between the physiological and the psychological variables are significant. Results suggest that relaxation may increase the readiness for demanding situations. Author (ESA)

N85-14484# John B. Pierce Foundation of Connecticut, New Haven.
THERMOREGULATORY CONSEQUENCES OF LONG-TERM MICROWAVE EXPOSURE AT CONTROLLED AMBIENT TEMPERATURES Final Report
E. R. ADAIR, D. E. SPIERS, R. O. RAWSON, B. W. ADAMS, D. K. SHELDON, P. J. PIVIROTTO, and G. M. AKEL Aug. 1984 91 p refs
(Contract EPA-R-807085)
(PB84-236603; EPA/600/1-84/009) Avail: NTIS HC A05/MF A01 CSCL 06R

The study was designed to identify and measure changes in thermoregulatory response systems, both behavioral and physiological, that may occur when squirrel monkeys are exposed to 2450-MHz CW microwaves 40 hours/week for 15 weeks. Microwave power densities explored were 1 and 5 mW/sq. cm. (SAR = 0.16 W/kg per mW/sq. cm.) and were presented at controlled environmental temperatures of 25, 30, and 35 C. Standardized tests, conducted periodically, assessed changes in thermoregulatory responses. Results showed no alteration of metabolic rate, internal body temperature, or thermoregulatory behavior by microwave exposure although the ambient temperature prevailing during chronic exposure could exert an effect. The most robust consequence of microwave exposure was a reduction in body mass which appeared to be a function of microwave power density. Author (GRA)

N85-15349*# Marquette Univ., Milwaukee, Wis. Dept. of Biology.
ALTERATIONS IN SKELETAL MUSCLE WITH DISUSE ATROPHY Annual Report
R. H. FITTS 1984 4 p
(Contract NAG2-212)
(NASA-CR-174195; NAS 1.26:174195) Avail: NTIS HC A02/MF A01 CSCL 06P

Progress is reported in the following areas: (1) microgel electrophoresis identification of single fibers; (2) skinned fiber preparation; and (3) microbiochemical techniques for assaying important enzymes and substrates in single fibers. A.R.H.

N85-15350# California Univ., Irvine, Dayton, Ohio.
PROCEEDINGS OF THE 14TH CONFERENCE ON ENVIRONMENTAL TOXICOLOGY
J. D. MACEWEN, E. H. VERNOT, and M. PINKERTON, ed. Wright-Patterson AFB, Ohio AF Medical Research Lab. Aug. 1984 339 p Proc. held at Dayton, Ohio, 15-17 Nov. 1983 Sponsored in part by Navy
(Contract F33615-80-C-0512)
(AD-A146400; AFAMRL-TR-83-099) Avail: NTIS HC A15/MF A01 CSCL 06T

Papers were presented covering molecular mechanisms of n-hexane neurotoxicity, metabolism of n-hexane and anatomical effects of neurotoxins. The pathological, metabolic, electrophysiological and biochemical characteristics of organophosphorus induced neurotoxicity were discussed in specific presentations. The male reproductive system as a target organ and specific problems associated with mixture toxicology were subjects of individual sessions. Occupational health data bases, early detection of environmental exposure and effects of exposure to Agent Orange were discussed in papers.

N85-15351# Albert Einstein Coll. of Medicine, New York. Inst. of Neurotoxicology.
NEUROTOXICOLOGY: A NEW SCIENTIFIC CHALLENGE
P. S. SPENCER *In* Calif. Univ., Irvine Proc. of the 14th Conf. on Environ. Toxicol. p 13-16 Aug. 1984 Sponsored in part by the Muscular Dystrophy Assoc., Amyotrophic Lateral Sclerosis Association of America, and Shell International Research
(Contract NIH-NS-19611; NIH-OH-00851; NIH-OH-00555)
(AD-P004017) Avail: NTIS HC A15/MF A01 CSCL 06T

The science of neurotoxicology is in its infancy. The scale of the problem has been recognized, the scope of the discipline defined, and a preliminary classification of neurotoxic response developed. Some information is available on the relative frequency of neurotoxic response developed. Some information is available on the relative frequency of neurotoxic disease in developed and developing countries, and in which environmental or social niches these diseases occur. The challenge facing basic and clinical neurotoxicologists is to understand how these diseases develop and how they can be prevented. Since many neurotoxic conditions mimic naturally occurring neurological diseases, investigations designed to determine the biological actions of neurotoxic chemicals will undoubtedly illuminate other types of nervous-system compromise. Viewed from this perspective, the neurotoxic agent is not only a threat to human health, but also a powerful investigatory tool. GRA

N85-15352# Eastman Kodak Co., Rochester, N. Y. Health, Safety and Human Factors Lab.
REVIEW OF THE TOXICOKINETICS OF N-HEXANE
G. D. DIVINCENZO *In* Calif. Univ., Irvine Proc. of the 14th Conf. on Environ. Toxicol. p 17-24 Aug. 1984
(AD-P004018) Avail: NTIS HC A15/MF A01 CSCL 06T

N-Hexane is a volatile, lipophilic solvent that is readily absorbed by the pulmonary, oral, and dermal routes. It is rapidly excreted unchanged in expired air, and is excreted in urine in the form of metabolites. n-Hexane is metabolized by a complex pathway that leads to a variety of oxidation products, one of which is 2.5-hexanedione. The neurotoxicity of n-hexane is related to its metabolism to 2,5-hexanedione. n-Hexane is the least potent number of a series of neurotoxic hexacarbons. GRA

N85-15353# Albert Einstein Coll. of Medicine, New York. Dept. of Neurology.
INTERACTIONS OF KETONES AND HEXACARBONS
B. VERONESI (Northrup Services, Research Triangle Park, N.C.), A. W. LINGON (Exxon Corp., E. Millstone, N.J.), and P. S. SPENCER *In* Calif. Univ., Irvine Proc. of the 14th Conf. on Environ. Toxicol. p 25-39 Aug. 1984
(Contract CDC-OH-00535; CDC-OH-00851; NSF PFR-78-812701)
(AD-P004019) Avail: NTIS HC A15/MF A01 CSCL 06T

Methyl ethyl ketone appears to accelerate the onset and severity of the dying-back neuropathy produced by hexacarbons. The mechanism underlying this potentiation is unknown. It was our intention to replicate and investigate this interaction in tissue culture using organotypic explants of mouse spinal cord with attached dorsal root ganglia and striated muscle. At maturity, this complex displays morphological and bioelectrical features typical of mammalian neuromuscular tissues in vivo. This type of tissue culture has been used for many years in experimental neurobiology and neuropathology and is amenable to neurotoxicological inquiries. It has been especially valuable in addressing the pathogenic and metabolic events of subchronic exposure to aliphatic hexacarbons. GRA

N85-15354# New York State Dept. of Health, Albany.
MOLECULAR MECHANISMS OF N-HEXANE NEUROTOXICITY
A. P. DECAPRIO *In* Calif. Univ., Irvine Proc. of the 14th Conf. on Environ. Toxicol. p 40-59 Aug. 1984
(AD-P004020) Avail: NTIS HC A15/MF A01 CSCL 06T

A hypothetical molecular mechanism of action must ideally account for the structure/activity relationships, neurofilament accumulation, in vivo covalent protein binding, direct action on axonal components, and target organ specificity which are characteristic of the neuropathy caused by these compounds. Although this ideal has not yet been realized, substantial progress has been made toward elucidation of the crucial events leading to neuropathy. Ultimate success awaits exploration of the molecular interaction of the neurotoxic diketones with axonal components in vivo. The distinguishing features of n-hexane neuropathy are listed. GRA

N85-15355# Ohio State Univ., Columbus. Dept. of Neurology and Pathology.
PATHOLOGY AND AXONAL TRANSPORT IN HEXACARBON NEUROPATHIES
Z. SAHENK and J. R. MENDELL *In* Calif. Univ., Irvine Proc. of the 14th Conf. on Environ. Toxicol. p 60-67 Aug. 1984
(AD-P004021) Avail: NTIS HC A15/MF A01 CSCL 06T

These studies lead us to propose the following hypothesis. The earliest change in the axon following hexacarbon exposure is an alteration in the cytoskeleton, resulting in clusters of microtubule channels segregated from neurofilaments. Initially, fast anterograde transport continues through these functioning channels. With continued exposure, the cytoskeleton becomes chaotic, and pathways for moving organelles are impaired, affecting both anterograde and retrograde transport. The severe disruption in axoplasmic transport seems to play a key role in axonal degeneration, at least in part related to the failure of delivery of important materials to the distal axon. Furthermore, the accumulation of lysosomal material, carried by retrograde transport, may play a role in the initiation and/or acceleration of the intraaxonal digestive process which is part of nerve fiber degeneration. GRA

N85-15356# Stauffer Chemical Co., Farmington, Conn. Toxicology Dept.
ORGANOPHOSPHORUS-INDUCED DELAYED NEUROTOXICITY: SYNDROME AND EXPERIMENTAL MODELS
G. L. SPRAGUE, A. A. BICKFORD, and T. R. CASTLES *In* Calif. Univ., Irvine Proc. of the 14th Conf. on Environ. Toxicol. p 69-75 Aug. 1984
(AD-P004022) Avail: NTIS HC A15/MF A01 CSCL 06T

This study was conducted to compare neurotoxicity in hens and rats produced by tri-o-cresyl phosphate (TOCP) delayed neurotoxicant. A metabolic inhibitor, piperonyl butoxide, was co-administered with TOCP in rats in an attempt to reduce their resistance to organophosphate-induced delayed neurotoxicity. GRA

N85-15357# American Cyanamid Co., Princeton, N.J. Agriculture Research Div.
CHEMISTRY AND METABOLISM OF DELAYED NEUROTOXIC ORGANOPHOSPHORUS ESTERS
J. G. HOLLINGSHAUS *In* Calif. Univ., Irvine Proc. of the 14th Conf. on Environ. Toxicol. p 76-105 Aug. 1984
(AD-P004023) Avail: NTIS HC A15/MF A01 CSCL 06T

In general, correlations between organophosphorus ester-induced delayed neurotoxicity (OPIDN) in vivo and physical/chemical parameters or inhibition of NTE in vitro have not been totally satisfactory. Some correlations of OPIDN with leaving groups, length of O-alkyl chains, or the nature of the P-C group have been demonstrated, but such correlations only apply to closely related series of compounds where two of the substituents remain constant while the third is varied. Although the biochemical and physiologic functions of NTE are unknown, there are numerous satisfactory correlations between inhibitors of NTE in vitro and OPIDN in vivo. However, significant exceptions have been found which at present make it impossible to predict those structures most likely to produce OPIDN. GRA

N85-15358# Virginia Polytechnic Inst., Blacksburg. Coll. of Veterinary Medicine.
PATHOLOGY OF ORGANOPHOSPHORUS-INDUCED DELAYED NEUROTOXICITY
B. S. JORTNER *In* Calif. Univ., Irvine Proc. of the 14th Conf. on Environ. Toxicol. p 106-117 Aug. 1984
(AD-P004024) Avail: NTIS HC A15/MF A01 CSCL 06T

Details of the nature and metabolic effects of the neurotoxic organophosphorus compounds, experimental protocols used, species susceptibility, and clinical disease produced in studies of delayed neuropathy are considered elsewhere in these proceedings. This presentation will emphasize the nature of associated nervous system lesions. To properly appreciate this, a brief note of clinical abnormalities is useful. Administration of an appropriate dose of a neurotoxic organophosphorus compound to a susceptible species produces clinical signs in about 1-3 weeks. In hens given tri-ortho-tolyl (or cresyl) phosphate (TOTP), an unsteady, clumsy gait began in about 8-10 days, and in association with ataxia, progressed to weakness and paralysis. Wings were affected later, and to a lesser degree. GRA

N85-15359# Parke-Davis Pharmaceutical Co., Ann Arbor, Mich.
ELECTROPHYSIOLOGIC CHANGES IN ORGANOPHOSPHORUS-INDUCED DELAYED NEUROTOXICITY
R. J. ANDERSON *In* Calif. Univ., Irvine Proc. of the 14th Conf. on Environ. Toxicol. p 118-126 Aug. 1984
(AD-P004025) Avail: NTIS HC A15/MF A01 CSCL 06T

There is now a considerable body of literature showing that organophosphorus (OP) agents which produce organophosphorus-induced delayed neuropathy (OPIDN) also inhibit neurotoxic esterase (NTE). Although the functional relationship of these two events has not been established, the correlation is strong enough that NTE inhibition can be used as a reliable predictor of the peripheral neuropathy potency of a given agent (Johnson, 1975). There is a wealth of data describing the histopathology and biochemistry associated with OPIDN, but few electrophysiologic correlates have been made. GRA

N85-15360# Michigan Univ., Ann Arbor. Toxicology Research Lab.
BIOCHEMISTRY AND PATHOGENIC HYPOTHESES OF ORGANOPHOSPHORUS-INDUCED DELAYED NEUROTOXICITY
B. W. SCHWAB and R. J. RICHARDSON *In* Calif. Univ., Irvine Proc. of the 14th Conf. on Environ. Toxicol. p 127-135 Aug. 1984
(Contract NIH-ES-01611; NIH-ES-02770)
(AD-P004026) Avail: NTIS HC A15/MF A01 CSCL 06T

This report will be a brief review of the investigations which provide data supportive of the hypothesis that a membrane-associated protein is the initial target of neurotoxic organophosphorus compounds (the term neurotoxic OP will be used in this paper to refer to organophosphorus compounds which produce delayed neuropathy). Findings from more recent studies will be used to develop a picture of the molecular state of the protein at the outset of the neurotoxic process. GRA

N85-15361# Johns Hopkins Univ., Baltimore, Md. School of Medicine.
CRITICAL OVERVIEW OF HEXACARBONS AND ORGANOPHOSPHATES
J. W. GRIFFIN *In* Calif. Univ., Irvine Proc. of the 14th Conf. on Environ. Toxicol. p 136-163 Aug. 1984
(AD-P004027) Avail: NTIS HC A15/MF A01 CSCL 06T

At the outset it seems worthwhile to compare and contrast the two groups of agents that have been discussed today - the neurotoxic hexacarbons and the delayed neurotoxicity of organophosphates. Dr. Spencer indicated that distal axonal degeneration is by far the most common pathologic manifestation of chemical neurotoxicity in general. The groups of agents under discussion both produce types of distal axonal degeneration. These agents have received extensive study, not only because of their public health implications, but as model systems for this type of neuropathology. In the last few years a wealth of basic toxicology, biochemistry, and data describing structure-function relationships has developed around both groups of agents. Parenthetically, it is difficult to overestimate the value of this broad research effort. GRA

N85-15362# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
PHARMACOKINETIC INTERACTIONS OF MIXTURES
M. E. ANDERSEN and H. J. CLEWELL, III *In* Calif. Univ., Irvine Proc. of the 14th Conf. on Environ. Toxicol. p 226-238 Aug. 1984
(AD-P004032) Avail: NTIS HC A15/MF A01 CSCL 06T

This paper is divided into two sections. First, we describe several examples from the literature which indicate toxicologic or

pharmacokinetic interactions arising during co-exposure to two vapors. Secondly, we discuss the metabolic basis of these interactions and try to generalize these results to illuminate the interactions that are expected during exposure to more complex mixtures. When possible, the examples in the second portion are given a quantitative basis by applying a physiological pharmacokinetic model to describe these interactions. GRA

N85-15363# California Univ., Irvine, Dayton, Ohio.
THE TOXICITY OF COMPLEX MIXTURES
H. N. MACFARLAND *In* Calif. Univ., Irvine Proc. of the 14th Conf. on Environ. Toxicol. p 239-245 Aug. 1984
(AD-P004033) Avail: NTIS HC A15/MF A01 CSCL 06T

In discussing the topic of the toxicity of complex mixtures, a definition of what we mean by complex is required. I shall consider any mixture of toxicants containing two or more components as complex. Statisticians have proposed various mathematical models to describe a number of types of toxicological action that mixtures may exhibit and I shall touch on these briefly. In addition, I will outline some studies on two component air pollutant mixtures and also another study with a mixture containing several hundred components to show how toxicologists, in fact, deal with these problems and to what extent they refer to these mathematical models in current practice. GRA

N85-15364# New Jersey Medical School, Newark. Dept. of Pharmacology.
TERATOGENICITY STUDIES OF CARBARYL AND MALATHION ALONE AND IN COMBINATION IN VARIOUS LABORATORY ANIMALS
M. S. ABDEL-RAHMAN and D. W. LECHNER *In* Calif. Univ., Irvine Proc. of the 14th Conf. on Environ. Toxicol. p 246-257 Aug. 1984
(AD-P004034) Avail: NTIS HC A15/MF A01 CSCL 06T

In the area of teratology, little has been studied concerning the interaction of chemicals, especially these two pesticides. This report will discuss in sufficient detail those aspects of teratogenicity and the mechanism which should allow for a better understanding of the toxic actions of these pesticides. GRA

N85-15365# Environmental Protection Agency, Cincinnati, Ohio. Toxicology and Microbiology Div.
TOXICOLOGY OF NATURAL AND MAN-MADE TOXICANTS IN DRINKING WATER
R. J. BULL *In* Calif. Univ., Irvine Proc. of the 14th Conf. on Environ. Toxicol. p 259-266 Aug. 1984
(AD-P004035) Avail: NTIS HC A15/MF A01 CSCL 06T

There are the cases where one chemical actually reacts with a second chemical within the body to produce a more or less toxic group of chemicals. For the purposes of this paper, however, only reactions of chlorine to produce chemicals that possess carcinogenic and mutagenic properties will be considered. GRA

N85-15366# Ohio State Univ., Columbus. Dept. of Pharmacology.
ASPECTS OF SOLVENT TOXICITY IN MIXTURES
A. J. TOBIA, C. H. MILLER, JR., and D. COURI *In* Calif. Univ., Irvine Proc. of the 14th Conf. on Environ. Toxicol. p 267-283 Aug. 1984
(AD-P004036) Avail: NTIS HC A15/MF A01 CSCL 06T

In this presentation we will deal with chemicals produced in the United States in excess of 1 billion pounds per year. It is presumed that chemicals produced in such high volume would be those most likely to present health hazards under certain conditions of exposure. A recent EPA document, Perspectives on the Top Fifty Production Volume of Chemicals (July 1980), lists the Top 50 Chemicals. Although eleven of the top twelve are inorganic (elements, mineral acids and bases or salts), 31 of the 50 are organic, mostly monomers of plastics, rubbers or fibers; also fertilizers, antifreeze and intermediates. Xylene appears twice - once as mixed xylenes which is mostly meta and also as p-xylene, although toxic levels are not distinguished. GRA

N85-15367# School of Aerospace Medicine, Brooks AFB, Tex.
AN UPDATE ON THE CAPABILITIES OF THE AIR FORCE COMPUTERIZED OCCUPATIONAL HEALTH PROGRAM (COHP)
C. D. WORTHY, JR. and K. A. MEIER *In* Calif. Univ., Irvine Proc. of the 14th Conf. on Environ. Toxicol. p 293-299 Aug. 1984
(AD-P004037) Avail: NTIS HC A15/MF A01 CSCL 06T

The Air Force has been conducting an aggressive occupational health program for over 30 years. The ultimate goal of the program is to protect the worker, both military and civilian, by providing a work environment that is free of recognized chemical, physical, or biological health risks. The success of the program has been and will be an essential contribution to our country's overall military readiness. GRA

N85-15368# School of Aerospace Medicine, Brooks AFB, Tex.
THE EPIDEMIOLOGY AND TOXICOLOGY OF AGENT ORANGE
W. H. WOLFE *In* Calif. Univ., Irvine Proc. of the 14th Conf. on Environ. Toxicol. p 300-306 Aug. 1984
(AD-P004038) Avail: NTIS HC A15/MF A01 CSCL 06T

An estimated 107 million pounds of herbicides were aerially-disseminated on three million acres in South Viet Nam from January 1962 through October 1971. Approximately 94 percent of all herbicides sprayed in Vietnam were 2,4-D (56 million pounds or 53 percent of total) or 2,4,5-T (44 million pounds or 41 percent of total). The 44 million pounds of 2,4,5-T contained an estimated 368 pounds of the toxic contaminant, 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD or dioxin). Currently, there are no epidemiologic data associating TCDD with any long-term health effects in humans other than intermittent Chloracne; however, while there is no evidence validating serious long-term health effects, neither is there strong evidence for lack of effect. GRA

N85-15369# Air Force Occupational and Environmental Health Lab., Brooks AFB, Tex.
EARLY DETECTION OF ENVIRONMENTAL EXPOSURE
R. T. P. DETREVILLE *In* California Univ., Irvine Proc. of the 14th Conf. on Environ. Toxicol. p 307-324 Aug. 1984
(AD-P004039) Avail: NTIS HC A15/MF A01 CSCL 06T

General methods of prevention in industrial hygiene are shown in Table 1 which shows the place of early detection of disease or excessive exposure. Early detection and/or exclusion of excessive exposure within a comprehensive program is usually much more cost effective than looking for early disease in an uncontrolled or inadequately controlled industrial environment. Table 2 lists some of the examples of screening approaches that have been used. Our diagnostic methods have advanced rapidly and there are much more sophisticated types of X-ray examinations and even CAT scanning that may be applicable in identifying whether chest disease has resulted from asbestos exposure. GRA

N85-15370# Naval Health Research Center, San Diego, Calif.
PREDICTION OF PERCENT BODY FAT FOR U.S. NAVY WOMEN FROM BODY CIRCUMFERENCES AND HEIGHT Interim Report
J. A. HODGDON and M. B. BECKETT Jun. 1984 31 p
(AD-A146456; NAVHLTHRSCHC-84-29) Avail: NTIS HC A03/MF A01 CSCL 06N

In October 1981, OPNAVINST 6110.1B was promulgated establishing the percentage of body weight contributed by fat mass (%BF) as the basis for weight control decisions. Tables based upon the work of Wright, et al. allowing prediction of %BF from neck, biceps, forearm, abdomen and thigh circumferences were accepted for use on an interim basis. This report covers validation of the equation of Wright and his co-workers, as well as development and cross-validation of a new equation which offers improved prediction of %BF for U.S. Navy female personnel. Anthropometric measures consisting of 8 skinfold thicknesses, 11 body circumferences, height, and body weight were made of 214 female U.S. Navy personnel aged 18-44 years (mean age - 26.5 years). In addition, each participant had her body density and %BF determined by underwater weighing. Validity of the Wright

equation was assessed by correlation between predicted and measured %BF. The correlation coefficient - 0.80 (std. err. meas. = 4.19 %BF). Errors in prediction near the Navy minimum standard of 30% BF, dictated development of a new equation. Factor analysis of the anthropometric variables indicated a suitable equation could be developed using circumferences and height as predictors. An equation was developed using forward, stepwise multiple regression of logarithmic transforms of circumferences and height as predictors of body density determined from underwater weighing. The final equation was: Body Density = -0.350 x log (ABDOMEN I + HIP - NECK) + 0.221 X log (HEIGHT) + 1.296. All measurements are expressed in centimeters. The multiple correlation coefficient for this equation was 0.85. GRA

N85-15371# Army Military Personnel Center, Alexandria, Va.
ELECTROPHYSIOLOGICAL CORRELATES OF VERNIER ACUITY IN HUMAN VISUAL CORTEX M.S. Thesis
R. ZAK 28 Apr. 1984 98 p
(AD-A146533) Avail: NTIS HC A05/MF A01 CSCL 06P

A three part evoked potential (EP) study was undertaken in an attempt to better understand the neural mechanisms underlying vernier acuity. Results indicated: (1) VEPs evoked by vernier offset stimuli could be used to estimate psychophysical threshold, (2) VEP amplitude was affected by interference lines in the same way as psychophysical sensitivity (3) origin of the VEPs (and the associated neural mechanism) may be outside of striate cortex. GRA

N85-15372# Brigham and Women's Hospital, Boston, Mass.
INTERACTION BETWEEN LUNG MECHANICS AND GAS EXCHANGE BY LOW VOLUME HIGH FREQUENCY PULMONARY VENTILATION IN PATIENTS WITH RESPIRATORY FAILURE Annual Summary Report, 1 Oct. 1982 - 30 Sep. 1983
J. M. DRAZEN, J. LEHR, A. F. SAARI, J. SOLWAY, and A. S. SLUTSKY 22 Nov. 1983 46 p
(Contract DAMD17-82-C-2210; DA PROJ. 3M1-62734-A-875)
(AD-A146604) Avail: NTIS HC A03/MF A01 CSCL 06P

Research progress has been made toward two goals in the first contract year, patient studies and model studies. In the patient studies we investigated the relationship between airway pressure and lung volume during high frequency low tidal volume ventilation (HFV). Patients requiring mechanical ventilatory support for treatment of respiratory insufficiency were studied by imposing rapid (1-10 Hz) oscillations with low tidal volumes (50-150 m1) at a constant mean airway pressure of 5 cm H2O. In the model studies the pressure drop during sinusoidal mean flows in a four generation network of rigid, uniform diameter, symmetrically branching tubes was studied. The data obtained were analyzed via a process of Fourier decomposition. The results showed that the pressure signals consist mainly of a dominant component at the excitation frequency (fundamental) and a first harmonic of smaller magnitude. We found the magnitude and phase of the fundamental to correlate closely with classical predictions as long as the parameter was less than 200. GRA

N85-15373# Federal Aviation Administration, Washington, D.C. Office of Aviation Medicine.
BLOOD PRESSURE LEVELS OF ACTIVE PILOTS COMPARED WITH THOSE OF AIR TRAFFIC CONTROLLERS
C. F. BOOZE, JR. and L. S. SIMCOX Apr. 1984 14 p
(AD-A146645; FAA-AM-84-3) Avail: NTIS HC A02/MF A01 CSCL 06E

Currently some 15,212 active airmen are certified to fly with a diagnosis of hypertension. Federal Aviation Administration blood pressure standards for certification of airmen for considered to be quite liberal; however, recent FAA policy further liberalized medications and dosages allowed in certification of airmen. Since limited information is available concerning the recorded blood pressures of airmen, a systematic sample of active pilots was extracted from automated medical files maintained by the Aeromedical Certification Branch of the Civil Aeromedical Institute for descriptive purposes as well as to compare with a sample of air traffic controllers, given the continuing interest in the relationship of stress of air traffic control work. This is a pre-strike ATCS sample. Distributions of blood pressure by age were compared by using conventional nonparametric techniques for 10-year age intervals. Data were also compared with general population findings. Prevalence of hypertension is greater in the general United States population than found with any of these groups reported. Prevalence of borderline and definite hypertension is seen to increase with age for all groups studied. Prevalence of any degree of hypertension is lower for airline pilots than the all-airmen group or the air traffic controller group. Of the three airmen groups, prevalence of hypertension is highest for the air traffic controllers, but the influence of more liberal waiver and retention criteria for air traffic controllers is an important reason for the excess. GRA

N85-15374# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.
HUMAN REACTIONS TO TRANSIENT ELECTRIC CURRENTS, VOLUME 12 Annual Report, Jul. 1983 - Jun. 1984
J. P. REILLY, W. LARKIN, L. B. KITTLER, and V. T. FREEMAN Jul. 1984 130 p refs Sponsored in part by Maryland Dept. of Natural Resources, Annapolis 12 Vol.
(PB84-231463; JHU/APL-CPE-8313) Avail: NTIS HC A07/MF A01 CSCL 06T

The third year of a three year study of human reactions to transient electric currents is discussed. Stimuli represent those that may be encountered by induction in high strength dc or ac electric fields. These include individual capacitive discharges, and more complex stimuli applicable to ac field induction. Results are presented from a large sample of individuals. Statistical variations among individuals are presented. Factors which account for individual sensitivity differences are identified. Intersubject differences in the large population study are compared with individual variations in a longitudinal study. In other tests with a relatively few subjects, sensitivity dependences are reported for changes in the body location of the stimulus for differing rates of approach to a charged electrode, and for cutaneous temperature changes. A neuroelectric model is described, and used to account for sensitivity to a variety of stimulus waveforms. GRA

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BEHAVIORAL SCIENCES

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

A85-16012
VOLUNTARY SELECTION OF THE TARGET FOR SMOOTH EYE MOVEMENT IN THE PRESENCE OF SUPERIMPOSED, FULL-FIELD STATIONARY AND MOVING STIMULI
E. KOWLER (Rutgers University, New Brunswick, NJ), J. VAN DER STEEN, E. P. TAMMINGA, and H. COLLEWIJN (Rotterdam, Universiteit, Rotterdam, Netherlands) Vision Research (ISSN 0042-6989), vol. 24, no. 12, 1984, p. 1789-1798. refs
(Contract AF-AFOSR-82-0085)

A85-16230#
MODELS OF HUMAN PERCEPTION OF THREE-DIMENSIONAL MOTION [MODELE PERCEPCJI RUCHU PRZESTRZENNEGO U CZLOWIEKA]
M. KRAWCZYK and J. MORAWSKI Technika Lotnicza i Astronautyczna (ISSN 0040-1145), vol. 39, July 1984, p. 4-9. In Polish. refs

The recent literature on the modeling of human organs of equilibrium is surveyed. Particular emphasis is placed on the possibility of simulating the operation of the system for the perception of linear and angular acceleration from the viewpoint of a global equilibrium-organ model. The starting point of the research is the anatomical structure of the ear. Physical models

of the equilibrium organ are examined, and a description is given of a method which has led to the development of precise experimentally validated mathematical models. Methods of experimental study are also reviewed. L.M.

A85-16325* Virginia Polytechnic Inst. and State Univ., Blacksburg.
ON THE MEASUREMENT OF PILOT PERCEPTUAL WORKLOAD - A COMPARISON OF ASSESSMENT TECHNIQUES ADDRESSING SENSITIVITY AND INTRUSION ISSUES
J. G. CASALI and W. W. WIERWILLE (Virginia Polytechnic Institute and State University, Blacksburg, VA) Ergonomics (ISSN 0014-0139), vol. 27, Oct. 1984, p. 1033-1050. Research supported by the Virginia Polytechnic Institute and State University. refs (Contract NAG2-17)

A flight simulator-based study was conducted to examine fourteen distinct mental workload estimation measures, including opinion, secondary task, physiological, and primary task measures. Both the relative sensitivity of the measures to changes in mental workload and the differential intrusion of the changes on primary task performance were assessed. The flight task was varied in difficulty by manipulation of the presentation rate and complexity of a hazard-perception task that required each of 48 licensed pilots to rely heavily on their perceptual abilities. Three rating scales (Modified Cooper-Harper, Multi-descriptor, and Workload-Compensation-Interference/Technical Effectiveness), two secondary task measures (time estimation and tapping regularity), one physiological measure (respiration frequency), and one primary task measure (danger-condition response time) were reliable indicants of workload changes. Recommendations for applying the workload measures are presented. Author

A85-16522
ILLUSORY MOTION IN VISUAL DISPLAYS
A. M. M. LELKENS and J. J. KOENDERINK (Utrecht, Rijksuniversiteit, Utrecht, Netherlands) Vision Research (ISSN 0042-6989), vol. 24, no. 9, 1984, p. 1083-1090. Research supported by the Nederlandse Organisatie voor Zuiver-Wetenschappelijk Onderzoek. refs

The apparent motion of a change in the structure of a random check pattern is studied by spatially masking it with another noise pattern and it is compared with phi motion. A fundamental difference with phi motion is the insensitivity of second order correlators (Reichardt mechanisms) to this apparent motion. The following experimental characteristics distinguish this motion from phi motion: it induces no motion after-effect, it is not transparent to another simultaneous motion, it is strongly influenced by spatial masking and it does not evoke optokinetic nystagmus. A fourth order detector is introduced which is sensitive to this illusory motion as well as to phi motion. Simulation experiments with this detector together with the subjective reports of the observers lead to the conclusion that human subjects inadvertently treat the coarsest spatial structures as signal and the finest as the disturbing noise. Author

A85-16817
HYPNOSIS IN THE INVESTIGATION OF AVIATION ACCIDENTS
D. N. HILAND and P. A. DZIESZKOWSKI (U.S. Naval Aerospace Medical Institute, Pensacola, FL) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 55, Dec. 1984, p. 1136-1142. refs

The efficacy of hypnotic inquiry techniques with ten witnesses to six recent Naval aircraft accidents was evaluated in this study. Eight witnesses had been directly involved in an accident, five as mishap pilots. Interviews were conducted under conservative standards of practice after regular interviews had been completed and all depositions taken. Naval officers who accompanied the witness(es) to the interviews and concomitantly assisted the accident investigation boards served as the evaluators. Important information concerning the accident was gained in the majority of the interviews. Secondary survival information of importance was obtained in a number of cases as well. None of the witnesses experienced psychological or career problems as a result of the interviews, and the hypnosis seemed highly therapeutic in some cases. Results suggest that hypnosis seemed highly therapeutic in some cases. Results suggest that hypnotic interview techniques with witnesses may be of great value in the investigations of certain aircraft accidents. Author

A85-17150
THE TIME ERROR IN THE DISCRIMINATION BETWEEN THE DURATIONS OF OPTICAL SIGNALS [VREMENNAIA OSHIBKA PRI RAZLICHENII DLITEL'NOSTEI SVETOVYKH STIMULOV]
N. G. SHPAGONOVA (Akademiia Nauk SSSR, Institut Psikhologii, Moscow, USSR) Psikhologicheskii Zhurnal, vol. 5, Mar.-Apr. 1984, p. 128-132. In Russian. refs

An experimental study was carried out concerning the effect of varying durations of optical stimuli and their sequence on the value of time errors and the accuracy of visual discrimination. The time error was found to vary with variations of standard durations. These variations are individual for each subject; however, the general tendency is expressed in the fact that the time error has a positive value on standard durations from 50 to 500 ms. On the 1000-ms standard, either an overvaluation or an undervaluation of the standard duration is observed. B.J.

A85-17160
A METHOD FOR REGULATING THE JOINT ACTIVITY OF A FLIGHT CREW [SPOSOB REGULIROVANIIA SOVMESTNOI DEIATEL'NOSTI LETNOGO EKIPAZHA]
A. F. PCHELINOV Voprosy Psikhologii (ISSN 0042-8841), Mar.-Apr. 1984, p. 132-134. In Russian.

A simple method for regulating the joint activity of a flight crew during various important operations of the aircraft (e.g., takeoff) is proposed with the aim of reducing psychological stress. The method consists in the writing of the required functions on horizontally lined paper, one function per line (e.g., pilot function on line one, copilot function on line two, etc.). A sample of such a document is provided. B.J.

A85-18499* Stanford Univ., Calif.
COLOR MEASUREMENT AND DISCRIMINATION
B. A. WANDELL (Stanford University, Stanford, CA) Optical Society of America, Journal, A: Optics and Image Science (ISSN 0740-3232), vol. 2, Jan. 1985, p. 62-71. refs
(Contract F33615-82-K-5108; NCC2-44; NIH-2-R01-EY-03164)

The present investigation is concerned with new results which show that for test lights with slow temporal modulations, and thus little effect on the luminance system, the vector-difference hypothesis represents an adequate characterization of discrimination data. It is pointed out that for certain experimental conditions color measurements can be successfully extended to include a difference measure which predicts the discriminability of pairs of lights. When discrimination depends principally on opponent-channel responses, discrimination thresholds can be predicted from the detection contour alone. Attention is given to discriminations with a 6-Hz Gabor function, the categorization of stimulus regions, and the nature of the visual mechanisms. G.R.

A85-18500
COLORS OF MONOCHROMATIC LIGHTS THAT VARY IN CONTRAST-INDUCED BRIGHTNESS
K. FULD and T. A. OTTO (New Hampshire, University, Durham, NH) Optical Society of America, Journal, A: Optics and Image Science (ISSN 0740-3232), vol. 2, Jan. 1985, p. 76-83. Research supported by the University of New Hampshire. refs

According to the Bezold-Bruecke effect, the hues of most monochromatic lights change as their intensities vary. The relationship between hue and intensity is reasonably well understood. There is, however, a need to examine more closely whether the hues of monochromatic lights change as their contrast-induced brightnesses vary, and if so, to what extent. The present investigation is concerned with such an examination. Subjects viewed, with their foveas, monochromatic lights surrounded by white fields of various intensities, and described

the color of the central, monochromatic test fields using a color-naming technique. The obtained data provided a basis for the derivation of equal-hue contours. In addition, black and white response functions were determined for the monochromatic fields. G.R.

A85-18720
NEW SYSTEM FOR THE SELECTION OF AIR TRAFFIC CONTROL PERSONNEL [NEUES AUSWAHLSYSTEM FUER FLUGSICHERUNGSPERSONAL]
K. STEININGER (Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Institut fuer Flugmedizin, Hamburg, West Germany) DFVLR-Nachrichten (ISSN 0011-4901), vol. 43, Nov. 1984, p. 35-37. In German.

Air traffic control operations in West Germany are very demanding on account of the great air traffic density in this country. It is, therefore, vital that the personnel of the air traffic control organization is well qualified for their work. The selection of suitable applicants represents an essential precondition for the successful development of personnel qualified for the performance of the air traffic control operations. Education and training leading to the position of a fully responsible air traffic controller requires a time of five years. Certain difficulties have arisen in connection with the current selection system, and a fundamental revision of this system is necessary. A description is given of the approaches developed by the DFVLR for such a revision, taking into account the great differences in performance shown even in the case of people of the same age group, education, and orientation with respect to interests. Attention is given to the criteria which are considered in the selection process. G.R.

A85-18849
A PILOT-SELECTION SPATIAL-ORIENTATION TEST CONFORMING TO THE MODEL OF RASCH AND THE INVESTIGATION OF THE SOLUTION STRATEGY USING THE LINEAR LOGISTICAL TEST MODEL [EIN RASCH-MODELLKONFORMER RAUMVORSTELLUNGSTEST ZUR PILOTENSELEKTION UND DIE UNTERSUCHUNG DES LOESUNGSVERHALTENS MIT HILFE DES LINEAREN LOGISTISCHEN TESTMODELLS]
P. GROESSENBRUNNER Wien, Universitaet, Philosophische Fakultaet, Doktor Dissertation, 1983, 200 p. In German. refs

The theory of spatial-orientation and spatial-visualization testing is reviewed; several existing tests are evaluated; a Pilot's Spatial Test (PST) is developed using the probabilistic dichotomous logistical test theory of Rasch (1960); the results of tests on several groups of subjects are reported; and an attempt is made to characterize human perceptual space using an approach based on the linear logistic model of Fischer (1972). The final version of the PST comprises 13 items (asking the subject to indicate the maneuvers in three dimensions required to make a prescribed change in the position of an aircraft silhouette) which are administered without a time limit. Some test subjects are also tested using a Link trainer or the Elliot-Price (1975) spatial test, and the PST is found to have reliability 0.64, validity vs the Link-trainer test 0.56, and agreement validity with the Elliot-Price test -0.65. T.K.

A85-19006
PROFICIENCY IN MASTERING THE INSTRUMENT CONTROL OPERATIONS OF CHEMICAL PRODUCTION IN RELATION TO CERTAIN PERSONALITY TRAITS AND THE LEVEL OF DEVELOPMENT OF PSYCHOLOGICAL FUNCTIONS [USPESHNOST' OSVOENIIA PROFESSII APPARATCHIKA KHIMICHESKOGO PROIZVODSTVA V ZAVISIMOSTI OT PROIAVLENIIA NEKOTORYKH LICHNOSTNYKH SVOISTV I UROVNIA RAZVITIIA PSIKHOFIZIOLOGICHESKIKH FUNKTSII]
N. D. BOBRISHCHEVA-PUSHKINA (I Moskovskii Meditsinskii Institut, Moscow, USSR) Gigiena Truda i Professional'nye Zabolevaniia (ISSN 0016-9919), July 1984, p. 22-26. In Russian. refs

A85-19031
ONTOGENETIC ASPECTS OF MENTAL HYGIENE IN PHYSICAL EDUCATION AND SPORTS [ONTOGENETICHESKIE ASPEKTY PSIKHOGIGIENY FIZICHESKOI KUL'TURY I SPORTA]
G. D. GORBUNOV, N. B. STAMBULOVA, and L. V. KOLMAN (Leningradskii Gosudarstvennyi Institut Fizicheskoi Kul'tury, Leningrad, USSR) Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), April 1984, p. 24-26. In Russian. refs

A85-19071
ON THE WAY TO COMPUTER PSYCHODIAGNOSTICS [NA PUTI K KOMP'IUTERNOI PSIKHODIAGNOSTIKE]
A. G. SHMELEV (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR) Moskovskii Universitet, Vestnik, Seriia 14 - Psikhologiia, Apr.-June 1984, p. 13-16. In Russian.

The development of the computer psychodiagnostics of cognitive style is considered in the framework of man-computer interactive systems for the solution of differential-psychological problems. The following stages in the solution of these problems are noted: the collection of data and identification of user types; the investigation of conditions in which these types are effective; and the generation of specialized interactive programs adapted to these user types. B.J.

A85-19072
THE PSYCHOLOGICAL STRUCTURE OF MAN-COMPUTER INTERACTIVE SYSTEMS [PSIKHOLOGICHESKAIA STRUKTURA DIALOGA 'CHELOVEK-EVM']
O. K. TIKHOMIROV (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR) Moskovskii Universitet, Vestnik, Seriia 14 - Psikhologiia, Apr.-June 1984, p. 17-24. In Russian. refs

The psychological structure of man-computer interactive systems is examined with respect to the concepts of need, protection, activity, 'personality' of the partner, understanding, time, usability, and efficiency. The control and optimization of the interaction on the basis of these parameters are considered. B.J.

A85-19073
EXPERIMENTAL STUDY OF THE SEMANTIC ORGANIZATION OF MEMORY [EKSPERIMENTAL'NOE ISSLEDOVANIE SEMANTICHESKOI ORGANIZATSII PAMIATI]
ZH. M. GLOZMAN, L. S. TSVETKOVA, K. M. SHIPKOVA (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR), and A. F. PANTELEEV (Saratovskii Gosudarstvennyi Universitet, Saratov, USSR) Moskovskii Universitet, Vestnik, Seriia 14 - Psikhologiia, Apr.-June 1984, p. 46-53. In Russian. refs

A85-19074
PSYCHOLOGICAL ASPECTS OF AN ASSESSMENT AND PREDICTION OF THE EFFECTS OF HYPOTENSIVE DRUGS ON THE RELIABILITY AND WORK EFFICIENCY OF TRANSPORT OPERATORS [PSIKHOLOGICHESKIE ASPEKTY OTSENKI I PROGNOZIROVANIIA VLIIANIIA GIPOTENZIVNYKH PREPARATOV NA NADEZHNOST' I EFFEKTIVNOST' RABOTY OPERATOROV TRANSPORTNYKH SREDSTV]
L. S. NERSESIAN and E. G. BUREKHZON (Vsesoiuznyi Nauchno-Issledovatel'skii Institut Zheleznodorozhnoi Gigieny, Moscow, USSR) Psikhologicheskii Zhurnal, vol. 5, May-June 1984, p. 109-119. In Russian. refs

A85-19075
THE STRUCTURE OF THE CONTROLLING MOVEMENTS OF A HUMAN OPERATOR IN THE PROCESS OF TRACKING [STRUKTURA UPRAVLIAIUSHCHIKH DVIZHENII CHELOVEKA-OPERATORA V PROTSESSE SLEZHENIIA]
V. A. DENISOV (Akademiia Nauk SSSR, Institut Psikhologii, Moscow, USSR) and A. P. CHERNYSHEV Psikhologicheskii Zhurnal, vol. 5, May-June 1984, p. 138-151. In Russian. refs

The results of an experimental investigation of the controlling movements of a human operator is presented. Measurements were made of the tracking regions, tracking failure, and the discrimination borderline while tracking signals of different types of individual

and group activity. Elementary movements of the cognitive, corrective, and physiological types were identified. The relative dependence of the corrective movements suggests that they had an autonomous contour. An analysis of the EEG functions during the exercise showed that there is a relationship between the structure of controlling movements and the organization of brain processes. I.H.

N85-14473# Groningen Rijksuniversiteit (Netherlands). Dept. of Neurophysiology.
ESTIMATING NUMBER, TIME AND LENGTH; A BASELINE STUDY
F. VERINGA *In* ESA Life Sci. Res. in Space p 265-269 Aug. 1984 refs
Avail: NTIS HC A14/MF A01

Human performance in estimating numerosity, length and time interval, and in reproducing force was studied. Subjects can achieve lasting stability and can be reliably calibrated. External interference with sensory input systems can greatly change performance, and body awareness, as can perturbation of sensory systems controlling motor output. This is demonstrated in length indicating tasks. Blindfolding, local anesthesia, loads and accelerations, reduced gravity, and experimental pain can disturb input and motor control. To delimit proprioceptive contributions in voluntary aiming movements, microgravity experiments are needed. Definition of visual, proprioceptive and experoceptive control over voluntary activities in space aids selection and training of spacecrews, and in space ergonomy. A stand alone computerized control for length indication experiments is specified. Author (ESA)

N85-14475# Glostrup Hospital (Denmark). Sleep Laboratory Dept.
COMPUTERIZED SLEEP STAGING BY DETECTING EYE AND HAND MOVEMENT, DELTA EEG ACTIVITY AND EMG, USING PORTABLE SOLID STATE TECHNIQUE
G. WILDSCHIODTZ *In* ESA Life Sci. Res. in Space p 275-278 Aug. 1984 refs
Avail: NTIS HC A14/MF A01

A computerized sleep recording system was developed from eye and hand movement detectors, EEG-delta detectors and EMG detectors. It can be used for sleep recording in space to detect circadian rhythm disturbances and to evaluate sleep deprivation. The influence of weightlessness on delta activity and number of movements are studied. Author (ESA)

N85-14485# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Hamburg (West Germany). Abteilung Flugphysiologie und -Psychologie.
THE CONSTRUCTION OF AUDITIVE TESTS OF ATTENTION AND SPATIAL ORIENTATION AND THEIR FACTORIAL STRUCTURE
J. WINKE Jun. 1984 78 p refs In GERMAN; ENGLISH summary
(DFVLR-FB-84-21) Avail: NTIS HC A05/MF A01; DFVLR, Cologne DM 26

Tests of spatial orientation and attention were constructed for the selection of air traffic controllers. Items are presented acoustically via loudspeakers or headphones. These methods were compared with traditional paper-pencil tests where items are presented visually. The relationship between the sensory modalities used to present the test problem and the mental abilities for information processing were studied. There are no clear modality specific factors revealed by factor analyses: most of the variance is determined by well known modality-unspecific cognitive factors. Author (ESA)

N85-14486# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Abteilung Flaechenflugzeuge.
INVESTIGATION OF PILOT BEHAVIOR IN FLIGHT TESTS WITH A RATE COMMAND/ATTITUDE HOLD CONTROL SYSTEM
D. ALTENKIRCH Feb. 1984 59 p refs In GERMAN; ENGLISH summary
(DFVLR-FB-84-25) Avail: NTIS HC A04/MF A01; DFVLR, Cologne DM 23

Handling qualities of a rate command/attitude hold system for pitch and roll axes, using a sidegrip as pilot's control, were evaluated during flight tests. The influence of heading hold and wing levelling functions were investigated. An MFB 320 flight simulator was used as a flight test vehicle. Overall system behavior was evaluated by two pilots in 84 instrument landing approaches. Pilot-vehicle performance was determined by measured aircraft state and performance parameters. The system clearly reduces the number of pilot command activations during the landing procedure. Author (ESA)

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MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

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

A85-16072#
STUDY AND REALIZATION OF A MEASUREMENT AND AUTOMATIC-PROCESSING SYSTEM FOR HUMAN EYE MOVEMENTS APPLICATION TO THE ERGONOMICS OF WORK STATIONS [ETUDE ET REALISATION D'UN SYSTEME DE MESURE ET DE TRAITEMENT AUTOMATIQUES DES MOUVEMENTS OCULAIRES CHEZ L'HOMME APPLICATION A L'ERGONOMIE DES POSTES DE TRAVAIL]
J. GERBER Valenciennes et Hainaut-Cambresis, Universite, Docteur (3e cycle) Thesis, 1983, 150 p. In French. refs

Systems are developed for the semiautomatic or fully automatic evaluation of the video-recorded output of an NAC eye-mark recorder in workload-measurement applications. The principles of eye-movement measurement are reviewed; the characteristics of different oculometers are compared; the problems posed by time-consuming manual data-reduction procedures are indicated; and semiautomatic analysis hardware and software based on a conventional microcomputer are presented. The extension of the principles of this device to a fully automatic system requires the use of fixed light sources (laser diodes) in the observed area, permitting definition of the zones of interest and evaluation of eye movement even when head movement is allowed. Comparative analysis of a typical industrial-inspection task confirms the validity of the fully automatic approach. T.K.

A85-16093*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
COOPERATIVE CONTROL - THE INTERFACE CHALLENGE FOR MEN AND AUTOMATED MACHINES
W. W. HANKINS, III and N. E. ORLANDO (NASA, Langley Research Center, Automation Technology Branch, Hampton, VA) American Society of Mechanical Engineers, International Computers in Engineering Conference and Exhibit, Las Vegas, NV, Aug. 12-16, 1984, Paper. 9 p. refs

The research issues associated with the increasing autonomy and independence of machines and their evolving relationships to human beings are explored. The research, conducted by Langley Research Center (LaRC), will produce a new social work order in which the complementary attributes of robots and human beings, which include robots' greater strength and precision and humans' greater physical and intellectual dexterity, are necessary for systems of cooperation. Attention is given to the tools for

performing the research, including the Intelligent Systems Research Laboratory (ISRL) and industrial manipulators, as well as to the research approaches taken by the Automation Technology Branch (ATB) of LaRC to achieve high automation levels. The ATB is focusing on artificial intelligence research through DAISIE, a system which tends to organize its environment into hierarchical controller/planner abstractions. M.D.

A85-16119#
ADVANCED LIFE SUPPORT AND THERMAL CONTROL TECHNOLOGIES FOR SPACE STATION
K. THOERMER, A. I. SKOOG, and H. KREEB (Dornier System GmbH, Friedrichshafen, West Germany) DGLR, AAS, and AIAA, Symposium, 5th, Hamburg, West Germany, Oct. 3-5, 1984. 18 p. refs
(AAS PAPER 84-312)

Life support systems technology is noted to have progressed beyond that of the Space Shuttle/Spacelab generation to meet prospective space station requirements. Such important regenerative life support system elements as the solid amine system, Sabatier reactor, and water reclamation are ready for hardware qualification. In the case of contamination control elements, however, ground tests are not capable of simulating the requisite zero-g conditions; systems combining liquids with vapors or gases can therefore be realistically tested only in orbit, together with thermal systems based on heat pipe technology. Initial system overdesign, based on the analytic inclusion of zero-g effects, may be significantly reduced for life support and thermal systems after a few orbital experiments. O.C.

A85-16534
CONTROLLING A MANIPULATOR USING SENSORY MOTOR INTERACTION
V. S. GURFINKEL, E. A. DEVIANIN, A. V. LENSKII, S. B. MOZHZHEVELOV, A. M. FORMALSKII, and A. IU. SHNEIDER (Akademiia Nauk SSSR, Institut Problem Peredachi Informatsii; Moskovskii Gosudarstvennyi Universitet, Moscow, USSR) Robotica (ISSN 0263-5747), vol. 2, July 1984, p. 155-159. refs

The control of a robot manipulator with force sensors in the gripping tips is considered. The sensors measure three components of the force. Complicated motions of the manipulator are compiled from basic movements, and the paper describes how the operation of grasping an arbitrarily positioned object is constructed from the basic movements. A mathematical model of the basic procedure of keeping contact with the object is considered. Author

A85-16811
A THEORETICAL METHOD FOR SELECTING SPACE CRAFT AND SPACE SUIT ATMOSPHERES
R. D. VANN and J. R. TORRE-BUENO (Duke University, Medical Center, Durham, NC) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 55, Dec. 1984, p. 1097-1102. refs
(Contract N00014-83-K-0019)

A theoretical method for selecting space craft and space suit atmospheres assumes that gas bubbles cause decompression sickness and that the risk increases when a critical bubble volume is exceeded. The method is consistent with empirical decompression exposures for humans under conditions of nitrogen equilibrium between the lungs and tissues. Space station atmospheres are selected so that flight crews may decompress immediately from sea level to station pressure without preoxygenation. Bubbles form as a result of this decompression but are less than the critical volume. The bubbles are absorbed during an equilibration period after which immediate transition to suit pressure is possible. Exercise after decompression and incomplete nitrogen equilibrium are shown to increase bubble size, and limit the usefulness of one previously tested stage decompression procedure for the Shuttle. The method might be helpful for evaluating decompression procedures before testing. Author

A85-17107
THE QUESTIONS OF STANDARDIZING THE COMBINED EFFECTS OF LOCAL VIBRATIONS AND NOISE [K VOPROSU NORMIROVANIIA KOMBINIROVANNOGO DEISTVIIA LOKAL'NOI VIBRATSII I SHUMA]
V. F. VYSHCHIPAN and P. S. BAZOVKIN (Institut Gigieny Truda i Profzabolevanii, Krivoi Rog, Ukrainian SSR) Gigiena Truda i Professional'nye Zabolevaniia, March 1984, p. 1-4. In Russian. refs

Current data for the limiting noise and local vibration spectra of various industrial environments in the USSR were used to develop a numerical model of the interaction between the effects of noise and local vibration. It is shown that within a narrow range of values the combined effects are additive. The complete results of the numerical experiment are presented in a table. I.H.

A85-17457
USE OF A STOCHASTIC HUMAN-OPERATOR MODEL TO ESTIMATE THE OPERATOR CHARACTERISTICS IN THE TASK OF TRACKING A RANDOMLY MOVING OBJECT [ISPOL'ZOVANIE ODNOI STOKHASTICHESKOI MODELI CHELOVEKA-OPERATORA DLIA OTSENKI EGO KHARAKTERISTIK V ZADACHE SLEZHENIIA ZA SLUCHAINO DVIGAIUSHCHIMSIA OB'EKTOM]
I. V. KUROCHKIN and A. A. MALTSEV (Gor'kovskii Gosudarstvennyi Universitet, Gorki, USSR) Radiofizika (ISSN 0021-3462), vol. 27, no. 10, 1984, p. 1267-1271. In Russian. refs

A85-17815*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
THE EVALUATION OF DISPLAY SYMBOLOGY - A CHRONOMETRIC STUDY OF VISUAL SEARCH
R. REMINGTON (NASA, Ames Research Center, Aero-Space Human Factors Research Div., Moffett Field, CA) and D. WILLIAMS (Psycho-Linguistic Research Associates, Menlo Park, CA) IN: Digital Avionics Systems Conference, 6th, Baltimore, MD, December 3-6, 1984, Proceedings . New York, American Institute of Aeronautics and Astronautics, 1984, p. 84-89.
(AIAA PAPER 84-2616)

Three single-target visual search tasks were used to evaluate a set of CRT symbols for a helicopter traffic display. The search tasks were representative of the kinds of information extraction required in practice, and reaction time was used to measure the efficiency with which symbols could be located and identified. The results show that familiar numeric symbols were responded to more quickly than graphic symbols. The addition of modifier symbols such as a nearby flashing dot or surrounding square had a greater disruptive effect on the graphic symbols than the alphanumeric characters. The results suggest that a symbol set is like a list that must be learned. Factors that affect the time to respond to items in a list, such as familiarity and visual discriminability, and the division of list items into categories, also affect the time to identify symbols. Author

A85-17816#
ARTIFICIAL INTELLIGENCE IMPLICATIONS FOR ADVANCED PILOT/VEHICLE INTERFACE DESIGN
K. J. MAXWELL and J. A. DAVIS (General Dynamics Corp., Fort Worth, TX) IN: Digital Avionics Systems Conference, 6th, Baltimore, MD, December 3-6, 1984, Proceedings . New York, American Institute of Aeronautics and Astronautics, 1984, p. 90-94.
(AIAA PAPER 84-2617)

The impact on pilot/vehicle interface (PVI) design for fighter aircraft from the introduction of artificial intelligence (AI) technology is discussed. Three prototypical models (pilot manager/AI associate, pilot/AI colleague, Autonomous assistant) of the operational relationship between the pilot and AI systems are defined. These models provide a structure in which PVI issues are discussed. Issues involving the resolution of possible disagreements between the pilot and the AI system, intelligent presentation of information including an intelligent interrupt

capability, and natural language interaction are discussed. It is concluded that the introduction of AI into the aircraft will have a major impact on PVI design. Author

A85-17817#
MODEL-BASED REASONING IN EXPERT SYSTEMS - AN APPLICATION TO ENROUTE AIR TRAFFIC CONTROL
S. E. CROSS (USAF, Institute of Technology, Wright-Patterson AFB, OH) IN: Digital Avionics Systems Conference, 6th, Baltimore, MD, December 3-6, 1984, Proceedings . New York, American Institute of Aeronautics and Astronautics, 1984, p. 95-101. USAF-sponsored research; U.S. Department of Transportation. refs
(Contract DOT-FA79WA-4360)
(AIAA PAPER 84-2619)

The explanation capabilities (EC) of expert systems, the extent of computer understanding, and the artificial intelligence ability to reason about disparate knowledge are discussed in the context of air traffic control (ATC). EC is essential for humans to understand and interact with the results of computer reasoning. Questions of 'how' and 'why' certain actions are recommended can be satisfied by a display of the appropriate part of the computational process used to arrive at a conclusion, abstracted and expressed in a form amenable to the context of the question and intelligible to humans. The knowledge base may be solutions to the aircraft equations of motion. It may be necessary for representations to be multi-leveled to reply successively until satisfying the questioner's level of sophistication in understanding, e.g., physics. For ATC problems such as collision avoidance, the system must take into account operational aspects like other flight routes and flight economy. Several examples are provided of means by which an expert system could search for an answer and be able to explain it. M.S.K.

A85-17818#
MISSION SCENARIOS FOR COCKPIT AUTOMATION TECHNOLOGY
G. G. KUPERMAN and P. V. KULWICKI (USAF, Aerospace Medical Research Laboratory, Wright-Patterson AFB, OH) IN: Digital Avionics Systems Conference, 6th, Baltimore, MD, December 3-6, 1984, Proceedings . New York, American Institute of Aeronautics and Astronautics, 1984, p. 102-107. refs
(AIAA PAPER 84-2620)

This paper describes the development and application of a detailed tactical fighter attack mission scenario package for exploitation in an Air Force advanced development program directed to developing and validating an advanced crew system design methodology. The scenario development process excluded explicit consideration of a specific avionics suite and, for that reason, is described as being 'technology-free'. Emphasis was placed on identifying and describing areas of mission uncertainty and aircrew decision nodes encountered during conduct of the mission. Author

A85-17829*# Honeywell Systems and Research Center, Minneapolis, Minn.
SYSTEMS CONCEPT FOR SPEECH TECHNOLOGY APPLICATION IN GENERAL AVIATION
R. A. NORTH (Honeywell Systems and Research Center, Minneapolis, MN) and H. BERGERON (NASA, Langley Research Center, Hampton, VA) IN: Digital Avionics Systems Conference, 6th, Baltimore, MD, December 3-6, 1984, Proceedings . New York, American Institute of Aeronautics and Astronautics, 1984, p. 184-189. refs
(AIAA PAPER 84-2639)

The application potential of voice recognition and synthesis circuits for general aviation, single-pilot IFR (SPIFR) situations is examined. The viewpoint of the pilot was central to workload analyses and assessment of the effectiveness of the voice systems. A twin-engine, high performance general aviation aircraft on a cross-country fixed route was employed as the study model. No actual control movements were considered and other possible functions were scored by three IFR-rated instructors. The SPIFR was concluded helpful in alleviating visual and manual workloads during take-off, approach and landing, particularly for data retrieval and entry tasks. Voice synthesis was an aid in alerting a pilot to in-flight problems. It is expected that usable systems will be available within 5 yr. M.S.K.

A85-17841#
SELF ADAPTIVE FILTERING OF ENVIRONMENTAL NOISES FROM SPEECH
D. GRAUPE, J. GROSSPIETSCH, and S. BASSEAS (IntelliTech, Inc.; Illinois Institute of Technology, Northfield, IL) IN: Digital Avionics Systems Conference, 6th, Baltimore, MD, December 3-6, 1984, Proceedings . New York, American Institute of Aeronautics and Astronautics, 1984, p. 263-269. refs
(Contract N62269-83-R-0087)
(AIAA PAPER 84-2654)

Progress in work on self-adaptive filtering of speech from environmental noises is assessed. Two approaches are addressed: frequency and time domains. The processing is in either case dependent on definition of a discriminant which discerns speech from noise, a condition satisfied by phonemes. The abrupt time variations of phonemes is the most apparent characteristic. A discrete Fourier transform has been identified for the frequency domain, and autoregressive and autocorrelation models for the time domain. The analytical expressions for each, tailored for speech, are developed. When tested in a noisy environment for the speech frequencies of interest (monosyllabic words), the frequency domain algorithm exhibited a 6.7-25.5 dB superiority in SNR. Intelligibility, in a cafeteria setting, reached a 90 percent level after frequency domain filtering, compared to 32 percent without the filter. M.S.K.

A85-17847#
APPLICATIONS OF VOICE INTERACTIVE SYSTEMS - MILITARY FLIGHT TEST AND THE FUTURE
C. A. MOORE, R. D. MOORE (VERAC, Inc., San Diego, CA), and J. C. RUTH (McDonnell Douglas Electronics Co., St. Charles, MO) IN: Digital Avionics Systems Conference, 6th, Baltimore, MD, December 3-6, 1984, Proceedings . New York, American Institute of Aeronautics and Astronautics, 1984, p. 301-308.
(AIAA PAPER 84-2660)

In connection with the increasing complexity of fighter aircraft avionics, new problems in command and control arise which can no longer be solved with the aid of traditional control and display methodologies. The concept of the 'pilot as a manager' evolves. The pilot will need to access specific data or ask a subsystem for relational data. Under these conditions, voice recognition and synthesis will be an efficient form of communication for advanced aircraft. The present investigation is concerned with three distinct areas of voice interactive systems. First, an analysis is conducted regarding the benefits resulting from the use of interactive voice recognition and speech synthesis as a viable tool in current and advanced aircraft. Second, a description is given of current voice recognition systems for military aircraft. Attention is also given to the implementation of interactive voice systems in current and future aircraft systems. G.R.

A85-18461
STRUCTURES AND CHARACTERISTICS OF A NEURAL NETWORK MODEL FOR GENERATING CIRCADIAN RHYTHM
S. ENDO (Fukuoka University of Education, Munakata, Japan), Y. KINOUCHI, and T. USHITA (Tokushima University, Tokushima, Japan) Electronics and Communications in Japan (ISSN 0424-8368), vol. 67, Sept. 1984, p. 11-19. Translation. refs

The biological subject contains a circadian rhythm, which is considered as an autonomous phenomenon originating from its internal structure. The rhythm is known as a biological activity observed in any creature except for prochordata. In most animals, it is found that the circadian rhythm originates from the nervous system. We have discussed the neural network model based on the functions of the neural system, which generate the circadian rhythm. The aim of this paper is to clarify the network structure of the model and to discuss in detail the characteristics through

analysis and simulation. It is shown first that the model is composed of two neural oscillators and a neural network with nonlinear transformation characteristics. Then each of the subnetworks is analyzed, describing their basic behaviors. By computer simulation, the entrainment and the change of period are discussed, comparing the result with that of analysis. Those results are compared further with the actual properties of the circadian rhythms of creatures.
Author

A85-18848
ANALYSIS OF THE WORK PROCESS AND DETERMINATION OF DESIGN DATA FOR THE MAN-MACHINE INTERFACE IN VEHICLE-CONTROL SYSTEMS WITH THE HELP OF DIGITAL COMPUTER SIMULATION [ANALYSE DES ARBEITSPROZESSES UND ERMITTLUNG VON GESTALTUNGSDATEN FUER DIE SCHNITTSTELLE MENSCH-MASCHINE IN FAHRZEUGFUEHRUNGSSYSTEMEN MIT HILFE DER DIGITALEN RECHNERSIMULATION]
B. DOERING Aachen, Rheinisch-Westfaelische Technische Hochschule, Fakultaet fuer Maschinenwesen, Dr.-Ing. Dissertation, 1983, 267 p. In German. refs

Techniques for computer simulation of the man-machine interface in vehicles are developed and demonstrated for the case of the pilot of an HFB-320 Hansa Jet aircraft in an ILS approach. Modelling theories are introduced; a production-model approach to human control activity when operating a vehicle is explored; an implementation using the simulation language SLAM is developed; and some sample results are presented in tables, graphs, and printouts. The advantages of simulation studies for the ongoing improvement of cabin equipment during the design of an aircraft are indicated. T.K.

A85-19008
TEST RESULTS FOR A PATTERN SAMPLE OF COMBINED THERMAL-PROTECTION CLOTHING THAT AVOIDS THE SIZE PROBLEM [REZUL'TATY ISSLEDOVANII MAKETNOGO OBRAZTSA BEZRAZMERNOI KOMBINIROVANNOI TEPLOZASHCHITNOI ODEZHDY]
L. K. BUSYGINA, D. M. KARPINOS, A. I. MALAKHOV, T. K. MIROSHNIKOVA, and A. D. SALAMAKHIN Gigiena Truda i Professional'nye Zabolevaniia (ISSN 0016-9919), July 1984, p. 32-37. In Russian.

Tests have been performed on patterns of thermal-protection clothing that is suitable for operators of ground-based transportation systems functioning at temperatures ranging from -90 to +150 C. The clothing is in the form of a ribbon that is designed to coil around the wearer (thus overcoming the size problem) and combines three types of thermal-protection systems: liquid cooling and heating, electric heating, and inflation. Tests on pattern samples included the measurement of thermotechnical and hygienic characteristics and physiological effects, and such clothing is concluded to be feasible. B.J.

A85-19011
A PHYSIOLOGICAL AND HYGIENIC EVALUATION OF WORK CLOTHES MADE OF VARIOUS FABRICS AND MATERIALS [FIZIOLOGO-GIGIENICHESKAIA OTSENKA SPETSODEZHDY, IZGOTOVLENNOI IZ RAZLICHNYKH TKANEI I MATERIALOV]
V. N. ARTEMEV and V. L. MALKOVA (Vsesoiuznyi Nauchno-Issledovatel'skii Institut Okhrany Truda, Ivanovo, USSR) Gigiena Truda i Professional'nye Zabolevaniia (ISSN 0016-9919), April 1984, p. 36-39. In Russian.

A series of experiments to determine the hygienic characteristics of work clothes made of various fabrics and materials was carried out at temperatures of 21, 27, and 33 C. It is shown that the most significant changes in the functional capacities of the worker test subjects occurred while wearing overalls with covers made of phenylone. Overalls made of perforated leather had the greatest permeability, and a pair of overalls made of phenylone had the highest density-to-weight ratio. Recommendations are offered for some applications of the different types of work clothes in different work environments. I.H.

A85-19025
COMPUTER TOMOGRAPHY - A PHYSICAL DEVICE FOR MEDICAL DIAGNOSIS [KOMP'IUTERNYI TOMOGRAF: FIZICHESKII PRIBOR DLIA MEDITSINSKOI DIAGNOSTIKI]
A. ALEKSEEV Nauka i Zhizn' (ISSN 0028-1263), July 1984, p. 24-32. In Russian.

The paper summarizes the proceedings of the computer-tomography conference held in Moscow in February 1984 under the aegis of the Interdepartmental Council of the Soviet Academy of Sciences and the Academy of Medical Sciences. The current status, problems, and future prospects of the development of computer tomography in the Soviet Union are reviewed, and results of clinical application are discussed. Consideration is given to both conventional X-ray tomography and the nuclear-magnetic-resonance technique. B.J.

A85-19032
REGISTRATION OF ERGOMETRIC INDICATORS DURING THE PERFORMANCE OF SHORT-TERM EXERCISES ON A BICYCLE ERGOMETER [REGISTRATSIIA ERGOMETRICHESKIKH POKAZATELEI PRI VYPOLNENII KRATKOVREMENNYKH UPRAZHNENII NA VELOERGOMETRE]
A. N. KONRAD and N. V. IARUZHNYI (Gosudarstvennyi Tsentral'nyi Institut Fizicheskoi Kul'tury, Moscow, USSR) Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), July 1984, p. 27. In Russian.

A85-19052
A HYGIENIC CLASSIFICATION OF THE INDUSTRIAL SOURCES OF OPTICAL RADIATION [O GIGIENICHESKOI KLASSIFIKATSII PROIZVODSTVENNYKH ISTOCHNIKOV OPTICHESKOGO IZLUCHENIIA]
L. A. GVOZDENKO (Nauchno-Issledovatel'skii Institut Gigieny Truda i Profzabolevanii, Kiev, Ukrainian SSR) Gigiena i Sanitariia (ISSN 0016-9900), July 1984, p. 9-12. In Russian.

A scheme is proposed for classifying the various industrial optical radiation sources. The sources are classified according to their different biological effects at different intensities. The classification is recommended for use by physicians in identifying a particular radiation type and for the selection of appropriate forms of treatment and prevention of optical radiation-induced injuries in the workplace. I.H.

A85-19053
THE EFFECT OF THE HYGIENIC PROPERTIES OF WORKCLOTHES ON THE THERMAL REGIME OF THE HUMAN BODY IN CONDITIONS OF INHIBITED THERMAL EMISSION [VLIIANIE GIGIENICHESKIKH SVOISTV SPETSODEZHDY NA TEPLOVOE SOSTOIANIE CHELOVEKA V USLOVIIAKH ZATRUDNENNOI TEPLOOTDACHI ORGANIZMA]
S. P. RAIKHMAN and L. M. RIMSKAIA (Ministerstvo Zdravookhraneniia SSSR, Institut Biofiziki, Moscow, USSR) Gigiena i Sanitariia (ISSN 0016-9900), May 1984, p. 16-19. In Russian.

It is found through a series of experiments that air permeability and water absorbency in workclothes are the most important factors determining the thermal regime of the human body in conditions of extreme heat (45 C). Some interrelations between the parameters are discussed in detail. The experimental results are used to develop criteria for the selection of fabrics and materials for workclothes designs. I.H.

A85-19055
A HYGIENIC EVALUATION OF SCHOOL BUILDINGS WITH METALLIZED POLYMER COATINGS ON GLASS STRUCTURES [GIGIENICHESKAIA OTSENKA UCHEBNYKH POMESHCHENII S POLIMERNOI METALLIZIROVANNOI PLENKOI V KONSTRUKTSIIAKH OSTEKLENIIA]
B. Z. VORONOVA, L. V. DROBOTOVA, M. P. RONZHINA, and IU. A. MURASHKINA (Ministerstvo Zdravookhraneniia SSSR, Nauchno-Issledovatel'skii Institut Gigieny Detei i Podrostkov, Moscow, USSR) Gigiena i Sanitariia (ISSN 0016-9900), July 1984, p. 19-22. In Russian. refs

A85-19056
METHODOLOGICAL QUESTIONS CONCERNING THE ESTABLISHMENT OF HYGIENIC STANDARDS FOR COMBINED TWO-FREQUENCY ELECTROMAGNETIC FIELDS [METODICHESKIE VOPROSY GIGIENICHESKOGO NORMIROVANIIA KOMBINIROVANNYKH DVUKHCHASTOTNYKH ELEKTROMAGNITNYKH POLEI]
IU. D. DUMANSKII, D. S. IVANOV, N. G. NIKITINA, I. I. KARACHEV, S. V. BITKIN, and V. N. SOLDATCHENKOV Gigiena i Sanitariia (ISSN 0016-9900), July 1984, p. 38-42. In Russian.

A85-19061
HYGIENIC ASSESSMENT OF THE PEP-971 POLYMER COATING USED IN A WATER-SUPPLY SYSTEM [GIGIENICHESKAIA OTSENKA POLIMERNOGO POKRYTIIA PEP-971, PRIMENIAEMOGO V VODOSNABZHENII]
L. E. IAKOVLEVA and E. N. PASHKINA (Leningradskii Sanitarno-Gigienicheskii Meditsinskii Institut, Leningrad, USSR) Gigiena i Sanitariia (ISSN 0016-9900), July 1984, p. 74. In Russian.

Results are presented of a hygienic-chemical and toxicological investigation of the PEP-971 polymer coating used to protect drinking-water conduits against corrosion. A slight contamination of the water supply with organic compounds is noted, which disappears in a short period of time. B.J.

A85-19078
STEP ERGOMETRY IN CLINICAL PRACTICE [STEPERGOMETRIIA V KLINICHESKOI PRAKTIKE]
B. P. PREVARSKII (Kievskii Nauchno-Issledovatel'skii Institut Meditsinskikh Problem Fizkul'tury, Kiev, Ukrainian SSR) Voprosy Kurortologii, Fizioterapii i Lechebnoi Fizicheskoi Kul'tury (ISSN 0042-8787), May-June 1984, p. 29-31. In Russian. refs

A method of grading exercises for step ergometry tests is proposed. The method is based on experimental measurements of the volume of proper oxygen consumption (PMOC) in 120 healthy subjects and in 280 subjects with coronary heart disease. A table is given which can be used for determining the number and height of step rises corresponding to PMOC levels of 20, 35, 50 and 75 percent, respectively. I.H.

N85-14487*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
TWENTIETH ANNUAL CONFERENCE ON MANUAL CONTROL, VOLUME 1
S. G. HART, comp. and E. J. HARTZELL, comp. Sep. 1984 653 p refs Conf. held at Moffett Field, Calif., 12-14 Jun. 1984 2 Vol.
(NASA-CP-2341-VOL-1; A-9879-VOL-1; NAS 1.55:2341-VOL-1)
Avail: NTIS HC A99/MF A01 CSCL 05H

The 48 papers presented were devoted to humanopeator modeling, application of models to simulation and operational environments, aircraft handling qualities, teleopertors, fault diagnosis, and biodynamics.

N85-14488*# Purdue Univ., Lafayette, Ind. School of Aeronautics and Astronautics.
TIME SERIES MODELING OF HUMAN OPERATOR DYNAMICS IN MANUAL CONTROL TASKS
D. J. BIEZAD and D. K. SCHMIDT *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 1 p 1-40 Sep. 1984 refs
Avail: NTIS HC A99/MF A01 CSCL 05H

A time-series technique is presented for identifying the dynamic characteristics of the human operator in manual control tasks from relatively short records of experimental data. Control of system excitation signals used in the identification is not required. The approach is a multi-channel identification technique for modeling multi-input/multi-output situations. The method presented includes statistical tests for validity, is designed for digital computation, and yields estimates for the frequency response of the human operator. A comprehensive relative power analysis may also be performed for validated models. This method is applied to several sets of experimental data; the results are discussed and shown to compare favorably with previous research findings. New results are also presented for a multi-input task that was previously modeled to demonstrate the strengths of the method. Author

N85-14489*# Boeing Co., Seattle, Wash.
STATISTICAL TIME SERIES MODELS OF PILOT CONTROL WITH APPLICATIONS TO INSTRUMENT DISCRIMINATION
R. E. ALTSCHUL, P. M. NAGEL, and F. OLIVER *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 1 p 41-76 Sep. 1984 refs
Avail: NTIS HC A99/MF A01 CSCL 05H

A general description of the methodology used in obtaining the transfer function models and verification of model fidelity, frequency domain plots of the modeled transfer functions, numerical results obtained from an analysis of poles and zeroes obtained from z plane to s-plane conversions of the transfer functions, and the results of a study on the sequential introduction of other variables, both exogenous and endogenous into the loop are contained. B.G.

N85-14490*# Westfaelische Wilhelms Univ., Muenster (West Germany). Psychologisches Inst.
UTILIZATION OF HISTORIC INFORMATION IN AN OPTIMISATION TASK Abstract Only
T. BOESSER *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol 1 p 77 Sep. 1984
Avail: NTIS HC A99/MF A01 CSCL 05H

One of the basic components of a discrete model of motor behavior and decision making, which describes tracking and supervisory control in unitary terms, is assumed to be a filtering mechanism which is tied to the representational principles of human memory for time-series information. In a series of experiments subjects used the time-series information with certain significant limitations: there is a range-effect; asymmetric distributions seem to be recognized, but it does not seem to be possible to optimize performance based on skewed distributions. Thus there is a transformation of the displayed data between the perceptual system and representation in memory involving a loss of information. This rules out a number of representational principles for time-series information in memory and fits very well into the framework of a comprehensive discrete model for control of complex systems, modelling continuous control (tracking), discrete responses, supervisory behavior and learning. B.G.

N85-14491*# Systems Technology, Inc., Mountain View, Calif.
QUANTIFICATION OF CROSS-COUPLING AND MOTION FEEDTHROUGH FOR MULTIAXIS CONTROLLERS USED IN AN AIR COMBAT FLYING TASK
W. E. JEWELL and K. D. CITURS (McDonnell Aircraft Co., St. Louis, Mo.) *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 1 p 79-90 Sep. 1984 refs
Avail: NTIS HC A99/MF A01 CSCL 05H

A real-time piloted simulation of an air-to-air combat flying task using a wings-level-turn aircraft and various novel controllers was conducted. One objective is to quantify how the pilot interacts with the controllers and control modes, including: (1) controller versus aircraft response; (2) proprioceptive cross-coupling among axes of the controllers; and (3) biodynamic cross-coupling between the aircraft motions and the controllers. In order to aid in identifying the items listed above, both the target aircraft and the large amplitude multimode aerospace research simulator (LAMARS) motion system were distributed with quasi-random sums-of-sinusoids. Since the disturbances were separated in frequency, spectral analysis techniques were used to identify the three items listed. The results of the spectral analysis of controller motions from the two-axis side stick, a twist grip mounted on the side stick, a thumb button mounted on the side stick, and conventional rudder pedals are presented. Conclusions and recommendations for further research are also presented. B.G.

N85-14492*# CAE Electronics Ltd., Montreal (Quebec).
SIX DEGREES OF FREEDOM CONTROL WITH EACH HAND? Abstract Only
M. L. KING *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 1 p 91 Sep. 1984
Avail: NTIS HC A99/MF A01 CSCL 05H

For some time man has made six degree of freedom inputs to a pair of dextrous manipulators using both hands simultaneously by the use of the master/slave concept. The advent of the microprocessor has the potential to make the master/slave concept redundant by replacing the master with a mathematical model. All spacecraft to date, including the space shuttle, that were flown in six degrees of freedom were controlled by using both hands, the left hand controlling translation and the right rotation. Almost inevitably the same principle was applied to the CANADARM. At the instigation of NASA the development of a device whereby both translation and rotation could be combined allowing full control with one hand was developed. The development and testing of the device, and the extension of its application into spaceflight control are described. Also the concept of an adaptable workstation for multi-maniipulator and spacecraft flight control is discussed. B.G.

N85-14493*# California Univ., Davis. Dept. of Mechanical Engineering.
A NONLINEAR FILTER FOR COMPENSATING FOR TIME DELAYS IN MANUAL CONTROL SYSTEMS
R. A. HESS and A. A. MYERS *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 1 p 93-116 Sep. 1984 refs
Avail: NTIS HC A99/MF A01 CSCL 05H

A nonlinear filter configured to provide phase lead without accompanying gain distortion is analyzed and evaluated. The nonlinear filter is superior to a linear lead/lag compensator in its ability to maintain system stability as open loop crossover frequency is increased. Test subjects subjectively rated the filter as slightly better than a lead/lag compensator in its ability to compensate for delays in a compensatory tracking task. However, the filter does introduce unwanted harmonics. This is particularly noticeable for low frequency pilot inputs. A revised compensation method is proposed which allows such low frequency inputs to bypass the nonlinear filter. A brief analytical and experimental evaluation of the revised filter indicates that further evaluation in more realistic tasks is justified. Author

N85-14494*# Purdue Univ., Lafayette, Ind. School of Aeronautics and Astronautics.
MODEL ESTIMATION AND IDENTIFICATION OF MANUAL CONTROLLER OBJECTIVES IN COMPLEX TRACKING TASKS
D. K. SCHMIDT and P. J. YUAN *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 1 p 117-148 Sep. 1984 refs
(Contract NAS4-1)
Avail: NTIS HC A99/MF A01 CSCL 05H

A methodology is presented for estimating the parameters in an optimal control structural model of the manual controller from experimental data on complex, multiinput/multioutput tracking tasks. Special attention is devoted to estimating the appropriate objective function for the task, as this is considered key in understanding the objectives and strategy of the manual controller. The technique is applied to data from single input/single output as well as multi input/multi outpuut experiments, and results discussed. Author

N85-14495*# University of Southern California, Los Angeles. Dept. of Electrical Engineering-Systems.
STRUCTURE ERRORS IN SYSTEM IDENTIFICATION
G. A. BEKEY and F. Y. HADAEGH *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 1 p 149-156 Sep. 1984 refs Sponsored in part by NSF
Avail: NTIS HC A99/MF A01 CSCL 05H

An approach to system identification is presented which explicitly takes structure errors into account and hence provides a systematic way for answering questions concerning the magnitude of estimated parameter errors resulting from structural errors. It is indicated that, from this point of view, it is possible to define near equivalence between process and model and to obtain meaningful theoretical results on solution error system identification. It remains to apply these results to large realistic problems such as those involving models of complex man machine systems. Author

N85-14496*# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
EFFECTS OF CONTROL STICK PARAMETERS ON HUMAN CONTROLLER RESPONSE
D. W. REPPERGER and W. H. LEVINSON (Bolt, Beranek and Newman, Inc., Cambridge, Mass.) *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 1 p 157-172 Sep. 1984 refs
Avail: NTIS HC A99/MF A01 CSCL 05H

A fixed base laboratory tracking study was conducted to determine the effects of stick displacement and stick force characteristics on human tracking performance. Three different levels of control stick force/displacement characteristics and stick electrical gain were varied to observe their influence on RMS (Root Mean Square) tracking error and RMS control activity (stick output). The results indicated that both RMS tracking error and RMS control activity were influenced by the three different levels of control stick force/displacement characteristics and stick electrical gain. The human neuromotor time constant was affected by the electrical control gain of the stick while the spring stiffness of the stick influenced the time delay characteristics of the human response behavior. Author

N85-14497*# Systems Technology, Inc., Mountain View, Calif.
A METHOD FOR MEASURING THE EFFECTIVE THROUGHPUT TIME DELAY IN SIMULATED DISPLAYS INVOLVING MANUAL CONTROL
W. F. JEWELL and W. F. CLEMENT *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 1 p 173-184 Sep. 1984 refs
Avail: NTIS HC A99/MF A01 CSCL 05H

The advent and widespread use of the computer-generated image (CGI) device to simulate visual cues has a mixed impact on the realism and fidelity of flight simulators. On the plus side, CGIs provide greater flexibility in scene content than terrain boards and closed circuit television based visual systems, and they have the potential for a greater field of view. However, on the minus side, CGIs introduce into the visual simulation relatively long time delays. In many CGIs, this delay is as much as 200 ms, which is comparable to the inherent delay time of the pilot. Because most GCIs use multiloop processing and smoothing algorithms and are linked to a multiloop host computer, it is seldom possible to identify a unique throughput time delay, and it is therefore difficult to quantify the performance of the closed loop pilot simulator system relative to the real world task. A method to address these issues using the critical task tester is described. Some empirical results from applying the method are presented, and a novel technique for improving the performance of GCIs is discussed. Author

N85-14498*# Systems Technology, Inc., Hawthorne, Calif.
EFFECTS OF TRANSPORT DELAYS OF MANUAL CONTROL SYSTEM PERFORMANCE
R. W. ALLEN and R. J. DIMARCO *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 1 p 185-201 Sep. 1984 refs
Avail: NTIS HC A99/MF A01 CSCL 05H

Throughput or transport delays in manual control systems can cause degraded performance and lead to potentially unstable operation. With the expanding use of digital processors, throughput delays can occur in manual control systems in a variety of ways such as in digital flight control systems in real aircraft, and in equation of motion computers and computer generated images in simulators. Research has shown the degrading effect of throughput delays on subjective opinion and system performance and dynamic response. A generic manual control system model is used to

provide a relatively simple analysis of and explanation for the effects of various types of delays. The consequence of throughput delays of some simple system architectures is also discussed.
Author

N85-14499*# General Dynamics Corp., Fort Worth, Tex. Flight Control Systems Section.
STOL SIMULATION REQUIREMENTS FOR DEVELOPMENT OF INTEGRATED FLIGHT/PROPULSION CONTROL SYSTEMS
K. E. SANDERS, D. C. ANDERSON, and J. H. WATSON *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 1 p 202-209 Sep. 1984 refs
Avail: NTIS HC A99/MF A01 CSCL 05H

The role and use of simulation as a design tool in developing integrated systems where design criteria is largely unavailable is well known. This paper addresses additional simulation needs for the development of Integrated Flight/Propulsion Control Systems (IFPCS) which will improve the probability of properly interpreting simulation results. These needs are based on recent experience with power approach flying qualities evaluations of an advanced fighter configuration which incorporated Short Takeoff and Landing (STOL) technologies and earlier experiences with power approach flying qualities evaluations on the AFTI/F-16 program. The use of motion base platforms with axial and normal degrees of freedom will help in evaluating pilot coupling and workload in the presence of high frequency low amplitude axial accelerations produced by high bandwidth airspeed controllers in a gusty environment.
B.W.

N85-14500*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
MEASUREMENTS OF PILOT TIME DELAY AS INFLUENCED BY CONTROLLER CHARACTERISTICS AND VEHICLES TIME DELAYS
C. M. PRIVOZNIK, D. T. BERRY, and A. G. BARTOLI *In its* 20th Ann. Conf. on Manual Control, Vol. 1 p 210-221 Sep. 1984 refs
Avail: NTIS HC A99/MF A01 CSCL 05H

A study to measure and compare pilot time delay when using a space shuttle rotational hand controller and a more conventional control stick was conducted at NASA Ames Research Center's Dryden Flight Research Facility. The space shuttle controller has a palm pivot in the pitch axis. The more conventional controller used was a general-purpose engineering simulator stick that has a pivot length between that of a typical aircraft center stick and a sidestick. Measurements of the pilot's effective time delay were obtained through a first-order, closed-loop, compensatory tracking task in pitch. The tasks were implemented through a space shuttle cockpit simulator and a critical task tester device. The study consisted of 450 data runs with four test pilots and one nonpilot, and used three control stick configurations and two system delays. Results showed that the heavier conventional stick had the lowest pilot effective time delays associated with it, whereas the shuttle and light conventional sticks each had similar higher pilot time delay characteristics. It was also determined that each control stick showed an increase in pilot time delay when the total system delay was increased.
Author

N85-14501*# CAE Electronics Ltd., Montreal (Quebec).
PSYCHOPHYSICAL RESEARCH IN DEVELOPMENT OF A FIBER-OPTIC HELMET MOUNTED DISPLAY Abstract only
R. V. KRUK and T. M. LONGRIDGE (USAF Human Resources Lab., Williams AFB, Ariz.) *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 1 p 222 Sep. 1984
Avail: NTIS HC A99/MF A01 CSCL 05H

The Fiber Optic Helmet Mounted Display (FOHMD) was conceived as an innovative solution to existing flight simulator display deficiencies. An initial (breadboard) version of the system was fabricated to permit experimentation which would help define design requirements for a more refined engineering prototype. A series of visual/human factors studies are being conducted at the USAF Human Resources Laboratory (AFHRL) Operations Training Division, Williams AFB, Arizona to determine the optimum fit of human observer operating characteristics and fiber optic helmet mounted display technology. Pilot performance within a variety of high resolution insert/binocular overlap combinations is being assessed in two classes of environment. The first two of four studies planned incorporate an air-to-air combat environment, whereas the second two studies will use a low level environment with air to ground weapons delivery.
B.W.

N85-14502*# Manudyne Systems, Inc., Los Altos, Calif.
HELICOPTER PILOT PERFORMANCE FOR DISCRETE-MANEUVER FLIGHT TASKS
R. K. HEFFLEY, S. M. BOURNE, and W. S. HINDSON (Stanford Univ., Calif.) *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 1 p 223-232 Sep. 1984 refs
Avail: NTIS HC A99/MF A01 CSCL 05H

This paper describes a current study of several basic helicopter flight maneuvers. The data base consists of in-flight measurements from instrumented helicopters using experienced pilots. The analysis technique is simple enough to apply without automatic data processing, and the results can be used to build quantitative matah models of the flight task and some aspects of the pilot control strategy. In addition to describing the performance measurement technqiue, some results are presented which define the aggressiveness and amplitude of maneuvering for several lateral maneuvers including turns and sidesteps.
Author

N85-14503*# Northrop Corp., Hawthorne, Calif. Aircraft Div.
MAXIMUM NORMALIZED RATE AS A FLYING QUALITIES PARAMETER
E. D. ONSTOTT, J. S. WARNER, and J. HODGKINSON *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 1 p 233-258 Sep. 1984 refs
Avail: NTIS HC A99/MF A01 CSCL 05H

Discrete attitude commands have become a standard task for flying qualities evaluation and control system testing. Much pilot opinion data is now available for ground-based and in-flight simulations, but adequate performance measures and prediction methods have not been established. The Step Target Tracking Prediction method, introduced in 1978, correlated time-on-target and rms tracking data with NT-33 in-flight longitudinal simulations, but did not employ parameters easily measured in manned flight and simulation. Recent application of the Step Target Tracking Prediction method to lateral flying qualities analysis has led to a new measure of performance. This quantity, called Maximum Normalized Rate (MNR), reflects the greatest attitude rate a pilot can employ during a discrete maneuver without excessive overshoot and oscillation. MNR correlates NT-33 lateral pilot opinion ratings well, and is easily measured during flight test or simulation. Futhermore, the Step Target MNR method can be used to analyze large amplitude problems concerning rate limiting and nonlinear aerodynamics.
Author

N85-14504*# Analytical Mechanics Associates, Inc., Mountain View, Calif.
PREDICTIONS OF COCKPIT SIMULATOR EXPERIMENTAL OUTCOME USING SYSTEM MODELS
J. A. SORENSEN and T. GOKA *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 1 p 259-280 Sep. 1984 refs
(Contract NAS1-16135)
Avail: NTIS HC A99/MF A01 CSCL 05H

This study involved predicting the outcome of a cockpit simulator experiment where pilots used cockpit displays of traffic information (CDTI) to establish and maintain in-trail spacing behind a lead aircraft during approach. The experiments were run on the NASA Ames Research Center multicab cockpit simulator facility. Prior to the experiments, a mathematical model of the pilot/aircraft/CDTI flight system was developed which included relative in-trail and vertical dynamics between aircraft in the approach string. This model was used to construct a digital simulation of the string dynamics including response to initial position errors. The model was then used to predict the outcome of the in-trail following cockpit simulator experiments. Outcome included performance and

sensitivity to different separation criteria. The experimental results were then used to evaluate the model and its prediction accuracy. Lessons learned in this modeling and prediction study are noted.
Author

N85-14505*# California Univ., Davis. Dept. of Mechanical Engineering.
MULTILOOP MANUAL CONTROL OF DYNAMIC SYSTEMS
R. A. HESS and B. D. MCNALLY *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 1 p 281-298 Sep. 1984 refs
Avail: NTIS HC A99/MF A01 CSCL 05H

Human interaction with a simple, multiloop dynamic system in which the human's activity was systematically varied by changing the levels of automation was studied. The control loop structure resulting from the task definition parallels that for any multiloop manual control system, is considered a sterotype. Simple models of the human in the task, and upon extending a technique for describing the manner in which the human subjectively quantifies his opinion of task difficulty were developed. A man in the loop simulation which provides data to support and direct the analytical effort is presented. E.A.K.

N85-14506*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
A MODEL FOR THE EFFECTIVENESS OF AIRCRAFT ALERTING AND WARNING SYSTEMS Abstract Only
R. E. CURRY and J. E. NEU (USAF) *In its* 20th Ann. Conf. on Manual Control, Vol. 1 p 299 Sep. 1984
Avail: NTIS HC A99/MF A01 CSCL 05H

The effectiveness of an alerting system with a single alert was analyzed. The pilot's decision behavior is modeled by the theory of signal detection and therefore accounts for different strengths of cross check information and different pilot criteria. The model includes the effects of the alerting and warning system (CAWS) error rate; the pilot's past experience with the CAWS accuracy; his reliance on the CAWS rather than independent monitoring; missed alerts; and adoption of a minimum error or Neyman-Pearson objective rather than minimum cost objective. It is showwn that for rare events: (1) the expected cost is greatly increased if the pilot ignores the a posteriori information in the existence of an alert; (2) the expected cost is insensitive to CAWS Type 1 errors; and (3) the expected cost is sensitive to CAWS type 2 errors only when the cross check information is ambiguous. E.A.K.

N85-14507*# Gates Learjet Corp., Denver, Colo.
DEVELOPMENT AND CERTIFICATION OF A NEW STALL WARNING AND AVOIDANCE SYSTEM
W. M. GERTSEN and J. D. HAWKINS *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 1 p 301-326 Sep. 1984
Avail: NTIS HC A99/MF A01 CSCL 05H

Several methods may be employed to improve natural stall characteristics. The method employed on all learjets to obtain improved stall characteristics is a stall warning and avoidance system that employs angle of attack vanes, an electronic computer, a control column shaker motor, and a torquer which drives the control column in a pusher mode to avoid unwanted further buildup of angle of attack. The new system was developed with changes that improve system response with no performance penalty or increase in turbulence sensitivity. The following changes were made included modified system time constants and (alpha) time rate of change of vane angle dead zone and the addition of an alpha signal limiter and an alpha cut out below a specified angle of attack. E.A.K.

N85-14508*# Massachusetts Inst. of Tech., Cambridge. Man-Machine Systems Lab.
EVALUATION OF FUZZY RULEMAKING FOR EXPERT SYSTEMS FOR FAILURE DETECTION
F. LARITZ and T. B. SHERIDAN *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 1 p 327-336 Sep. 1984 refs
Avail: NTIS HC A99/MF A01 CSCL 05H

Computer aids in expert systems were proposed to diagnose failures in complex systems. It is shown that the fuzzy set theory of Zadeh offers a new perspective for modeling for humans thinking and language use. It is assumed that real expert human operators of aircraft, power plants and other systems do not think of their control tasks or failure diagnosis tasks in terms of control laws in differential equation form, but rather keep in mind a set of rules of thumb in fuzzy form. Fuzzy set experiments are described.
E.A.K.

N85-14509*# Ohio State Univ., Columbus. Dept. of Industrial and Systems Engineering.
THE ROLE OF KNOWLEDGE STRUCTURES IN FAULT DIAGNOSIS Abstract Only
P. J. SMITH, W. C. GIFFIN, T. H. ROCKWELL, and M. E. THOMAS *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 1 p 337-338 Sep. 1984
Avail: NTIS HC A99/MF A01 CSCL 05H

The use of human memory and knowledge structures to direct fault diagnosis performance was investigated. The performances of 20 pilots with instrument flight ratings were studied in a fault diagnosis task. The pilots were read a scenario which described flight conditions under which the symptoms which are indicative of a problem were detected. They were asked to think out loud as they requested and interpreted various pieces of information to diagnose the cause of the problem. Only 11 of the 20 pilots successfully diagnosed the problem. Pilot performance on this fault diagnosis task was modeled in the use of domain specific knowledge organized in a frame system. Eighteen frames, with a common structure, were necessary to account for the data from all twenty subjects. E.A.K.

N85-14510*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
THE EFFECT OF PART-SIMULATION OF WEIGHTLESSNESS ON HUMAN CONTROL OF BILATERAL TELEOPERATION: NEUROMOTOR CONSIDERATIONS
K. CORKER and A. BEJCZY *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 1 p 339-360 Sep. 1984 refs
(Contract NAS7-918)
Avail: NTIS HC A99/MF A01 CSCL 05H

The effect of weightlessness on the human operator's performance in force reflecting position control of remote manipulators was investigated. A gravity compensation system was developed to simulate the effect of weightlessness on the operator's arm. A universal force reflecting hand controller (FRHC) and task simulation software were employed. Two experiments were performed because of anticipated disturbances in neuromotor control specification on the human operator in an orbital control environment to investigate: (1) the effect of controller stiffness on the attainment of a learned terminal position in the three dimensional controller space, and (2) the effect of controller stiffness and damping on force tracking of the contour of a simulated three dimensional cube using the part simulation of weightless conditions. The results support the extension of neuromotor control models, which postulate a stiffness balance encoding of terminal position, to three dimensional motion of a multilink system, confirm the existence of a disturbance in human manual control performance under gravity compensated conditions, and suggest techniques for compensation of weightlessness induced performance decrement through appropriate specification of hand controller response characteristics. These techniques are based on the human control model. E.A.K.

N85-14511*# Massachusetts Inst. of Tech., Cambridge. Man-Machine System Lab.
REVIEW OF TELEOPERATOR RESEARCH
T. B. SHERIDAN *In* NASA. Ames Research Lab 20th Ann. Conf. on Manual Control, Vol. 1 p 361-366 Sep. 1984 refs
Avail: NTIS HC A99/MF A01 CSCL 05H

A predictor display to overcome time lag problems with remote control systems is discussed. The video picture is a (necessarily) time-delayed picture from the remote location, generated as a coherent frame (snapshot) so that all picture elements in a single scan are delayed the same. The computer-generated graphics is a line drawing of the present configuration of the manipulator arm, vehicle or other device. The latter is generated by using the same control signals which are sent to the remote manipulator (device) to drive a computer model of it. The computer model is drawn on the video display in exactly the same location as where it will actually be after a one-way time delay and where it will be seen to be on the video after one round-trip time delay. If one waits at least one round-trip delay without moving, both the graphics model and the video picture of the manipulator (device) are seen to coincide. The predictor technque proved to work well and was shown for time delays in the 1-3 second range to reduce completion times for a variety of manipulation tasks by 50-150 percent reliably. R.J.F.

N85-14512*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
VISUAL SYSTEMS FOR REMOTELY CONTROLLED VEHICLES
T. REZEK *In its* 20th Ann. Conf. on Manual Control, Vol. 1 p 367-396 Sep. 1984
Avail: NTIS HC A99/MF A01 CSCL 05H

The Variable Acuity Remote Viewing System is discussed. It was conceived as a technique for resolving the field of view/resolution/ bandwidth tradeoffs that exist in remote viewing systems. This system is based on the fact that integration of the human eye acuity function shows only about 130,000 pixels are required to fully support the human vision. This quantity is well within the capabilities of conventional video systems. The technique utilizes a non-linear optical system in both the sensing and display equipment. The non-linearity is achieved by a special lens which translates a uniform pixel array on its image plane into the object field as a variable angular array. This lens will record the same angular detail the eye would see when viewing the same scene and compress this detail into a uniform matrix of equal sized picture elements on its image plane. This image can be scanned with a broadcast quality tv having a 525 line raster scan. Conventional transmission equipment can then also be used to send the image information to a remote location. When received, the image is projected by a light valve projector onto a hemispherical screen by an identical non-linear lens. R.J.F.

N85-14513*# Massachusetts Inst. of Tech., Cambridge. Man-Machine Systems Lab.
MEASURING WORKLOAD DIFFERENCES BETWEEN SHORT-TERM MEMORY AND LONG-TERM MEMORY SCENARIOS IN A SIMULATED FLIGHT ENVIRONMENT
S. L. BERG and T. B. SHERIDAN *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 1 p 397-416 Sep. 1984 refs
Avail: NTIS HC A99/MF A01 CSCL 05H

Four highly experienced Air Force pilots each flew four simulated flight scenarios. Two scenarios required a great deal of aircraft maneuvering. The other two scenarios involved less maneuvering, but required remembering a number of items. All scenarios were designed to be equaly challenging. Pilot's Subjective Ratings for Activity-level, Complexity, Difficulty, Stress, and Workload were higher for the manuevering scenarios than the memory scenarios. At a moderate workload level, keeping the pilots active resulted in better aircraft control. When required to monitor and remember items, aircraft control tended to decrease. Pilots tended to weigh information about the spatial positioning and performance of their aircraft more heavily than other items. Author

N85-14514*# Toronto Univ. (Ontario). Dept. of Industrial Engineering.
VISUAL ATTENTION TO RADAR DISPLAYS
N. MORAY, M. RICHARDS, and C. BROPHY *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 1 p 417-430 Sep. 1984 refs Sponsored in part by United Kingdom Ministry of Defense
Avail: NTIS HC A99/MF A01 CSCL 05H

A model is described which predicts the allocation of attention to the features of a radar display. It uses the growth of uncertainty and the probability of near collision to call the eye to a feature of the display. The main source of uncertainty is forgetting following a fixation, which is modelled as a two dimensional diffusion process. The model was used to predict information overload in intercept controllers, and preliminary validation obtained by recording eye movements of intercept controllers in simulated and live (practice) interception. R.J.F.

N85-14515*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
POPCORN: A SUPERVISORY CONTROL SIMULATION FOR WORKLOAD AND PERFORMANCE RESEARCH
S. G. HART, V. BATTISTE (San Jose State Univ., Calif.), and P. T. LESTER (San Jose State Univ., Calif.) *In its* 20th Ann. Conf. on Manual Control, Vol. 1 p 431-454 Sep. 1984 refs
Avail: NTIS HC A99/MF A01 CSCL 05H

A multi-task simulation of a semi-automatic supervisory control system was developed to provide an environment in which training, operator strategy development, failure detection and resolution, levels of automation, and operator workload can be investigated. The goal was to develop a well-defined, but realistically complex, task that would lend itself to model-based analysis. The name of the task (POPCORN) reflects the visual display that depicts different task elements milling around waiting to be released and pop out to be performed. The operator's task was to complete each of 100 task elements that ere represented by different symbols, by selecting a target task and entering the desired a command. The simulated automatic system then completed the selected function automatically. Highly significant differences in performance, strategy, and rated workload were found as a function of all experimental manipulations (except reward/penalty). R.J.F.

N85-14516*# Search Technology, Inc., Norcross, Ga.
PSYCHOLOGICAL ISSUES IN ONLINE ADAPTIVE TASK ALLOCATION
N. M. MORRIS, W. B. ROUSE, S. L. WARD (AF Aerospace Medical Research Lab., Wright-Patterson AFB, Ohio), and P. R. FREY *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 1 p 455-466 Sep. 1984 refs
Avail: NTIS HC A02/MF A01 CSCL 05H

Adaptive aiding is an idea that offers potential for improvement over many current approaches to aiding in human-computer systems. The expected return of tailoring the system to fit the user could be in the form of improved system performance and/or increased user satisfaction. Issues such as the manner in which information is shared between human and computer, the appropriate division of labor between them, and the level of autonomy of the aid are explored. A simulated visual search task was developed. Subjects are required to identify targets in a moving display while performing a compensatory sub-critical tracking task. By manipulating characteristics of the situation such as imposed task-related workload and effort required to communicate with the computer, it is possible to create conditions in which interaction with the computer would be more or less desirable. The results of preliminary research using this experimental scenario are presented, and future directions for this research effort are discussed. R.J.F.

N85-14517*# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.

USE OF LINEAR PERSPECTIVE SCENE CUES IN A SIMULATED HEIGHT REGULATION TASK

W. H. LEVISON and R. WARREN (AFAMRL/HEF, Wright-Patterson AFB, Ohio) *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 1 p 467-490 Sep. 1984 refs (Contract F33615-81-C-0515)

Avail: NTIS HC A99/MF A01 CSCL 05H

As part of a long-term effort to quantify the effects of visual scene cuing and non-visual motion cuing in flight simulators, an experimental study of the pilot's use of linear perspective cues in a simulated height-regulation task was conducted. Six test subjects performed a fixed-base tracking task with a visual display consisting of a simulated horizon and a perspective view of a straight, infinitely-long roadway of constant width. Experimental parameters were (1) the central angle formed by the roadway perspective and (2) the display gain. The subject controlled only the pitch/height axis; airspeed, bank angle, and lateral track were fixed in the simulation. The average RMS height error score for the least effective display configuration was about 25% greater than the score for the most effective configuration. Overall, larger and more highly significant effects were observed for the pitch and control scores. Model analysis was performed with the optimal control pilot model to characterize the pilot's use of visual scene cues, with the goal of obtaining a consistent set of independent model parameters to account for display effects. M.G.

N85-14518*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif. Aerospace Human Factors Research Div.

COCKPIT WINDOW EDGE PROXIMITY EFFECTS ON JUDGEMENTS OF HORIZON VERTICAL DISPLACEMENT

R. F. HAINES *In its* 20th Ann. Conf. on Manual Control, Vol. 1 p 491-514 Sep. 1984 refs

Avail: NTIS HC A02/MF A01 CSCL 05H

To quantify the influence of a spatially fixed edge on vertical displacement threshold, twenty-four males (12 pilots, 12 non-pilots) were presented a series of forced choice, paired comparison trials in which a 32 deg arc wide, thin, luminous horizontal stimulus line moved smoothly downward through five angles from a common starting position within a three second-long period. The five angles were 1.4, 1.7, 2, 2.3, and 2.6 deg. Each angle was presented paired with itself and the other four angles in all combinations in random order. For each pair of trials the observer had to choose which trial possessed the largest displacement. A confidence response also was made. The independent variable was the angular separation between the lower edge of a stable 'window' aperture through which the stimulus was seen to move and the lowest position attained by the stimulus. It was found that vertical displacement accuracy is inversely related to the angle separating the stimulus and the fixed window edge ($p = .05$). In addition, there is a strong tendency for pilot confidence to be lower than that of non-pilots for each of the three angular separations. These results are discussed in erms of selected cockpit features and as they relate to how pilots judge changes in aircraft pitch attitude. M.G.

N85-14519*# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.

MEAN AND RANDOM ERRORS OF VISUAL ROLL RATE PERCEPTION FROM CENTRAL AND PERIPHERAL VISUAL DISPLAYS

J. C. VANDERVAART and R. J. A. W. HOSMAN *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 1 p 515-530 Sep. 1984 refs

Avail: NTIS HC A99/MF A01 CSCL 05H

A large number of roll rate stimuli, covering rates from zero to plus or minus 25 deg/sec, were presented to subjects in random order at 2 sec intervals. Subjects were to make estimates of magnitude of perceived roll rate stimuli presented on either a central display, on displays in the peripheral ield of vision, or on all displays simultaneously. Response was by way of a digital keyboard device, stimulus exposition times were varied. The present experiment differs from earlier perception tasks by the same authors in that mean rate perception error (and standard deviation) was obtained as a function of rate stimulus magnitude, whereas the earlier experiments only yielded mean absolute error magnitude. Moreover, in the present experiment, all stimulus rates had an equal probability of occurrence, whereas the earlier tests featured a Gaussian stimulus probability density function. Results yield a ood illustration of the nonlinear functions relating rate presented to rate perceived by human observers or operators. Author

N85-14520*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

DIRECTION JUDGEMENT ERRORS IN PERSPECTIVE DISPLAYS

M. W. MCGREEVY and S. R. ELLIS *In its* 20th Ann. Conf. on Manual Control, Vol. 1 p 531-550 Sep. 1984 refs

Avail: NTIS HC A99/MF A01 CSCL 05H

Spatial information transfer characteristics of perspective situation displays were investigated by having eight subjects judge the directions of displayed targets relative to a fixed position in the center of computer generated perspective scenes. Their errors in judging azimuth angles varied sinusoidally with the azimuth of the targets. Errors alternated between clockwise and counterclock wise from one direction quadrant to the next. As the perspective geometry was varied between telephoto lens and wide angle lens views, the direction of error gradually reversed in all quadrants. The results can be explained by systematic differences between the three-dimensional stimulus angles and the perspective projections of those angles onto the display screen. M.G.

N85-14521*# Cornell Univ., Ithaca, N.Y. Dept. of Psychology.

THE INTERACTION OF FOCUSED ATTENTION WITH FLOW-FIELD SENSITIVITY

T. STOFFREGEN *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 1 p 551-558 Sep. 1984 refs

Avail: NTIS HC A99/MF A01 CSCL 05H

Two studies were performed to determine whether a subject's response to naturalistic optical flow specifying egomotion would be affected by a concurrent attention task. In the first study subjects stood in a moving room in which various areas of the optical flow generated by room movement were visible. Subjects responded to room motion with strong compensatory sway when the entire room was visible. When the side walls of the room were completely obscured by stationary screens, leaving only the front wall visible, sway was significantly reduced, though it remained greater than in an eyes-closed control. In Exp. 2 subjects were presented with either the full room (large sway response) or the room with only the front wall visible (moderate response), each in combination with either a hard or easy verbal addition task. Preliminary results show that swaying in the fully visible room and in the room with only the front wall visible increased when combined with either the hard or easy tasks. These preliminary results suggest that at the least the pick-up of optical flow specifying egomotion is not affected by concurrent attentional activity. M.G.

N85-14522*# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.

ACCURACY OF SYSTEM STEP RESPONSE ROLL MAGNITUDE ESTIMATION FROM CENTRAL AND PERIPHERAL VISUAL DISPLAYS AND SIMULATOR COCKPIT MOTION

R. J. A. W. HOSMAN and J. C. VANDERVAART *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 1 p 559-574 Sep. 1984 refs

Avail: NTIS HC A99/MF A01 CSCL 05H

An experiment to investigate visual roll attitude and roll rate perception is described. The experiment was also designed to assess the improvements of perception due to cockpit motion. After the onset of the motion, subjects were to make accurate and quick estimates of the final magnitude of the roll angle step response by pressing the appropriate button of a keyboard device. The differing time-histories of roll angle, roll rate and roll acceleration caused by a step response stimulate the different

perception processes related the central visual field, peripheral visual field and vestibular organs in different, yet exactly known ways. Experiments with either of the visual displays or cockpit motion and some combinations of these were run to asses the roles of the different perception processes. Results show that the differences in response time are much more pronounced than the differences in perception accuracy. M.G.

N85-14523*# Toronto Univ. (Ontario). Dept. of Industrial Engineering.
FITTS' LAW? A TEST OF THE RELATIONSHIP BETWEEN INFORMATION LOAD AND MOVEMENT PRECISION
M. ZALASKI and P. SANDERSON *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 1 p 575-584 Sep. 1984 refs
Avail: NTIS HC A99/MF A01 CSCL 05H

The independence of information load (Hick's Law) and movement precision (Fitts' Law) was tested using additive factors methodology. Subjects were required to classify stimuli according to a decision rule with a variable entropy. The stimuli were presented in the center of the CRT screen. In response, subjects had to move a cursor from a starting point near the stimulus to the appropriate target. The precision of the response movement was varied by manipulating the ratio of the radius of the annulus to the width of the target area. The dependent measure was elapsed time between onset of the stimulus and completion of the response movement. Independence of the Hick's Law and Fitts' Law components of the reaction time was tested with an analysis of variance. Presence of an interaction would suggest that a decision stage and a response stage are dependent, and cannot be considered discrete steps in a serial process. Author

N85-14524*# Ohio State Univ., Columbus.
A PRODUCTION SYSTEM MODEL OF CAPTURING REACTIVE MOVING TARGETS M.S. Thesis
R. J. JAGACINSKI, B. D. PLAMONDON, and R. A. MILLER *In* NASA. Ames Research Center 20th Ann. Conf. of Manual Control, Vol. 1 p 585-600 Sep. 1984 refs
(Contract NAG2-195; AF-AFOSR-3697-78)
Avail: NTIS HC A99/MF A01 CSCL 05H

Subjects manipulated a control stick to position a cursor over a moving target that reacted with a computer-generated escape strategy. The cursor movements were described at two levels of abstraction. At the upper level, a production system described transitions among four modes of activity; rapid acquisition, close following, a predictive mode, and herding. Within each mode, differential equations described trajectory-generating mechanisms. A simulation of this two-level model captures the targets in a manner resembling the episodic time histories of human subjects. Author

N85-14525*# California Univ., Berkeley. Neurology Unit.
INVERSE MODELLING TO OBTAIN HEAD MOVEMENT CONTROLLER SIGNAL
W. S. KIM, S. H. LEE (Kwang Woon Univ., Seoul, Korea), B. HANNAFORD, and L. STARK *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 1 p 601-620 Sep. 1984 refs Sponsored in part by NIH, and by Ministry of Education, Korea
(Contract NCC-2-86)
Avail: NTIS HC A99/MF A01 CSCL 05H

Experimentally obtained dynamics of time-optimal, horizontal head rotations have previously been simulated by a sixth order, nonlinear model driven by rectangular control signals. Electromyography (EMG) recordings have spects which differ in detail from the theoretical rectangular pulsed control signal. Control signals for time-optimal as well as sub-optimal horizontal head rotations were obtained by means of an inverse modelling procedures. With experimentally measured dynamical data serving as the input, this procedure inverts the model to produce the neurological control signals driving muscles and plant. The relationships between these controller signals, and EMG records should contribute to the understanding of the neurological control of movements. Author

N85-14526*# Performance Measurement Associates, Inc., Vienna, Va.
A CONTROL MODEL: INTERPRETATION OF FITTS' LAW
E. M. CONNELLY *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 1 p 621-642 Sep. 1984 refs
Avail: NTIS HC A99/MF A01 CSCL 05H

The analytical results for several models are given: a first order model where it is assumed that the hand velocity can be directly controlled, and a second order model where it is assumed that the hand acceleration can be directly controlled. Two different types of control-laws are investigated. One is linear function of the hand error and error rate; the other is the time-optimal control law. Results show that the first and second order models with the linear control-law produce a movement time (MT) function with the exact form of the Fitts' Law. The control-law interpretation implies that the effect of target width on MT must be a result of the vertical motion which elevates the hand from the starting point and drops it on the target at the target edge. The time optimal control law did not produce a movement-time formula simular to Fitt's Law. R.S.F.

N85-14527*# Ohio State Univ., Columbus.
THE IMPACT OF PICTORIAL DISPLAY ON OPERATOR LEARNING AND PERFORMANCE M.S. Thesis
R. A. MILLER, L. J. MESSING, and R. J. JAGACINSKI *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 1 p 643-662 Sep. 1984 refs
(Contract NAG2-195)
Avail: NTIS HC A99/MF A01 CSCL 05H

The effects of pictorially displayed information on human learning and performance of a simple control task were investigated. The controlled system was a harmonic oscillator and the system response was displayed to subjects as either an animated pendulum or a horizontally moving dot. Results indicated that the pendulum display did not effect performance scores but did significantly effect the learning processes of individual operators. The subjects with the pendulum display demonstrated more vertical internal models early in the experiment and the manner in which their internal models were tuned with practice showed increased variability between subjects. Author

N85-14528*# Rockwell International Corp., Los Angeles, Calif. Human Engineering/Biomedical.
DOES MCKUER'S LAW HOLD FOR HEART RATE CONTROL VIA BIOFEEDBACK DISPLAY?
B. J. COURTER and H. R. JEX *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 1 p 663-670 Sep. 1984
Avail: NTIS HC A99/MF A01 CSCL 05H

Some persons can control their pulse rate with the aid of a biofeedback display. If the biofeedback display is modified to show the error between a command pulse-rate and the measured rate, a compensatory (error correcting) heart rate tracking control loop can be created. The dynamic response characteristics of this control loop when subjected to step and quasi-random disturbances were measured. The control loop includes a beat-to-beat cardiotachmeter differenced with a forcing function from a quasi-random input generator; the resulting error pulse-rate is displayed as feedback. The subject acts to null the displayed pulse-rate error, thereby closing a compensatory control loop. McRuer's Law should hold for this case. A few subjects already skilled in voluntary pulse-rate control were tested for heart-rate control response. Control-law properties are derived, such as: crossover frequency, stability margins, and closed-loop bandwidth. These are evaluated for a range of forcing functions and for step as well as random disturbances. R.S.F.

N85-14529*# California Univ., Berkeley. Dept. of Engineering Science.
NEW USES FOR SENSITIVITY ANALYSIS: HOW DIFFERENT MOVEMENT TASKS EFFECT LIMB MODEL PARAMETER SENSITIVITY
J. M. WINTERS and L. STARK *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 1 p 671-698 Sep. 1984 refs
Avail: NTIS HC A99/MF A01 CSCL 05H

Original results for a newly developed eight-order nonlinear limb antagonistic muscle model of elbow flexion and extension are presented. A wider variety of sensitivity analysis techniques are used and a systematic protocol is established that shows how the different methods can be used efficiently to complement one another for maximum insight into model sensitivity. It is explicitly shown how the sensitivity of output behaviors to model parameters is a function of the controller input sequence, i.e., of the movement task. When the task is changed (for instance, from an input sequence that results in the usual fast movement task to a slower movement that may also involve external loading, etc.) the set of parameters with high sensitivity will in general also change. Such task-specific use of sensitivity analysis techniques identifies the set of parameters most important for a given task, and even suggests task-specific model reduction possibilities. A.R.H.

N85-14530*# Technion - Israel Inst. of Tech., Haifa. Dept. of Aeronautical Engineering.
SUPPRESSION OF BIODYNAMIC INTERFERENCE BY ADAPTIVE FILTERING
M. VELGER, S. J. MERHAV, and A. J. GRUNWALD *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 1 p 699-718 Sep. 1984 refs
(Contract F33615-82-C-0520)
Avail: NTIS HC A99/MF A01 CSCL 05H

Preliminary experimental results obtained in moving base simulator tests are presented. Both for pursuit and compensatory tracking tasks, a strong deterioration in tracking performance due to biodynamic interference is found. The use of adaptive filtering is shown to substantially alleviate these effects, resulting in a markedly improved tracking performance and reduction in task difficulty. The effect of simulator motion and of adaptive filtering on human operator describing functions is investigated. Adaptive filtering is found to substantially increase pilot gain and cross-over frequency, implying a more tight tracking behavior. The adaptive filter is found to be effective in particular for high-gain proportional dynamics, low display forcing function power and for pursuit tracking task configurations. A.R.H.

N85-14531*# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
ACTIVE STICKS: A NEW DIMENSION IN CONTROLLER DESIGN
D. W. REPPERGER and D. MCCOLLOR (Raytheon Service Corp.) *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 1 p 719-734 Sep. 1984 refs
Avail: NTIS HC A99/MF A01 CSCL 05H

A smart stick controller was built which actively produces a force to interact with the subject's hand and to aid in tracking. When the human tracks in this situation, the man-machine system can be viewed as the combination of two closed loop feedback paths. The inner loop occurs as a result of a tactile information channel effecting the man-controller interaction through force with this stick in the active mode (the stick generates a force) and the passive mode (the stick not generating a force) are reported. The most noteworthy observation is a significant increase in apparent neuromotor bandwidth and consequently better tracking performance. A.R.H.

N85-14532*# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
MODELS FOR THE EFFECTS OF G-SEAT CUING ON ROLL-AXIS TRACKING PERFORMANCE
W. H. LEVISON, G. R. MCMILLAN (AFMRL), and E. A. MARTIN (ASD) *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 1 p 735-752 Sep. 1984 refs
(Contract F33615-81-C-0515)
Avail: NTIS HC A99/MF A01 CSCL 05H

Including whole-body motion in a flight simulator improves performance for a variety of tasks requiring a pilot to compensate for the effects of unexpected disturbances. A possible mechanism for this improvement is that whole-body motion provides high derivative vehicle state information whic allows the pilot to generate more lead in responding to the external disturbances. During development of motion simulating algorithms for an advanced g-cuing system it was discovered that an algorithm based on aircraft roll acceleration producted little or no performance improvement. On the other hand, algorithms based on roll position or roll velocity produced performance equivalent to whole-body motion. The analysis and modeling conducted at both the sensory system and manual control performance levels to explain the above results are described. Author

N85-14533*# University of Southern California, Los Angeles. Dept. of Safety Science.
AN ANALYSIS OF KINETIC RESPONSE VARIABILITY
P. A. HANCOCK, L. G. CARLTON (Illinois Univ., Champaign), and K. M. NEWELL (Illinois Univ., Champaign) *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 1 p 753-760 Sep. 1984 refs
Avail: NTIS HC A99/MF A01 CSCL 05H

Studies evaluating variability of force as a function of absolute force generated are synthesized. Inconsistencies in reported estimates of this relationship are viewed as a function of *experimental constraints imposed. Typically, within-subject force* variability increases at a negative accelerating rate with equal increments in force produced. Current pulse-step and impulse variability models are unable to accommodate this description, although the notion of efficiency is suggested as a useful construct to explain the description outlined. Author

N85-14534*# Kon-Kuk Univ., Seoul (South Korea). Dept. of Electrical Engineering.
EFFECTS OF EXTERNAL LOADS ON HUMAN HEAD MOVEMENT CONTROL SYSTEMS
M. H. NAM and O. M. CHOI *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 1 p 761-762 Sep. 1984 refs
Avail: NTIS HC A99/MF A01 CSCL 05H

The central and reflexive control strategies underlying movements were elucidated by studying the effects of external loads on human head movement control systems. Some experimental results are presented on dynamic changes weigh the addition of aviation helmet (SPH4) and lead weights (6 kg). Intended time-optimal movements, their dynamics and electromyographic activity of neck muscles in normal movements, and also in movements made with external weights applied to the head were measured. It was observed that, when the external loads were added, the subject went through complex adapting processes and the head movement trajectory and its derivatives reached steady conditions only after transient adapting period. The steady adapted state was reached after 15 to 20 seconds (i.e., 5 to 6 movements). A.R.H.

N85-14535*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
TWENTIETH ANNUAL CONFERENCE ON MANUAL CONTROL, VOLUME 2
S. G. HART, comp. and E. J. HARTZELL, comp. Sep. 1984 423 p refs Conf. held at Moffett Field, Calif., 12-14 Jun. 1984 2 Vol.
(NASA-CP-2341-VOL-2; A-9879-VOL-2; NAS 1.55:2341-VOL-2)
Avail: NTIS HC A18/MF A01 CSCL 05H

Volume II contains thirty two complete manuscripts and five abstracts. The topics covered include the application of event-related brain potential analysis to operational problems, the subjective evaluation of workload, mental models, training, crew interaction analysis, multiple task performance, and the measurement of workload and performance in simulation.

N85-14536*# Illinois Univ., Urbana. Dept. of Psychology.
ERPS TO MONITOR NON-CONSCIOUS MENTATION
E. DONCHIN *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 2 p 1-20 Sep. 1984 refs
Avail: NTIS HC A18/MF A01 CSCL 05H

Event Related Brain Potentials (or ERPs) are extracted from the EEG that can be recorded between a pair of electrodes placed on a person's scalp. The EEG is recorded as a continual fluctuation in voltage. It is the results of the integration of the potential fields generated by a multitude of neuronal ensembles that are active as the brain goes about its business. Within this ongoing signal it is possible to distinguish voltage fluctuations that are triggered in neural structures by the occurrence of specific events. This activity, evoked as it is by an external event, is known as the Evoked, or Event Related, Potential. The ERPs provide a unique opportunity to monitor non-conscious mentation. The inferences that can be based on ERP data are described and the limits of these inferences are emphasized. This, however, will not be an exhaustive review of the use of ERPs in Engineering Psychology. The application, its scope, and its limitations will be illustrated by means of one example. This example is preceded by a brief technical introduction to the methodology used in the study of ERPs. The manner in which ERPs are used to study cognition is described. B.W.

N85-14537*# Illinois Univ., Champaign. Cognitive Psychophysiology Lab.
PERFORMANCE ENHANCEMENTS UNDER DUAL-TASK CONDITIONS
A. F. KRAMER, C. D. WICKENS, and E. DONCHIN *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 2 p 21-36 Sep. 1984 refs
Avail: NTIS HC A18/MF A01 CSCL 05H

Research on dual-task performance has been concerned with delineating the antecedent conditions which lead to dual-task decrements. Capacity models of attention, which propose that a hypothetical resource structure underlies performance, have been employed as predictive devices. These models predict that tasks which require different processing resources can be more successfully time shared than tasks which require common resources. The conditions under which such dual-task integrality can be fostered were assessed in a study in which three factors likely to influence the integrality between tasks were manipulated: inter-task redundancy, the physical proximity of tasks and the task relevant objects. Twelve subjects participated in three experimental sessions in which they performed both single and dual-tasks. The primary task was a pursuit step tracking task. The secondary tasks required the discrimination between different intensities or different spatial positions of a stimulus. The results are discussed in terms of a model of dual-task integrality. B.W.

N85-14538*# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
IN SEARCH OF A VISUAL-CORTICAL DESCRIBING FUNCTION: A SUMMARY OF WORK IN PROGRESS
A. M. JUNKER and K. J. PEIO (Systems Research Labs, Inc., Dayton, Ohio) *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 2 p 37-54 Sep. 1984 refs
Avail: NTIS HC A18/MF A01 CSCL 05H

The thrust of the present work is to explore the utility of using a sum of sinusoids (seven or more) to obtain an evoked response and, furthermore, to see if the response is sensitive to changes in cognitive processing. Within the field of automatic control system technology, a mathematical input/output relationship for a sinusoidally stimulated nonlinear system is defined as describing function. Applying this technology, sum of sines inputs to yield describing functions for the visual-cortical response have been designed. What follows is a description of the method used to obtain visual-cortical describing functions. A number of measurement system redesigns were necessary to achieve the desired frequency resolution. Results that guided and came out of the redesigns are presented. Preliminary results of stimulus parameter effects (average intensity and depth of modulation) are also shown. B.W.

N85-14539*# Technion - Israel Inst. of Tech., Haifa.
MEASUREMENT OF WORKLOAD: PHYSICS, PSYCHOPHYSICS, AND METAPHYSICS Abstract Only
D. GOPHER *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 2 p 55 Sep. 1984
Avail: NTIS HC A18/MF A01 CSCL 05H

The present paper reviews the results of two experiments in which workload analysis was conducted based upon performance measures, brain evoked potentials and magnitude estimations of subjective load. The three types of measures were jointly applied to the description of the behavior of subjects in a wide battery of experimental tasks. Data analysis shows both instances of association and dissociation between types of measures. A general conceptual framework and methodological guidelines are proposed to account for these findings. Author

N85-14540*# Illinois Univ., Urbana-Champaign. Dept. of Psychology.
SUBJECTIVE WORKLOAD ASSESSMENT AND VOLUNTARY CONTROL OF EFFORT IN A TRACKING TASK
M. A. VIDULICH and C. D. WICKENS *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 2 p 57-72 Sep. 1984 refs
Avail: NTIS HC A18/MF A01 CSCL 05H

A manual control tracking task was manipulated along two dimensions: (1) control order and (2) forcing function bandwidth. In the first phase of the experiment subjective workload assessments were collected. It was found that subjective assessments of workload were closely associated with performance in the case of increasing control order, but not in the case of increasing bandwidth. This was interpreted as indicating that subjective workload assessments are most appropriate for the study of increasing difficulty centered in response selection processes as opposed to response execution processes. In the second phase of the experiment the subjects were asked to voluntarily limit the effort they applied in the performance of the tracking task. The results indicate that the subjects were quite facile in doing this. However, comparison of these data to the findings of other studies that manipulated effort via dual-task biasing indicate that effort manipulation is much more potent in a single-task configuration. This finding is discussed in terms of multiple resource theories of attentional capacity. The utility of an analysis of covariance procedure in studying the relationships between subjective ratings and performance is highlighted. Author

N85-14541*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Vehicle Simulation Lab.
DECISION TREE RATING SCALES FOR WORKLOAD ESTIMATION: THEME AND VARIATIONS
W. W. WIETWILLE, J. H. SKIPPER, and C. A. RIEGER (Hughes Aircraft Co., Fullerton, Calif.) *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 2 p 73-84 Sep. 1984 refs
(Contract NAG2-17)
Avail: NTIS HC A18/MF A01 CSCL 05H

The modified Cooper-Harper (MCH) scale has been shown to be a sensitive indicator of workload in several different types of aircrew tasks. The MCH scale was examined to determine if certain variations of the scale might provide even greater sensitivity and to determine the reasons for the sensitivity of the scale. The MCH scale and five newly devised scales were studied in two different aircraft simulator experiments in which pilot loading was treated as an independent variable. Results indicate that while one of the new scales may be more sensitive in a given experiment, task dependency is a problem. The MCH scale exhibits consistent sensitivity and remains the scale recommended for general use. The results of the rating scale experiments are presented and the questionnaire results which were directed at obtaining a better understanding of the reasons for the relative sensitivity of the MCH scale and its variations are described. R.S.F.

N85-14542*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
ASSESSING THE SUBJECTIVE WORKLOAD OF DIRECTIONAL ORIENTATION TASKS
R. C. MILLER (Informatics General Corp., Palo Alto, Calif.) and S. G. HART *In its* 20th Ann. Conf. on Manual Control, Vol. 2 p 85-96 Sep. 1984 refs
Avail: NTIS HC A18/MF A01 CSCL 05H

The impact of various flight-related tasks on the workload imposed by the requirement to compute new headings, course changes, and reciprocal headings was investigated. Eight pilots were presented with a series of heading-change tasks in a laboratory setting. Two levels of difficulty of each of three tasks were presented verbally and spatially. Performance was measured by evaluating the speed and accuracy of the responses. The subjective responses and objective measures of performance reflected a strong association between subjective experience and objective behavior. The reciprocal calculations were performed quickly and accurately throughout and were considered to be minimally loading. Subjective workload, percent correct and response times for the two course-change tasks varied significantly as a function of level of difficulty and display format, with no discernable speed/accuracy trade off. R.S.F.

N85-14543*# Arizona State Univ., Tempe. Dept. of Psychology.
CLASSIFICATION SYSTEMS FOR INDIVIDUAL DIFFERENCES IN MULTIPLE-TASK PERFORMANCE AND SUBJECTIVE ESTIMATES OF WORKLOAD
D. L. DAMOS *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 2 p 97-104 Sep. 1984 refs
Avail: NTIS HC A18/MF A01 CSCL 05H

Human factors practitioners often are concerned with mental workload in multiple-task situations. Investigations of these situations have demonstrated repeatedly that individuals differ in their subjective estimates of workload. These differences may be attributed in part to individual differences in definitions of workload. However, after allowing for differences in the definition of workload, there are still unexplained individual differences in workload ratings. The relation between individual differences in multiple-task performance, subjective estimates of workload, information processing abilities, and the Type A personality trait were examined. Author

N85-14544*# Toronto Univ. (Ontario). Dept. of Psychology.
MENTAL MODELS OF INVISIBLE LOGICAL NETWORKS
P. SANDERSON *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 2 p 105-120 Sep. 1984 refs
Avail: NTIS HC A18/MF A01 CSCL 05H

Subjects were required to discover the structure of a logical network whose links were invisible. Network structure had to be inferred from the behavior of the components after a failure. It was hypothesized that since such failure diagnosis tasks often draw on spatial processes, a good deal of spatial complexity in the network should affect network discovery. Results show that the ability to discover the linkages in the network is directly related to the spatial complexity of the pathway described by the linkages. This effect was generally independent of the amount of evidence available to subjects about the existence of the link. These results raise the question of whether inferences about spatially complex pathways were simply not made, or whether they were made but not retained because of a high load on memory resources.
Author

N85-14545*# Technion - Israel Inst. of Tech., Haifa.
THE REPRESENTATION OF ACTION PLANS IN LONG TERM MEMORY Abstract Only
G. N. FUSSFELD, W. KOENIG (Illinois Univ., Champaign), and D. KARIS (Illinois Univ., Champaign) *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 2 p 121-122 Sep. 1984
Avail: NTIS HC A18/MF A01 CSCL 05H

A sequence of experiments conducted on a two hand chord typewriter, to compare the efficiency of different coding principles employed to associate letters with their chord productions is described. This keyboard represents an effort to identify effective alternatives to the existing typewriter. It consists of two seperate 5-key panels (one for each hand), and letters are entered by typing chords composed of one to five fingers. Each panel is capable of producing the full alphabet. One group of experiments was designed to separate between perceptual and motor factors in the acivation of single letter chords. The results underline the importance of perceptual factors in the activation of motor plans. The complexity of the patterns employed to represent letters was shown to account for 50 percent of variance in the typing speeds of single letters. The theoretical implications of these results are discussed in relation to a vision based theory of action plans.
M.G.

N85-14546*# Search Technology, Inc., Norcross, Ga.
ON LOOKING INTO THE BLACK BOX: PROSPECTS AND LIMITS IN THE SEARCH FOR MENTAL MODELS Abstract Only
W. B. ROUSE and N. M. MORRIS *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 2 p 123-124 Sep. 1984
Avail: NTIS HC A18/MF A01 CSCL 05H

To place the arguments advanced in this paper in alternative points of view with regard to mental models are reviewed. Use of the construct in areas such as neural information processing, manual control, decision making, problem solving, and cognitive science are discussed. Also reviewed are several taxonomies of mental models. The available empirical evidence for answering questions concerning the nature and usage of mental models is then discussed. A variety of studies are reviewed where the type and form of humans' knowledge have been manipulated. Also considered are numerous transfer of training studies whose results provide indirect evidence of the nature of mental models. The alternative perspectives considered and the spectrum of empirical evidence are combined to suggest a framework within which research on mental models can be viewed. By considering interactions of dimensions of this framework, the most salient unanswered questions can be identified. M.G.

N85-14547*# Connecticut Univ., Storrs. Dept. of Electrical Engineering and Computer Science.
ISSUES IN DEVELOPING A NORMATIVE DESCRIPTIVE MODEL FOR DYADIC DECISION MAKING Abstract Only
D. SERFATY and D. L. KLEINMAN *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 2 p 125 Sep. 1984
Avail: NTIS HC A18/MF A01 CSCL 05H

Most research in modelling human information processing and decision making has been devoted to the case of the single human operator. In the present effort, concepts from the fields of organizational behavior, engineering psychology, team theory and mathematical modelling are merged in an attempt to consider first the case of two cooperating decisionmakers (the Dyad) in a multi-task environment. Rooted in the well-known Dynamic Decision Model (DDM), the normative descriptive approach brings basic cognitive and psychophysical characteristics inherent to human behavior into a team theoretic analytic framework. An experimental paradigm, involving teams in dynamic decision making tasks, is designed to produce the data with which to build the theoretical model. Author

N85-14548*# Massachusetts Inst. of Tech., Cambridge.
GETTING MENTAL MODELS AND COMPUTER MODELS TO COOPERATE Abstract Only
T. B. SHERIDAN, J. ROSEBOROUGH, L. CHARNEY, and M. MENDEL *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 2 p 127 Sep. 1984
Avail: NTIS HC A18/MF A01 CSCL 05H

A qualitative theory of supervisory control is outlined wherein the mental models of one or more human operators are related to the knowledge representations within automatic controllers (observers, estimators) and operator decision aids (expert systems, advice-givers). Methods of quantifying knowledge and the calibration of one knowledge representation to another (human, computer, or objective truth) are discussed. Ongoing experiments in the use of decision aids for exploring one's own objective function or exploring system constraints and control strategies are described. Author

N85-14549*# Psycho-Linguistic Research Associates, Menlo Park, Calif.
A COMPARATIVE STUDY OF ALTERNATIVE CONTROLS AND DISPLAYS FOR BY THE SEVERELY PHYSICALLY HANDICAPPED
D. WILLIAMS, C. SIMPSON, and M. BARKER (Children's Hospital at Stanford, Palo Alto, Calif.) *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 2 p 129-142 Sep. 1984 refs
Avail: NTIS HC A18/MF A01 CSCL 05H

A modification of a row/column scanning system was investigated in order to increase the speed and accuracy with which communication aids can be accessed with one or two switches. A selection algorithm was developed and programmed in BASIC to automatically select individuals with the characteristic difficulty in controlling time dependent control and display systems. Four systems were compared: (1) row/column directed scan (2 switches); (2) row/column auto scan (1 switch); (3) row auto scan (1 switch); and (4) column auto scan (1 switch). For this sample population, there were no significant differences among systems for scan time to select the correct target. The row/column auto scan system resulted in significantly more errors than any of the other three systems. Thus, the most widely prescribed system for severely physically disabled individuals turns out for this group to have a higher error rate and no faster communication rate than three other systems that have been considered inappropriate for this group. M.G.

N85-14550*# Systems Technology, Inc., Hawthorne, Calif.
A MANUAL CONTROL TEST FOR THE DETECTION AND DETERRENCE OF IMPAIRED DRIVERS
A. C. STEIN, R. W. ALLEN, and H. R. JEX *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 2 p 143-156 Sep. 1984 refs
Avail: NTIS HC A18/MF A01 CSCL 05H

A brief manual control test and a decision strategy were developed, laboratory tested, and field validated which provide a means for detecting human operator impairment from alcohol or other drugs. The test requires the operator to stabilize progressively unstable controlled element dynamics. Control theory and experimental data verify that the human operator's control ability on this task is constrained by basic cybernetic characteristics, and that task performance is reliably affected by impairment effects on these characteristics. Assessment of human operator control ability is determined by a statistically based decision strategy. The operator is allowed several chances to exceed a preset pass criterion. Procedures are described for setting the pass criterion based on individual ability and a desired unimpaired failure rate. These procedures were field tested with apparatus installed in automobiles that were designed to discourage drunk drivers from operating their vehicles. This test program demonstrated that the control task and detection strategy could be applied in a practical setting to screen human operators for impairment in their basic cybernetic skills. R.J.F.

N85-14551*# Rush Medical Coll., Chicago, Ill. Dept. of Physiology.
ELECTROMYOGRAPHIC PATTERNS ASSOCIATED WITH DISCRETE LIMB MOVEMENTS
D. M. CORCOS, G. L. GOTTLIEB, and G. C. AGARWAL *In* NASA. Ames Research Center 20th Ann Conf. on Manual Control, Vol. 2 p 157-174 Sep. 1984 refs
(Contract NIH-NS-15630; NIH-AM-33189; NSF IESE-82-12067)
Avail: NTIS HC A18/MF A01

The relationship between the movement time (MT) for accurate and rapid discrete movements of distance A to a target of width W was quantified by Fitts and is given by the equation: MT = a + b log sub 2 (2A/W). This relationship, known as Fitt's Law, received considerable support for many types of movements. It also raises the interesting question: if MT is affected by distance moved and accuracy, then how do the patterns of muscle activation alter? It is suggested that it is unlikely that all movements are initiated by a pulse of constant duration. Instead, it seems that movements are initiated by an agonist burst which is scaled both in the amount of activation and the duration of activation according to either distance, target size, velocity, or a combination of factors. The number of bursts varies considerably and further research is required to establish: (1) which factors affect the pattern of the signal and (2) how different patterns produce movement trajectories. R.J.F.

N85-14552*# Forschungsinstitut fuer Anthropotechnik, Wachtberg (West Germany).
COLOR AND GREY SCALE IN SONAR DISPLAYS
K. F. KRAISS and K. H. KUETTELWESCH *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 2 p 175-180 Sep. 1984 refs
Avail: NTIS HC A18/MF A01 CSCL 05H

In spite of numerous publications 1 it is still rather unclear, whether color is of any help in sonar displays. The work presented here deals with a particular type of sonar data, i.e., LOFAR-grams (low frequency analysing and recording) where acoustic sensor data are continuously written as a time-frequency plot. The question to be answered quantitatively is, whether color coding does improve target detection when compared with a grey scale code. The data show significant differences in receiver-operating characteristics performance for the selected codes. In addition it turned out, that the background noise level affects the performance dramatically for some color codes, while others remain stable or even improve. Generally valid rules are presented on how to generate useful color scales for this particular application. R.J.F.

N85-14553*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
MANUAL-CONTROL ANALYSIS APPLIED TO THE MONEY-SUPPLY CONTROL TASK
R. C. WINGROVE *In its* 20th Ann. Conf. on Manual Control, Vol. 2 p 181-198 Sep. 1984 refs
Avail: NTIS HC A18/MF A01 CSCL 05H

The recent procedure implemented by the Federal Reserve Board to control the money supply is formulated in the form of a tracking model as used in the study of manual-control tasks. Using this model, an analysis is made to determine the effect of monetary control on the fluctuations in economic output. The results indicate that monetary control can reduce the amplitude of fluctuations at frequencies near the region of historic business cycles. However, with significant time lags in the control loop, monetary control tends to increase the amplitude of the fluctuations at the higher frequencies. How the investigator or student can use the tools developed in the field of manual-control analysis to study the nature of economic fluctuations and to examine different strategies for stabilization is examined. R.J.F.

N85-14554*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
WHAT PILOTS LIKE (AND DON'T LIKE) ABOUT THE NEW COCKPIT TECHNOLOGY
R. E. CURRY (Search Technology, Inc., Palo Alto, Calif.) *In its* 20th Ann. Conf. on Manual Control, Vol. 2 p 199-216 Sep. 1984 refs
Avail: NTIS HC A18/MF A01 CSCL 05H

Pilot's perceptions of the new cockpit technology in the B-767 are discussed. Although the data reported were taken from the introductory experience of the B-767, it is felt that similar, if not identical, results would be obtained with any other new cockpit technology aircraft, i.e., the A310. The following conclusions were drawn from the information collected thus far: A large majority of the pilots enjoy flying the B-767 more than the older airplanes. The pilots accept the new cockpit technology, and they choose to use it because they find it useful. The pilots are aware of the possible loss of flying skill with the presence of automation, and they hand fly (usually with flight director) to prevent this loss. There is no evidence of loss of skills from the data collected. The primary points of confusion or surprise were autothrottle/autopilot interactions; the autopilot during the wrong way or not capturing the course; and achieving desired results with the Flight Management System/Control Display Unit (FMS/CDU). The pilots felt training for the FMS/CDU could be improved, and they especially wanted more hands on experience. R.J.F.

N85-14555*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
CREW COMMUNICATION AS A FACTOR IN AVIATION ACCIDENTS
J. GOGUEN (Structural Semantics, Palo Alto, Calif.), C. LINDE (Structural Semantics, Palo Alto, Calif.), and M. MURPHY *In its* 20th Ann. Conf. on Manual Control, Vol. 2 p 217-248 Sep. 1984 refs
Avail: NTIS HC A03/MF A01 CSCL 05H

The incidence of air transport accidents caused by problems in crew communication and coordination was investigated. Communication patterns which are most effective in specific situations were determined. Methods to assess the effectiveness of crew communication patterns were developed. The results lead to the development of new methods training crews in effective communication and provide guidelines for the design of aviation procedures and equipment. E.A.K.

N85-14556*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
A FULL MISSION SIMULATOR STUDY OF AIRCREW PERFORMANCES: THE MEASUREMENT OF CREW COORDINATION AND DECISIONMAKING FACTORS AND THEIR RELATIONSHIPS TO FLIGHT TASK PERFORMANCES
M. R. MURPHY, R. J. RANDLE, T. A. TANNER, R. M. FRANKEL (Wayne State Univ., Detroit, Mich.), J. A. GOGUEN (Structural Semantics, Palo Alto, Calif.), and C. LINDE (Structural Semantics, Palo Alto, Calif.) *In its* 20th Ann. Conf. on Manual Control, Vol. 2 p 249-262 Sep. 1984 refs
Avail: NTIS HC A18/MF A01 CSCL 05H

Sixteen three man crews flew a full mission scenario in an airline flight simulator. A high level of verbal interaction during instances of critical decision making was located. Each crew flew the scenario only once, without prior knowledge of the scenario problem. Following a simulator run and in accord with formal instructions, each of the three crew members independently viewed and commented on a videotape of their performance. Two check pilot observers rated pilot performance across all crews and, following each run, also commented on the video tape of the crew's performance. A linguistic analysis of voice transcript is made to provide assessment of crew coordination and decision making qualities. Measures of crew coordination and decision making factors are correlated with flight task performance measures. E.A.K.

N85-14557*# Stanford Univ., Calif.
COMMUNICATION ON THE FLIGHT DECK
A. SIESFELD, R. CURLEY, and R. CALFEE *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 2 p 263-272 Sep. 1984
Avail: NTIS HC A18/MF A01 CSCL 05H

The importance of good verbal communication by airplane crews is discussed. The common understanding of what it takes to fly a plane serves the communication and coordination. It is shown that accidents and incidents often are a result of failure to communicate. People's conceptions of what they are doing effect performance of a task and communication about performance of that task. It is known that if what they are doing is complex, they must find a simple framework to represent it to avoid being overwhelmed by complexity. A model that reduces the complexity of flying a jet to a representation composed of a few relatively independent dimensions which capture the major features of this task was developed. The model allows assessment of what crew members know, to look at actual performance, and to develop training recommendations. E.A.K.

N85-14558*# Army Aviation Center, Fort Rucker, Ala.
DETERMINING TRAINING DEVICE REQUIREMENTS IN ARMY AVIATION SYSTEMS
M. L. POUMADE *In* NASA. Ames Research Center 20th Ann. Conf., on Manual Control, Vol. 2 p 273-282 Sep. 1984 refs
Avail: NTIS HC A18/MF A01 CSCL 05H

A decision making methodology which applies the systems approach to the training problem is discussed. Training is viewed as a total system instead of a collection of individual devices and unrelated techniques. The core of the methodology is the use of optimization techniques such as the transportation algorithm and multiobjective goal programming with training task and training device specific data. The role of computers, especially automated data bases and computer simulation models, in the development of training programs is also discussed. The approach can provide significant training enhancement and cost savings over the more traditional, intuitive form of training development and device requirements process. While given from an aviation perspective, the methodology is equally applicable to other training development efforts. E.A.K.

N85-14559*# Illinois Univ., Urbana. Cognitive Psychophysiology Lab.
THE DESIGN AND USE OF SUBTASKS IN PART TRAINING AND THEIR RELATIONSHIP TO THE WHOLE TASK
A. M. MANE, M. G. H. COLES, D. KARIS, D. STRAYER, and E. DONCHIN *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 2 p 283-290 Sep. 1984 refs
Avail: NTIS HC A18/MF A01 CSCL 05H

The part versus whole training is discussed. Common sense dictates that a massive body of knowledge should not be taught as a whole. For the same reason, if a part of the task is very difficult, one should not go over the task in its entirety. Repetitive training on the difficult part should lead to better results. Several part training methods were developed, including: pure part, progressive part, repetitive part, retrogressive and isolated parts. The question was posited whether training on parts of a task is a beneficial enterprise. The way the task will be disassembled for the part training needs to be determined. It is argued that the effectiveness of part training depends on the degree to which a task is decomposable. E.A.K.

N85-14560*# Illinois Univ., Champaign. Cognitive Psychophysiology Lab.
REPRESENTING MULTIDIMENSIONAL SYSTEMS USING VISUAL DISPLAYS
E. J. CASEY, A. F. KRAMER, and C. D. WICKENS *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 2 p 291-298 Sep. 1984 refs
(Contract MDA903-83-K-0255)
Avail: NTIS HC A18/MF A01 CSCL 05H

Techniques employed to represent multiattribute information in an integrated, object display are reviewed and discussed. A study is proposed to investigate the effects of system parameters such as intervariable correlation on the choice of an optimal display format. The results of a psychophysical scaling study of five different displays are presented. Author

N85-14561*# California State Univ., Hayward.
TYPES OF TRACKING ERRORS INDUCED BY CONCURRENT SECONDARY MANUAL TASK
S. T. KLAPP, P. A. KELLY, V. BATTISTE, and S. DUNBAR *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 2 p 299-304 Sep. 1984 refs
(Contract NCC2-223)
Avail: NTIS HC A18/MF A01 CSCL 05H

Future one-man helicopters may require the pilot to control flight with one hand, and simultaneously manipulate other instruments using the other hand. The nature of errors induced in a right hand tracking task (simulating flight control) when responses are required by the left hand are examined. The present experiment focused on detection of hesitations in which the tracking joy stick remained motionless for 1/3 sec. or longer. Author

N85-14562*# Illinois Univ., Urbana-Champaign. Dept. of Psychology.
THE EFFECTS OF TASK STRUCTURE ON TIME-SHARING EFFICIENCY AND RESOURCE ALLOCATION OPTIMALITY
P. S. TSANG and C. D. WICKENS *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 2 p 305-318 Sep. 1984 refs
(Contract N00014-79-C-0658)
Avail: NTIS HC A18/MF A01 CSCL 05H

A distinction was made between two aspects of time sharing performance: time sharing efficiency and attention allocation optimality. A secondary task technique was employed to evaluate the effects of the task structures of the component time shared tasks on both aspects of the time sharing performance. Five pairs of dual tasks differing in their structural configurations were investigated. The primary task was a visual/manual tracking task which requires spatial processing. The secondary task was either another tracking task or a verbal memory task with one of four different input/output configurations. Congruent to a common finding, time-sharing efficiency was observed to decrease with an increasing overlap of resources utilized by the time shared tasks. Research also tends to support the hypothesis that resource allocation is more optimal when the time shared tasks placed heavy demands on common processing resources than when they utilized separate resources. Author

N85-14563*# Connecticut Univ., Storrs. Dept. of Electrical engineering and Computer Science.
ON CHOOSING BETWEEN TWO PROBABILISTIC CHOICE SUB-MODELS IN A DYNAMIC MULTITASK ENVIRONMENT
E. P. SOULSBY *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 2 p 319-336 Sep. 1984 refs
(Contract F33615-81-K-0510)
Avail: NTIS HC A18/MF A01 CSCL 05H

An independent random utility model based on Thurstone's Theory of Comparative Judgment and a constant utility model based on Luce's Choice Axiom are reviewed in detail. Predictions from the two models are shown to be equivalent under certain restrictions on the distribution of the underlying random process. Each model is applied as a stochastic choice submodel in a dynamic, multitask, environment. Resulting choice probabilities are nearly identical, indicating that, despite their conceptual differences, neither model may be preferred over the other based solely on its predictive capability. Author

N85-14564*# California Univ., Berkeley. Dept. of Electrical Engineering.
NO FATIGUE EFFECT ON BLINK RATE
W. KIM, W. ZANGEMEISTER (Hamburg Univ., West Germany), and L. STARK *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 2 p 337-348 Sep. 1984 refs
(Contract NCC2-86)
Avail: NTIS HC A18/MF A01 CSCL 05H

Blink rate is reported to vary dependent upon ongoing task performance, perceptual, attentional and cognitive factors, and fatigue. Five levels of task difficulty were operationally defined and task performance as lines read aloud per minute were measured. A single noninvasive infrared TV eyetracker was modified to measure blinking and an on-line computer program identified and counted blinks while the subject performed the tasks. Blink rate decreased by 50% when either task performance increased (fast reading) or visual difficulty increased (blurred text); blink rate increased greatly during rest breaks. There was no change in blink rate during one hour experiments even though subjects complained of severe fatigue. Author

N85-14565*# Performance Measurement Associates, Inc., Vienna, Va.
PERFORMANCE MEASURES FOR AIRCRAFT LANDINGS AS A FUNCTION OF AIRCRAFT DYNAMICS
E. M. CONNELLY *In* NASA. Ames Research Center 20th Ann. Conf. on Manual Control, Vol. 2 p 349-358 Sep. 1984 refs
Avail: NTIS HC A18/MF A01 CSCL 05H

A theory of performance measurement for operator controlled systems is presented. The theory permits synthesis of a system performance measure which scores performance on successive data samples based on the impact of the sampled performance on the overall summary of performance. The development of measures for aircraft carrier landings for the glide path and angle of attack control channels is documented. While developing the performance measures, the measures used previously were evaluated and were found to lack the necessary discrimination capability. The previously used measure, the RMS of deviations from the glide path, can, for instance, provide identical scores for both satisfactory and unsatisfactory flight paths. Two types of performance measures developed for aircraft landings are described. Also, an argument is given for the need to test performance measures prior to their use. A suggested test of the measures is offered. B.G.

N85-14566*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
MEASURING PILOT WORKLOAD IN A MOVING-BASE SIMULATOR. PART 2: BUILDING LEVELS OF WORKLOAD
B. H. KANTOWITZ (BITS, Inc., West Lafayette, Ind.), S. G. HART, M. R. BORTOLUSSI (BITS, Inc., West Lafayette, Ind.), R. J. SHIVELY (Purdue Univ., West Lafayette, Inc.), and S. C. KANTOWITZ (BITS, Inc., West Lafayette, Ind.) *In its* 20th Ann. Conf. on Manual Control, Vol. 2 p 373-396 Sep. 1984 refs
(Contract NCC2-228)
Avail: NTIS HC A18/MF A01 CSCL 05H

Pilot behavior in flight simulators often use a secondary task as an index of workload. His routine to regard flying as the primary task and some less complex task as the secondary task. While this assumption is quite reasonable for most secondary tasks used to study mental workload in aircraft, the treatment of flying a simulator through some carefully crafted flight scenario as a unitary task is less justified. The present research acknowledges that total mental workload depends upon the specific nature of the sub-tasks that a pilot must complete as a first approximation, flight tasks were divided into three levels of complexity. The simplest level (called the Base Level) requires elementary maneuvers that do not utilize all the degrees of freedom of which an aircraft, or a moving-base simulator; is capable. The second level (called the Paired Level) requires the pilot to simultaneously execute two Base Level tasks. The third level (called the Complex Level) imposes three simultaneous constraints upon the pilot. B.G.

N85-14567*# National Aerospace Lab., Amsterdam (Netherlands).
MULTI-CREW MODEL ANALYTIC ASSESSMENT OF LANDING PERFORMANCE AND DECISION-MAKING DEMANDS
P. MILGRAM, R. VANDERWIJNGAART, H. VEERBEEK, and O. F. BLEEKER (National Aerospace Lab., Schipol, Netherlands) *In* NASA. Ames Research Lab. 20th Ann. Conf. on Manual Control, Vol. 2 p 373-396 Sep. 1984 refs
Avail: NTIS HC A18/MF A01 CSCL 05H

Some of the relative merits of the PROCRU approach to modelling multi-crew flight deck activity during approach to landing are discussed. On the basis of two realistic flight scenarios, the ability of the model to simulate different vectored approaches is demonstrated. A secondary exemplary analysis of a nominal and an accelerated final approach is performed, illustrating the potential of the expected net gain (ENGP) functions as a measure of decision-making load. Author

N85-14568*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
THE STERNBERG TASK AS A WORKLOAD METRIC IN FLIGHT HANDLING QUALITIES RESEARCH
J. C. HEMINGWAY *In its* 20th Ann. Conf. on Manual Control, Vol. 2 p 397-422 Sep. 1984 refs
Avail: NTIS HC A18/MF A01 CSCL 05H

The objective of this research was to determine whether the Sternberg item-recognition task, employed as a secondary task measure of spare mental capacity for flight handling qualities (FHQ) simulation research, could help to differentiate between different flight-control conditions. FHQ evaluations were conducted on the Vertical Motion Simulator at Ames Research Center to investigate different primary flight-control configurations, and selected stability and control augmentation levels for helicopers engaged in low-level flight regimes. The Sternberg task was superimposed upon the primary flight-control task in a balanced experimental design. The results of parametric statistical analysis of Sternberg secondary task data failed to support the continued use of this task as a measure of pilot workload. In addition to the secondary task, subjects provided Cooper-Harper pilot ratings (CHPR) and responded to a workload questionnaire. The CHPR data also failed to provide reliable statistical discrimination between FHQ treatment conditions; some insight into the behavior of the secondary task was gained from the workload questionnaire data. Author

N85-14569# Los Alamos Scientific Lab., N. Mex.
ACCEPTANCE-TESTING PROCEDURES FOR AIR-LINE SUPPLIED-AIR SUITS
O. D. BRADLEY Jun. 1984 24 p refs
(Contract W-7405-ENG-36)
(DE84-016980; LA-10156-MS) Avail: NTIS HC A02/MF A01

Procedures and requirements were established for airline supplied air suits for testing and evaluation. The adequacy of performance, recommendations for improvement and/or operational restrictions of the devices are made. The test equipment, test methods, design, and performance criteria for airline supplied air suits are prescribed. DOE

N85-14808*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
HELICOPTER HUMAN FACTORS PROGRAMS AND PLANS
E. M. HUFF *In its* Technical Workshop: Advanced Helicopter Cockpit Design Concepts p 13-22 Dec. 1984
Avail: NTIS HC A15/MF A01 CSCL 05H

Design concepts for pilot interaction with highly computerized systems and particularly the dialog aspects (transfer of information back and forth between the pilot and the system) are examined. Principles for blending the various input-output media are needed. Applied artificial intelligence aspects dealing with input and output grammar, message understanding, and message prioritization are studied. B.G.

N85-14819*# Miami Univ., Coral Gables, Fla.
HUMAN FACTORS IN COCKPIT AUTOMATION
E. L. WIENER *In* NASA. Ames Research Center Technical Workshop: Advanced Helicopter Cockpit Design Concepts p 173-186 Dec. 1984
Avail: NTIS HC A15/MF A01 CSCL 05H

The rapid advance in microprocessor technology has made it possible to automate many functions that were previously performed manually. Several research areas have been identified which are basic to the question of the implementation of automation in the cockpit. One of the identified areas deserving further research is warning and alerting systems. Modern transport aircraft have had one after another warning and alerting systems added, and computer-based cockpit systems make it possible to add even more. Three major areas of concern are: input methods (including voice, keyboard, touch panel, etc.), output methods and displays (from traditional instruments to CRTs, to exotic displays including the human voice), and training for automation. Training for operating highly automatic systems requires considerably more attention than it has been given in the past. Training methods have not kept pace with the advent of flight-deck automation. B.W.

N85-14820*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
INTELLIGENT INTERFACES FOR TACTICAL AIRBORNE PLATFORMS
A. MADNI *In its* Technical Workshop: Advanced Helicopter Cockpit Design Concepts p 187-196 Dec. 1984
Avail: NTIS HC A15/MF A01 CSCL 05H

Enhanced capabilities of tactical airborne platforms have resulted in increased number of aircrew tasks, greater task complexity, and increased time-stress in task performance. Embedded intelligence in the aircrew-vehicle interface (AVI) can help alleviate aircrew workload and enhance aircrew performance by: (1) optimizing the exchange of information between the aircrew and the onboard automation; and (2) adaptively allocating functions between aircrew and automation in response to situational demands. Intelligent interface issues are addressed in this report such as: (1) how to ensure that the aircrew can cope with the information influx; (2) how to present/portray both situational and internal status information; (3) how to allocate functions between the aircrew and the onboard automation; and (4) how to explain reasoning processes employed by onboard intelligence to the aircrew. B.W.

N85-14821*# Virginia Polytechnic Inst. and State Univ., Blacksburg.
HUMAN FACTORS OF VISUAL DISPLAYS
H. L. SNYDER *In* NASA. Ames Research Center Technical Workshop: Advanced Helicopter Cockpit Design Concepts p 197-202 Dec. 1984
Avail: NTIS HC A15/MF A01 CSCL 05H

Several human factors issues in visual displays are addressed in this report. They are as follows: (1) the importance of luminance range and contrast; (2) uniformity of visual displays; (3) image quality; (4) color contrast; and (5) dot matrix fonts. B.W.

N85-14822*# Wherry (Robert J., Jr.), Chalfont, Pa.
CREWSTATION DESIGN AND VALIDATION
R. J. WHERRY, JR. *In* NASA. Ames Research Center Technical Workshop: Advanced Helicopter Cockpit Design Concepts p 203-228 Dec. 1984
Avail: NTIS HC A15/MF A01 CSCL 05H

The central problem in crewstation design, that of optimizing the exchange of information between the human and machine components of a system is addressed. The CAR, CUBITS, GROUP, ABBREV, VRAS, and HOS programs, products of the Navy's Human Factors Engineering Technology Development program are all discussed. They are representative to the type of technology which was previously indicated as necessary to move crewstation design and validation to a higher lever of maturity, one which takes cognizance of the multivariate nature of the problems faced by the crewstation designer and has a far less dependence of the whims of personal or subjective opinion. B.W.

N85-14824*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
AVIONICS TECHNOLOGY - SYSTEM CONCEPTS
J. S. BULL and R. B. HUNTOON *In its* Technical Workshop: Advanced Helicopter Cockpit Design Concepts p 239-246 Dec. 1984
Avail: NTIS HC A15/MF A01 CSCL 05H

Avionics System Concepts to meet technology needs of advanced helicopter integrated cockpit design are identified. Specific avionics system concepts which should be conducted and/or support by NASA to most effectively aid industry in advanced helicopter integrated cockpit design are also identified. Candidate Missions and Mission Requirements to meet technology needs are considered. B.W.

N85-14825*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
MAN-MACHINE INTERFACE REQUIREMENTS - ADVANCED TECHNOLOGY
R. W. REMINGTON and E. L. WIENER *In its* Technical Workshop: Advanced Helicopter Cockpit Design Concepts p 247-266 Dec. 1984
Avail: NTIS HC A15/MF A01 CSCL 05H

Research issues and areas are identified where increased understanding of the human operator and the interaction between the operator and the avionics could lead to improvements in the performance of current and proposed helicopters. Both current and advanced helicopter systems and avionics are considered. Areas critical to man-machine interface requirements include: (1) artificial intelligence; (2) visual displays; (3) voice technology; (4) cockpit integration; and (5) pilot work loads and performance. B.W.

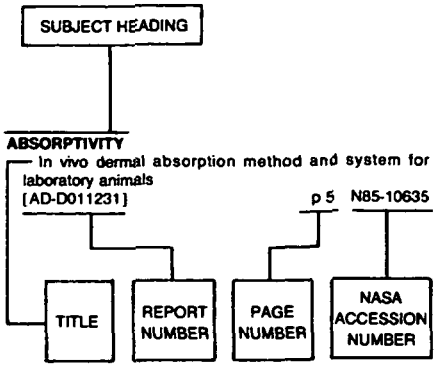
N85-15375# Navy Clothing and Textile Research Facility, Natick, Mass.
THE NEW NAVY FLIER'S FIRE-RESISTANT BLUE COVERALL Final Report
L. G. BOUTIN Aug. 1984 30 p
(AD-A146611; NCTRF-155) Avail: NTIS HC A03/MF A01 CSCL 11E

The Navy Clothing and Textile Research Facility (NCTRF), at the request of the Naval Air Systems Command, has developed a flyer's blue aramid coverall. NAVAIR's objective was to develop a unique blue flight coverall to enhance morale and the retention levels of Naval aviators. NAVAIR requested the coverall be similar to the Air Force CWU-27/P coverall but have a pencil pocket flap and shoulder epaulets for attachment of the Navy's soft shoulder boards. The fabric used for the coverall is a 95/5 Nomex/Kevlar piece-dyed material. Off-the-shelf piece-dyed material was purchased and tested in the NCTRF laboratory to the same criteria as the solution-dyed fabric used in the Air Force coverall. Although the fabric did not pass all tests, NCTRF felt that a purchase document could be written for an off the shelf fabric that meets the critical requirements. NCTRF then procured 500 new coveralls for NAVAIR and distributed these, as directed, to Navy, Air Force and Coast Guard installations. Twelve coveralls underwent fire pit testing at NADC. The fire pit testing showed that the coveralls did provide satisfactory protection for the conditions in which they would be used. GRA

N85-15376# National Inst. for Occupational Safety and Health, Cincinnati, Ohio. Div. of Biomedical and Behavioral Science.
HUMAN ASPECTS IN OFFICE AUTOMATION
B. G. F. COHEN 16 Apr. 1984 202 p refs
(PB84-240738) Avail: NTIS HC A10/MF A01. CSCL 05E

Aspects of stress encountered in office environments are reviewed. The tight building syndrome is defined. The syndrome refers to a high incidence of similar, nonspecific complaints such as upper respiratory irritation, headache, dizziness, or drowsiness among groups of workers who spend extended periods of time in buildings that use mechanical systems for ventilation. Toxic concentrations of substances such as carbon-monoxide (630080), nitrogen-dioxide (10102440), formaldehyde (50000), or butyl-methacrylate (97881) were found in office environments due to malfunctioning or inadequate ventilation. Organizational factors affecting stress among clerical workers are discussed. The impact of organizational factors on visual strain experienced with video display terminals is considered. Clerical health and safety issues are noted and ergonomic aspects of the workplace are considered. GRA

Typical Subject Index Listing



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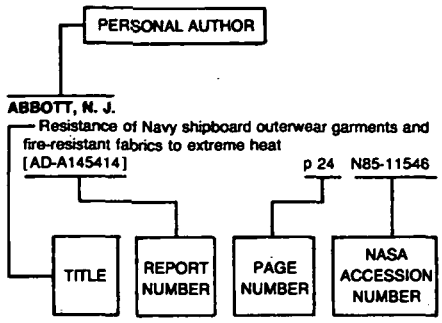

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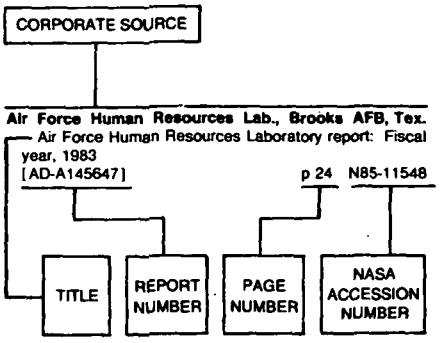

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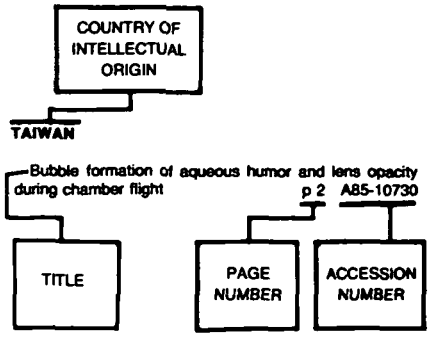

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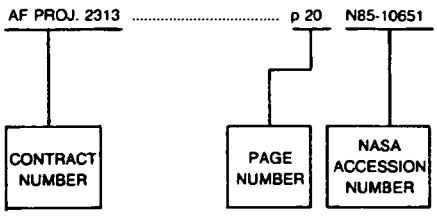

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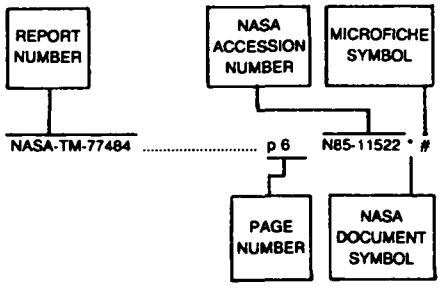

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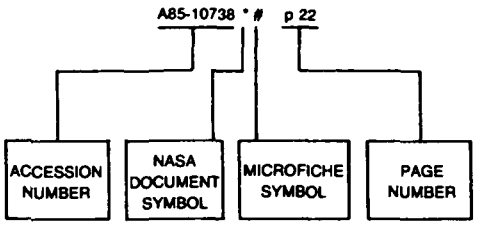

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