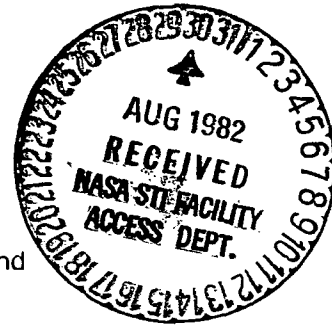




Aerospace Medicine
and Biology
A Continuing
Bibliography
with Indexes

NASA SP-7011(234)
July 1982



National Aeronautics and
Space Administration

Aerospace Medicine & Biology

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AEROSPACE MEDICINE AND BIOLOGY

**A CONTINUING BIBLIOGRAPHY
WITH INDEXES**

(Supplement 234)

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 June 1982 in

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



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

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INTRODUCTION

This Supplement to *Aerospace Medicine and Biology* lists 356 reports, articles and other documents announced during June 1982 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 in two major sections: *IAA Entries* and *STAR Entries*, in that order. 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. This procedure, which saves time and money, accounts for the slight variation in citation appearances.

Two indexes -- subject and personal author -- are included.

An annual index will be prepared at the end of the calendar year covering all documents listed in the 1982 Supplements.

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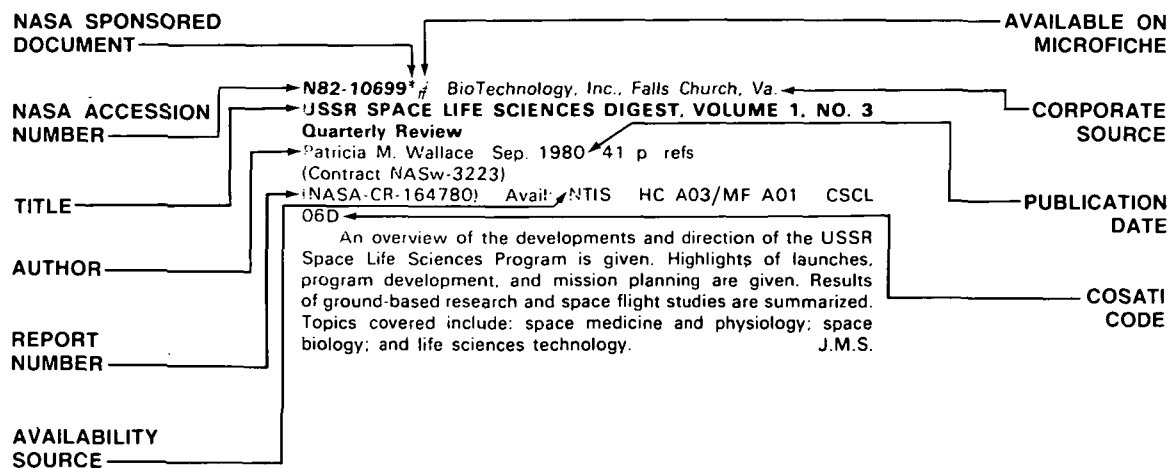
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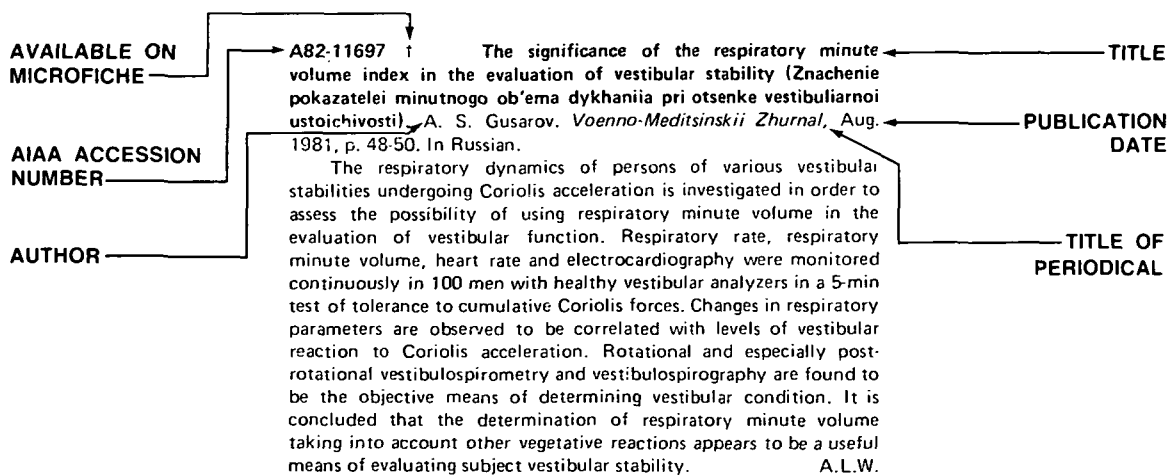
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TYPICAL CITATION AND ABSTRACT FROM IAA



AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 234)

JULY 1982

IAA ENTRIES

A82-25619 Final-position of a single degree-of-freedom tendon arm. P. R. H. Riemenschneider, T. L. Johnson (Bolt Beranek and Newman, Inc., Cambridge, MA), and K. H. Chen (MIT, Cambridge, MA). In: Conference on Decision and Control, 19th, and Symposium on Adaptive Processes, Albuquerque, NM, December 10-12, 1980, Proceedings. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 1070-1075. 5 refs. Research supported by the Whitaker Health Sciences Fund.

A decentralized controller for a mechanical analog of human biceps/triceps control of forearm movement has been designed and tested. The analysis, design, and implementation of this system should be of interest not only as a control application, but also because it brings out some important features which are generic to the positioning of tendon arms of all types. Most particularly, a crude but effective form of load compensation is shown to be possible without (the equivalent of) proprioceptive feedback; this supports recent physiological findings which suggest that large arm movements in primates may be predominantly open-loop processes of final position control. (Author)

A82-25632 * Control system analysis and synthesis for a six degree-of-freedom universal Force-Reflecting Hand Controller. M. Handlykken and T. Turner (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA). In: Conference on Decision and Control, 19th, and Symposium on Adaptive Processes, Albuquerque, NM, December 10-12, 1980, Proceedings. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 1197-1205. 13 refs. Contract No. NAS7-100.

A six degree-of-freedom joystick with feedback motors, called the Force-Reflecting Hand Controller (FRHC) is used as control input for the human operator in a teleoperator system. The geometric and dynamic properties of the FRHC are entirely different from those of the manipulator being controlled. The paper discusses the analysis and synthesis of the control loop between the FRHC and the robot arm and examines the necessary position and force transformations. The controller is implemented through a dedicated minicomputer. (Author)

A82-25647 Corrective saccades - Effect of shifting the saccade goal. H. Deubel, W. Wolf, and G. Hauske (München, Technische Universität, Munich, West Germany). *Vision Research*, vol. 22, no. 3, 1982, p. 353-364. 32 refs. Deutsche Forschungsgemeinschaft Contract No. SFB-50.

A double step paradigm was used to investigate the saccade control, in particular the role of retinal feedback on correction saccades. The first target step eliciting the primary saccade had an amplitude of 10-15 deg and was followed by a second target step of 3 deg which occurred 0-300 msec after the onset of the primary saccade. The characteristics of the saccadic reactions were analyzed as a function of the time between the end of the primary saccade and the second target step. The data show that correction saccades can be modified when the second target step occurs earlier than 60 msec after the end of the primary saccade. Secondary saccades then are corrective, and their parameters show no differentiation between

endogenous and exogenous refixation errors. In further experiments, additional blanking periods were inserted separating the visual system from reafferent information. Under this condition, the system is silent and starts the programming of the correction saccade only when the target is illuminated again. The data demonstrate that retinal feedback is a fundamental part in refixation. (Author)

A82-25648 Perceived rate of movement depends on contrast. P. Thompson (Cambridge University, Cambridge, England). *Vision Research*, vol. 22, no. 3, 1982, p. 377-380. 9 refs. Science Research Council Grant No. GR/A/73817.

The results of experiments which examined the appearance of moving gratings above threshold are reported. Moving sine wave gratings were generated on contiguous oscilloscopes and subjects varied the rate of the right hand screen to match the rate of movement of the left. Test grating contrasts were varied in 0.15 log time steps and the base pattern was displayed for only 2.5 sec/trial, followed by a 17.5 sec lapse. A changeover from under- to overestimation was observed at 8 Hz, and not at a constant velocity. A second experiment with varying rates of movement, contrast levels, and a left-eye display for comparison with a previous standard of movement was used for the contrast effects determination. The results closely matched the first experiment, and a two-channel model is proposed which features a slow channel sensitive to slow-moving patterns, and a fast channel for fast moving patterns, with different contrast sensitivities in each channel. M.S.K.

A82-25649 Intraretinal recordings of slow electrical responses to steady illumination in monkey - Isolation of receptor responses and the origin of the light peak. J. M. Valetton and D. van Norren (Centrale Organisatie voor Toegepost-Natuurwetenschappelijk Onderzoek, Soesterberg, Netherlands). *Vision Research*, no. 3, 1982, p. 393-399. 32 refs. Research supported by the Nederlandse Organisatie voor Zuiver-Wetenschappelijk Onderzoek.

A82-25676 † Basic principles of hypoxia control during shock (Osnovnye printsipy bor'by s gipoksiei pri shoke). V. K. Kulagin and I. G. Boldina. *Patologicheskaja Fiziologija i Eksperimental'naja Terapija*, July-Aug. 1981, p. 10-15. 47 refs. In Russian.

Principles governing the treatment of hypoxia encountered during episodes of shock are discussed. General mechanisms of the development of hypoxia during various types of shock are reviewed, including an elevation in sympathetic nervous system tonus and increase in catecholamine production, centralization of blood flow, blood loss, pulmonary disturbances leading to arterial hypoxemia, cellular damage limiting oxygen utilization and toxemia. The necessity of a combined approach to shock, treating pain, respiration, cardiovascular activity, tissue respiration, and metabolism, is emphasized, and it is noted that any treatment for shock will eventually affect shock-induced hypoxia. Particular attention is then given to various classes of antihypoxants used in the treatment of shock on the cellular and subcellular levels, including glucose, phosphorylated hydrocarbons, ATP and its dephosphorylation products, amino acids, Krebs cycle intermediates, electron acceptors and their constituents, vitamin B1, succinic acid, and thiourea derivatives. A.L.W.

A82-25677 † Expansion of the experimental possibilities of evaluating cardiac output by means of integral rheography using a

high-pass filter (Rasshirenie v eksperimente vozmozhnosti otsenki serdech'nogo vybrosa metodom integral'noi reografii putem primeni-niia fil'tra vysokikh chastot). M. A. Vizeľ' (Azerbaijdzhanskii Nauchno-Issledovatel'skii Institut Gigieny Truda i Professional'nykh Zabolevaniĭ, Baku, Azerbaijdzhan SSR). *Patologicheskaiia Fiziologiia i Eksperimental'naia Terapiia*, May-June 1981, p. 64, 65. 8 refs. In Russian.

A82-25678 † Dynamics of brain cell oxygen tension and electrical activity in the norm and in hypoxia (Dinamika napriazheniia kisloroda i elektricheskoi aktivnosti kletok mozga v norme i pri gipoksii). M. T. Shaov (Kabardino-Balkarskii Gosudarstvennyi Universitet, Nalchik, USSR). *Patologicheskaiia Fiziologiia i Eksperimental'naia Terapiia*, July-Aug. 1981, p. 22-26. 12 refs. In Russian.

Changes in oxygen levels and electrical activity in brain cells under normal conditions, conditions of acute hypoxia and following the development of hypoxia adaptation are investigated in a study of cellular adaptation mechanisms. Microelectrodes placed against the membranes of single cells in the rat motor cortex were used to measure both oxygen tension and electrical impulses in rats kept under laboratory conditions and periodically exposed to a simulated altitude of 7 km. Oxygen tensions at the cellular membrane are observed to be significantly greater in hypoxia-adapted than control animals under normal conditions and to remain higher, although by a lesser margin, at simulated altitudes as high as 12 km, although absolute levels in both groups decreased with increasing hypoxia. The formation of the oxygen gradient in adapted animals is related to a reduction in cellular oxygen consumption, which is reflected in differential reductions in electrical activity. A.L.W.

A82-25679 † Elevation of hypoxia tolerance under the influence of prolonged fasting (Povyshenie ustoichivosti organizma k gipoksii pod vliianiem dlitel'nogo golodaniia). Iu. V. Zinov'ev, E. Iu. Podgornaia, and A. G. Kardovskii (Kirovskii Nauchno-Issledovatel'skii Institut Perelivaniia Krovi, Kirov, USSR). *Patologicheskaiia Fiziologiia i Eksperimental'naia Terapiia*, July-Aug. 1981, p. 63-65. 12 refs. In Russian.

The use of fasting as a measure to increase hypoxia tolerance is investigated in rabbits undergoing altitude hypoxia, hemorrhagic hypotension, and circulatory hypoxia. Fasting for a period of two weeks is observed to increase the survival rate for exposure to 10,000 m simulated altitude for 1 hour from 10% for control animals and 20% for animals treated with glutamine, to 100%. Observations of hyperglycemia and a less intense antihypoxic effect in circulatory hypoxia due to hepatic-duodenal ligament compression suggest enhanced gluconeogenesis in the liver and kidneys to be the predominant mechanism accounting for increased hypoxia tolerance in fasted animals. A.L.W.

A82-25680 † The energy supply of serotonin inactivation processes in the lungs (Energobespechenie protsessov inaktivatsii serotoninina v legkikh). P. V. Dubilei (Volgogradskii Institut Fizikul'tury, Volgograd, USSR) and V. V. Teniukov (Chuvashskii Gosudarstvennyi Universitet, Cheboksary, USSR). *Patologicheskaiia Fiziologiia i Eksperimental'naia Terapiia*, July-Aug. 1981, p. 69-73. 11 refs. In Russian.

The nature of the energy supply to the energy-dependent tissue absorption process in the pulmonary inactivation of serotonin (5-HT) is investigated in a series of oxygen deprivation experiments, serving to suppress aerobic metabolism. Measurements of arterial, venous and pulmonary serotonin levels were made in dogs, cats and isolated perfused rat lungs under conditions of occlusion, hypoxic and anoxic hypoxia. Acute hypoxia is observed to lead to an impairment in pulmonary 5-HT inactivation as revealed by the increase in total and free 5-HT levels in arterial and venous blood. The transition from hypoxia to breathing of normal air reverses these changes, and increases the veno-arterial 5-HT gradient to a level twice the initial. Data indicate the importance of aerobic metabolism in the energy supply for 5-HT absorption, a hypothesis supported by observations of increases in glycolytic enzyme activities and lactate production during hypoxia. A.L.W.

A82-25681 † The effectiveness of various radio-protective agents in protecting the germ cells of male mice against the genetic effects of radiation. II - The incidence of reciprocal translocations in

irradiated spermatogonia (Effektivnost' primeniia razlichnykh radioprotektorov dlia zashchity polovnykh kletok samtsov myshei ot geneticheskogo deistviia radiatsii. II - Izuchenie chastoty retsiproknnykh translokatsii v spermatogoniakh). M. D. Pomerantseva, L. K. Ramaiia, G. A. Vil'kina, P. G. Zherebchenko, and G. V. Kalistratov (Akademiia Nauk SSSR, Institut Obshehei Genetiki; Ministerstvo Zdravookhraneniia SSSR, Moscow, USSR). *Radiobiologiia*, vol. 21, Nov.-Dec. 1981, p. 841-846. 19 refs. In Russian.

A82-25682 † The indication of radiation resistance modified by radio-protective agents. III - Analysis of the relationship between hypoxic and radio-protective effects in the rat bone marrow for hypoxias of different origin (Voprosy indikatsii modifitsirovannoi protektorami radiorezistentnosti. III - Analiz svyazi gipoksicheskogo i radiozashchitnogo effektov v kostnom mozge krysa v usloviakh gipoksii razlichnogo geneza). L. M. Rozhdestvenskii. *Radiobiologiia*, vol. 21, Nov.-Dec. 1981, p. 847-853. 18 refs. In Russian.

A82-25683 † Potentiation of the protective effect of sulfur-containing radioprotectors (Potentsirovanie zashchitnogo deistviia u serosoderzhashchikh radioprotektorov). V. G. Vladimirov, T. G. Zaitseva, and S. M. Smirnova. *Radiobiologiia*, vol. 21, Nov.-Dec. 1981, p. 836-840. 10 refs. In Russian.

The potentiation of the radiation-protective effects of cystamine and aminopropylaminoethylthiophosphoric acid (APAETP) by their simultaneous use with certain thiourea derivatives is investigated. Each sulfur-containing radioprotective agent was administered in combination with the hypertensives ethyron or methyron or the antioxidant gutimine to mice 20 min before exposure to a gamma-ray dose of 7.5 gr. Evaluation of 30-day survival rates and spleen and bone marrow cell populations reveals the thiourea derivatives to be effective in increasing the radioprotective actions of cystamine and APAETP, particularly when ethyron and gutimine are used. The two-component mixtures are also found to reduce the toxicity of the radioprotectors, thus widening the radioprotective zone and increasing the safety index. A.L.W.

A82-25684 † The therapeutic application of heterologous serum globulin against the acute radiation sickness of mice (Lechebnoe primeniie geterologicheskogo syvorotochnogo globulina pri ostroi luchevoi bolezni myshei). N. N. Dobronravova, T. D. Kuz'mina, A. M. Ulanova, A. P. Nevinnaia, G. A. Shal'nova, and I. A. Gol'tsev. *Radiobiologiia*, vol. 21, July-Aug. 1981, p. 595-598. 7 refs. In Russian.

A82-25685 † The influence of the seasonal factor and the intensity of work on the basic physiological functions of agricultural workers (Vliianie sezonnosti i napriazhennosti trudovogo protssesa na osnovnye funktsii organizma rabotnikov sel'skokhoziaistvennogo proizvodstva). A. O. Navakatikian, G. G. Lysina, L. N. Rossinskaia, and L. S. Osinskaia (Ministerstvo Zdravookhraneniia Ukrainskoi SSR, Laboratoriia Funktsional'noi Diagnostiki, Kiev, Ukrainian SSR). *Vrachebnoe Delo*, July 1981, p. 100-103. 9 refs. In Russian.

A82-25686 † Main trends in combatting oxygen hunger (Osnovnye napravleniia bor'by s kislorodnym golodaniem). V. A. Berezovskii (Akademiia Nauk Ukrainskoi SSR, Institut Fiziologii, Kiev, Ukrainian SSR). *Vrachebnoe Delo*, July 1981, p. 64-67. 19 refs. In Russian.

The system used in classifying hypoxic conditions is described. A description is also given of the two forms of oxygen therapy, which is one of the most common means of treating hypoxia. In the first, the partial pressure of oxygen is increased without raising the overall pressure; this is done by increasing the concentration of oxygen. In the second form of oxygen therapy, oxygen at a higher pressure is introduced in compression chambers. In many cases, however, oxygen therapy is ineffective because of an intolerance to oxygen. There are two approaches in treating any form of oxygen hunger. One is replacement therapy. The other involves vaccinations (in the case of infectious diseases) and the gradual acclimatization to and use of mountain climates (for many illnesses related to chronic hypoxic conditions). The overall therapeutic effect of mountain climates is discussed. C.R.

A82-25687 † Reception of retinol in rat retinas - Various molecular forms (Retseptsiia retinola v setchatke krysa - Razlichnye molekuliarnye formy). B. V. Pokrovskii, M. E. Shabanova, and B. I. Mitsner (Akademiia Meditsinskikh Nauk SSSR; Institut Tonkoi Khimicheskoi Tekhnologii, Moscow, USSR). *Voprosy Meditsinskoi Khimii*, vol. 27, May-June 1981, p. 392-397. 19 refs. In Russian.

A82-25688 † Expenditure of energy and the state of the neuromuscular system in athletes who use low-calorie diets to control their weight (Energotraty i funktsional'noe sostoiianie nervno-myshechnoi sistemy sportsmenov v usloviakh regulirovaniia massy tela s pomoshch'iu gipokaloriinoi diety). V. I. Shubin, K. A. Laricheva, N. I. Ialovaia, N. M. Lobas, and T. M. Shamarina (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Voprosy Pitaniia*, Jan.-Feb. 1981, p. 11-15. 9 refs. In Russian.

A82-25689 † Vestibular dysfunctions in caisson workers subjected to a combination of occupational hazards (Vestibuliarnaia disfunktsiia u rabochikh-kessonshchikov, podvergavshikhsia vozdeistviu kombinirovannykh proizvodstvennykh vrednostei). R. M. Rzaev (Azerbaijanskii Meditsinskii Institut, Baku, Azerbaidzhan SSR). *Vestnik Otorinolaringologii*, Jan.-Feb. 1982, p. 20-23. 7 refs. In Russian.

A82-25690 † A bicycle-ergometer evaluation of the physical adjustment made by patients after an inner mitral commissurotomy (Veloergometricheskaiia otsenka fizicheskoi adaptatsii bol'nykh posle zakrytoi mitral'noi komissurotomii). K. I. Danilova (Karagandinskoe Mezhhoblastnoe Otdelenie Serdechnoi Khirurgii, Karaganda, Kazakh SSR). *Kardiologiya*, vol. 21, Feb. 1981, p. 105, 106. 8 refs. In Russian.

A82-25691 † Comments on the theory for the accuracy of rapid motor acts of Schmidt et al. (Zamechaniia k teorii tochnosti bystrykh dvizhenii, predlozhennoi R. Shmidtom s soavtorami). I. E. Tsubulevskii (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR). *Voprosy Psikhologii*, May-June 1981, p. 127-131, 191. In Russian.

Attention is given to the theory of Schmidt et al. (1979) concerning the accuracy of rapid motor acts relating to motor-output variability. A description of the theory is given and some critical comments are made. Schmidt's theory is reduced to the proposition that when path and time are given the rapid motor acts are divided into two classes: targeted and nontargeted. It is argued that the nontargeted motor acts accord with the theory of open programmed control, while targeted acts cannot be explained by this theory. B.J.

A82-25692 † Population mechanisms of adapting to extreme environmental conditions [with *Clethrionomys glareolus* Schreb considered as an example] (Populatsionnye mekhanizmy prispoblenii k ekstremal'nym usloviim srede /na primere ryzhei polevki/). G. V. Olenov (Akademiia Nauk SSSR, Institut Ekologii Rastanii i Zhivotnykh, Sverdlovsk, USSR). *Zhurnal Obshchei Biologii*, vol. 42, July-Aug. 1981, p. 506-511. 21 refs. In Russian.

A82-25693 † The nature of autonomic effects produced by sombrevin (O prirode vegetativnykh effektov sombrevina). N. A. Osipova, O. N. Zagrebali'nyi, and V. A. Svetlov (I Moskovskii Meditsinskii Institut, Moscow, USSR). *Akademiia Meditsinskikh Nauk SSSR, Vestnik*, no. 1, 1981, p. 76-82. 40 refs. In Russian.

Clinical-electrophysiological studies involving the continuous synchronous recording of EEG, EKG, pneumograms, and galvanic skin response have been performed in order to investigate the stimulation mechanisms of respiratory and cardiac activity by sombrevin. It is found that the onset of sombrevin-induced autonomic crisis is preceded by the development of narcosis and is associated with increases in brain electric activity and with hypersynchronization of EEG rhythms. This onset may therefore be considered as a manifestation of an excitation phase. Phentanyl prevents the autonomic crisis, the antagonism of the drugs presumably effected at the hypothalamic level. B.J.

A82-25694 † A psychophysiological analysis of the memory changes undergone by humans in adapting to new climatic and geographic conditions (Psikhofiziologicheskii analiz izmenenii pamiat

ti cheloveka v protsesse adaptatsii k novym klimatogeograficheskim usloviim). E. I. Nikolaeva (Akademiia Meditsinskikh Nauk SSSR, Novosibirsk, USSR). *Akademiia Meditsinskikh Nauk SSSR, Vestnik*, no. 5, 1981, p. 68-71. 11 refs. In Russian.

A82-25695 † Connection of motor regimen with morbidity in workers (Vzaimosviaz' osobennosti dvigatel'nogo rezhima s zabolevaemost'iu u trudiashchikhsia). L. N. Nifontova and I. S. Bievetskaia (Vsesoiuznyi Nauchno-Issledovatel'skii Institut Fizicheskoi Kul'tury, Moscow, USSR). *Teoriia i Praktika Fizicheskoi Kul'tury*, Feb. 1981, p. 38-41. 15 refs. In Russian.

The dependence of worker morbidity on the duration, time distribution and intensity of physical exercise performed by them in the course of a week is investigated. Comparison of responses to a physical exercise questionnaire with the morbidity histories of automotive workers reveals the optimal level of exercise with respect to illness and injury incidence to be between 2 and 6 hours/week in the various age-sex groups. For persons under 30 years of age, the most beneficial regimen consists of exercise more than six times a week, while for those 30 and over exercise is most beneficial when taken two to three times a week. The least morbidity in all classes is observed in workers expending 4000-5000 kcal a week in physical exercise. Results are in accordance with previous studies, supporting the existence of definite motor activity norms for maintaining productivity and health. A.L.W.

A82-25696 † Dynamics of aerobic work capacity and changes in the functional stability of the oxygen-supply mechanism and hypophysical adrenocortical system in skiers (Dinamika aerobnoi rabotosposobnosti i izmenenie funktsional'noi ustoiichivosti mekhanizma snabzheniia organizma kislorodom i gipofizarno-adrenokortikal'noi sistemy u lyzhnikov-gonshchikov). T. A. Matsin, Kh. V. Kinks, and A. A. Viru (Tartuskii Gosudarstvennyi Universitet, Tartu, Estonian SSR). *Teoriia i Praktika Fizicheskoi Kul'tury*, Feb. 1981, p. 23-25. 6 refs. In Russian.

A82-25697 † Clinical characteristics of neurotic disorders in female long-distance telephone operators (Klinicheskaiia kharakteristika nevroticheskikh rastroistv u telefonistok mezhdugorodnykh stantsii). Iu. M. Nevskaiia (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Gigiena Truda i Professional'nye Zabolevaniia*, Feb. 1981, p. 30-32. In Russian.

A82-25698 † The importance of pauses during work with vibrating tools (Znachenie pazv pri rabote s vibroopasnymi instrumentami). Z. M. Butkovskaiia (Institut Gigieny Truda i Profzabolevaniia, Leningrad, USSR), R. I. Dol'nik (Sanitarno-Gigienicheskii Meditsinskii Institut, Leningrad, USSR), and A. F. Safonova (Saneptidstantsia, Leningrad, USSR). *Gigiena Truda i Professional'nye Zabolevaniia*, Oct. 1981, p. 40-43. In Russian.

A study is made of the activity of workers in the shipbuilding industry who use heavy vibrating tools. The amount of time during a shift that each worker spends actually operating the tool is determined. Although a sufficient number of the intervals between operation are at least 2 min, the distribution of these pauses is found to be uneven. Measures are proposed to correct this imbalance. C.R.

A82-25699 † The effectiveness of vibration damping at the working positions on open-pit excavators at the Kursk magnetic anomaly (Effektivnost' vibroamortizatsii rabochikh mest na kar'ernykh ekskavatorakh Kurskoi magnitnoi anomalii). Iu. P. Syromiatnikov, N. K. Kornilov, L. T. Kozakova, and A. I. Neplokhov (Institut Gigieny, Moscow, USSR). *Gigiena Truda i Professional'nye Zabolevaniia*, Nov. 1981, p. 35-37. 6 refs. In Russian.

A82-25700 † Physiological and hygienic characteristics of the work of open-hearth steel smelters (Fiziologo-gigienicheskaiia kharakteristika truda staleplavil'shchikov v usloviakh martenovskogo proizvodstva). E. N. Belitskaia (Meditsinskii Institut, Dnepropetrovsk, Ukrainian SSR). *Gigiena Truda i Professional'nye Zabolevaniia*, May 1981, p. 9-11. 9 refs. In Russian.

A82-25701 † Physiological effects of low levels of vibration combined with local muscular exercise in the cutting of semiprecious

stones (Vliianie na organizm 'malykh' urovnei vibratsii v sochetanii s lokal'noi myshechnoi nagruzkoj pri ogranke poludragotsennykh kamnei). L. Ia. Tarkovskaia, B. S. Salganikova, and E. E. Troitskaia (Institut Gigieny Truda i Profzabolevanii, Sverdlovsk, USSR). *Gigiena Truda i Professional'nye Zabolevaniia*, Nov. 1981, p. 38-41. In Russian.

A82-25702 † Basis for the refinement of permissible levels of local vibration (K voprosu ob obosnovanii utocneniia dopustimyykh urovnei lokal'noi vibratsii). G. A. Suvorov (Akademii Meditsinskikh Nauk SSSR, Moscow, USSR), Z. M. Butkovskaia (Institut Gigieny Truda i Profzabolevanii, Leningrad, USSR), and A. M. Mikulinskii (Institut Gigieny Truda i Profzabolevanii, Gorki, USSR). *Gigiena Truda i Professional'nye Zabolevaniia*, May 1981, p. 12-15. 10 refs. In Russian.

Experimental and clinical data is presented which supports a revision of standards in the Soviet Union for maximum local vibration exposure. Studies on bulls have shown the sensitivity thresholds to vibration at 125 and 500 Hz to differ by 10-15 dB, necessitating an upward revision of limiting vibration levels at frequencies of 16 Hz or less with respect to that at 125 Hz. Examinations of workers using high- and low-frequency hand-held machines have further allowed the determination of absolute vibration levels at various frequencies at which no significant physiological impairments are observed. Results are noted to converge with those of previous investigators identifying vibrations with maximum intensity in the octave band centered at 125 Hz as the most dangerous. A.L.W.

A82-25703 † Evaluation of certain indices used in experimental and field conditions to detect the effects of noise (Otsenka nekotorykh pokazatelei, primenimyykh v eksperimental'nykh i proizvodstvennykh usloviakh dlia ustanovleniia shumovogo vozdeistviia). L. Tsaneva, Ia. Moskov, and S. Dipchikova (Meditsinska Akademiia, Sofia, Bulgaria). *Gigiena Truda i Professional'nye Zabolevaniia*, Oct. 1981, p. 31-34. 6 refs. In Russian.

The cardiovascular function, the perception and processing of visual information, and disturbances in visual and motor coordination are considered as indices of the effects of noise. Noise exposure was found to produce a change in the parameters of information processing, and to reduce the tempo and quality of work. Changes in the visual analyzer function are manifested in an increase in the threshold of the electric sensitivity of the eye and in the reduction of visual acuity. Changes in the visual and motor coordination parameters are manifested in the increase in the time necessary to solve prescribed problems and in the increased number of errors. B.J.

A82-25704 † Coagulopathy in miners with vibration sickness (Koagulopatiia u gornikov, bol'nykh vibratsionnoi bolezniu). I. Pramatarov and G. Batinova (Meditsinska Akademiia, Plevn, Bulgaria). *Gigiena Truda i Professional'nye Zabolevaniia*, Nov. 1981, p. 48-50. 6 refs. In Russian.

A82-25705 † Some characteristics of cardiovascular system activity and adaptive antihypoxic mechanisms in keyboard computer operators during the course of a work shift (Nekotorye osobennosti funktsional'noi aktivnosti serdechno-sosudistoi sistemy i prispособitel'nykh antigipoksicheskikh mekhanizmov u operatorov klavishnykh elektronno-vychislitel'nykh mashin v dinamike rabochei smeny). A. A. Kononenko and V. V. Derkach (Institut Gigieny Truda i Profzabolevanii, Kharkov, Ukrainian SSR). *Gigiena Truda i Professional'nye Zabolevaniia*, Nov. 1981, p. 29-32. 11 refs. In Russian.

A82-25706 † Effects of high ambient temperature on athlete adaptation to muscular activity (Vliianie vysokoi vneshei temperatury na adaptatsiiu organizma sportsmena k myshechnoi deiatel'nosti). K. M. Akhundov and M. K. Rips (Azerbaidzhanskii Gosudartsvennyi Meditsinskii Institut, Baku, Azerbaidzhan SSR). *Teoriia i Praktika Fizicheskoi Kul'tury*, Apr. 1981, p. 25-27. 17 refs. In Russian.

A82-25707 † Clinical and epidemiologic analysis of ischemic EKG responses to physical exercise in males (Kliniko-epidemiologicheskii analiz iskhemicheskikh reatsii EKG na fizicheskuiu nagruzku u muzhchin). B. M. Lipovetskii, V. S. Konstantinov, and G. N. Il'ina (Akademii Meditsinskikh Nauk SSSR, Leningrad,

USSR). *Sovetskaja Meditsina*, no. 4, 1981, p. 10-13. 13 refs. In Russian.

A differential analysis is presented of the responses to physical exercise of males aged 40-59 in the presence or absence of accompanying stenocardia. Subjects were selected from a baseline population of 3907 persons residing in a single urban administrative district who had undergone preliminary cardiac screening. Exercise electrocardiograms performed on a bicycle ergometer or treadmill resulted in an ischemic response in 7.7% of healthy subjects selected randomly from the population, 55.0% of those selected with effort stenocardia, and 10.7% of those selected with hyperlipidemia. Three types of ischemic response are distinguished: isolated EKG ST segment depression, anginal pain without accompanying EKG changes, and a combination of anginal pain with ST segment depression. It is concluded that the ischemic response to physical exercise is related primarily to the degree of coronary insufficiency and the level of arterial pressure. A.L.W.

A82-25708 † Determination of the bacterial endotoxin content of the blood of irradiated animals and humans (Opredelenie soderzhanii bakterial'nykh endotoksinov v krovi zhivotnykh i liudei, podvergnutykh oblucheniui). P. N. Kiselev and T. S. Shchul's (Ministerstvo Zdravookhraneniia SSSR, Tsentral'nyi Nauchno-Issledovatel'skii Rentgenoradiologicheskii Institut, Leningrad, USSR). *Laboratornoe Delo*, no. 9, 1981, p. 561-563. 10 refs. In Russian.

The use of actinomycin D to increase organism sensitivity to bacterial lipopolysaccharides thereby allowing the detection of bacterial endotoxins is investigated in mice injected with blood components from irradiated animals. The mice were administered doses of the blood preparations in the amount of 1000 microgram/mouse simultaneously with 10 micrograms of actinomycin D, which amount had been found to increase mouse sensitivity to bacterial endotoxins by a factor of 1500. By this method it is found that the development of endotoxemia in mice irradiated at doses of 3 and 7 gr has a three-phase character, and that endotoxemia is present in humans at levels from 0.0806 to 0.9166 microgram/ml during therapeutic radiation treatments of the abdominal cavity. A.L.W.

A82-25709 † Evaluation of the antioxidant system of the body (Otsenka antioksidantnoi sistemy organizma). N. K. Rudakova-Shilina and N. P. Matiukhova (Vologradskii Meditsinskii Institut, Volograd, USSR). *Laboratornoe Delo*, no. 1, 1982, p. 19-22. 20 refs. In Russian.

Vitamin E content in the blood plasma lipids was examined along with reduced glutathione levels in the blood of donors aged 20 to 40. It was found that the content of vitamin E in the body had a tendency to decrease with age, and that the reduced glutathione levels did not vary significantly in the group examined. B.J.

A82-25710 † Impairment of orthostatic posture regulation in boxers following closed craniocerebral injury (Naruseniia regulatsii ortostaticheskoi posy posle zakrytoi cherepno-mozgovoi travmy u bokserov). R. Z. Kravets and V. M. Sirotkin (Orenburgskii Meditsinskii Institut, Orenburg, USSR). *Kazanskii Meditsinskii Zhurnal*, vol. 62, Nov.-Dec. 1981, p. 22-24. In Russian.

A82-25711 † Effect of white noise on the auditory cortex ultrastructure in rats (Vliianie belogo shuma na ul'trastrukturu slukhovoii kory krysa). N. I. Artiukhina, O. F. Kuvaeva, and I. P. Levshina (Akademii Nauk SSSR, Institut Vysheii Nervnoi Deiatel'nosti i Neirofiziologii, Moscow, USSR). *Biulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 91, Apr. 1981, p. 495-498. 15 refs. In Russian.

A82-25712 † Response of the cat femoral artery to increased circulation rate (Reatsii bedrennoi arterii koshek na uvelichenie skorosti krovotoka). A. M. Mel'kumians, E. S. Veselova, and V. M. Khaiutin (Akademii Meditsinskikh Nauk SSSR, Moscow, USSR). *Biulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 92, Aug. 1981, p. 7-9. 12 refs. In Russian.

A82-25713 † The significance of chemoreceptor stimuli for the rate of switch-on and switch-off of the respiratory response to

physical exercise (Znachenie khemoretseptornykh stimulov dlia skorosti vklucheniia i vykliucheniia reaktsii dykhanii na myshechnuiu rabotu). I. S. Breslav, G. G. Isaev, and A. M. Shmeleva (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR). *Biulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 91, May 1981, p. 522-525. 6 refs. In Russian.

The magnitude of the respiratory response to physical exercise and its switch-on and switch-off rates were investigated in 12 healthy men breathing different gas mixtures. It is shown that a hypercapnic stimulus reinforced and accelerated the respiratory response to exercise. In addition, it was found that a hypoxic stimulus resulted primarily in increased though transient changes in the ventilation rate at the beginning and the end of the exercise. This effect appears likely to be mediated by fast-responding arterial chemoreceptors.

B.J.

A82-25714 † Investigation of the mechanism of auditory adaptation by the simultaneous recording of auditory evoked potentials of the brain and neurotropic potentials of the cochlea (Izuchenie mekhanizma slukhovoii adaptatsii s pomoshchiu odnovremennoi registratsii slukhovykh vyzvannykh potentsialov kory golovnogo mozga i mikrofonnykh potentsialov ulitki). B. M. Sagalovich and G. G. Melkumova (Ministerstvo Zdravookhraneniia RSFSR, Moskovskii Nauchno-Issledovatel'skii Institut Ukhia, Gorla i Nosa, Moscow, USSR). *Biulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 91, May 1981, p. 520-522. 15 refs. In Russian.

Auditory adaptation was examined in 35 rabbits exposed to white noise (90 dB, 0.00002 Pa, 10 min) by the simultaneous recording of evoked potentials of the brain and the neurotropic potentials of the cochlea. The effects of the neurotropic drugs galanthamine, GABA, and nanophyn on the auditory adaptation were also investigated. It is found that the mechanism of auditory adaptation is determined by processes in synapses in central parts of the auditory system and is monitored by the sympathetic nervous system.

B.J.

A82-25715 † Seasonal vascular tension variations in patients with cerebral circulatory disorders under the conditions of an arid zone (Sezonnnye izmeneniia sosludistogo tonusa u bol'nykh s rasstroistvami mozgovogo krovoobrashcheniia v usloviakh aridnoi zony). A. K. Mamiev and K. O. Orazov (Turkmenskii Meditsinskii Institut, Ashkhabad, Turkmen SSR). *Zhurnal Nevropatologii i Psikhatrii im S.S. Korsakova*, vol. 81, 1981, p. 41-45. 13 refs. In Russian.

A82-25716 † Thyroid and hypophysial thyrotropic function in athletes during bicycle ergometer exercise (Sostoianie shchitovidnoi zhelezy i tireotropnoi funktsii gipofiza u sportsmenov pri veloergometricheskoi nagruzke). A. B. Burkashov, T. D. Bol'shakova, V. A. Siluanova, V. N. Khomiakova, V. G. Borisov, and A. S. Nasonov (I Moskovskii Meditsinskii Institut, Moscow, USSR). *Problemy Endokrinologii*, vol. 27, Mar.-Apr. 1981, p. 21-26. 22 refs. In Russian.

A82-25717 † Ultrastructural changes in skeletal muscle fibers under the influence of acute physical exercise (Izmeneniia ul'trastruktury skeletnykh myshechnykh volokon pod vlianiem ostrogo fizicheskogo napriazheniia). M. D. Shmerling, E. E. Filiushina, and I. I. Buzueva (Akademiia Meditsinskikh Nauk SSSR, Novosibirsk, USSR). *Arkhiv Anatomii, Gistologii i Embriologii*, vol. 80, Feb. 1981, p. 43-49. 9 refs. In Russian.

The characteristics of the ultrastructural changes in the various types of skeletal muscle fibers which are associated with intense physical exercise are studied. Electron microscopic and stereomorphometric evaluations were performed on the anterior tibial muscles of rats isolated after a single bout of intense exercise (treadwheel running to exhaustion) or three daily intense exercise periods. Ultrastructural changes in both the energetic and contractile apparatus are observed in both the white and red muscle fibers studied, particularly a swelling of the sarcoplasmic reticulum, decrease in relative mitochondrial volume and sharp drop in glycogen content in the white fibers and intercellular edema, mitochondrial destruction and disturbances in myofibril organization in both types of fibers. The observed changes are attributed to an adaptive

mechanism involving the rapid mobilization and exhaustion of cellular reserves.

A.L.W.

A82-25718 † Ultrastructural organization of AI and AIV zone projections of the cat auditory cortex to the posterior colliculi of the tectum opticum (Ul'trastrukturnaia organizatsiia proektsii zon AI i AIV slukhovoii kory mozga koshki v zadnikh kholmakh chetverokholmiia). E. E. Granstrem (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR). *Arkhiv Anatomii, Gistologii i Embriologii*, vol. 80, Mar. 1981, p. 32-39. 27 refs. In Russian.

A82-25719 † Neurophysiological basis for determining the biological significance of acoustic stimuli (Neirofiziologicheskie osnovy opredeleniia biologicheskoi znachimosti akusticheskikh stimulov). G. A. Kulikov. *Leningradskii Universitet, Vestnik, Biologii*, Nov. 1981, p. 80-87. 28 refs. In Russian.

A82-25720 † Effects of pharmacological agents on the development of hematic hypoxia (Vlianie farmakologicheskikh sredstv na razvitie gemicheskoi gipoksii). V. N. Kostiuhenkov and N. F. Farashchuk (Smolenskii Meditsinskii Institut, Smolensk, USSR). *Farmakologii i Toksikologii*, vol. 45, Jan.-Feb. 1982, p. 76-79. 17 refs. In Russian.

The effects of various pharmacological agents on the development of extreme hematic hypoxia and the dynamics of metabolic processes are compared. Substances belonging to the classes of neuroleptics, adrenal blockers, sympathetic blockers, cholinergic blockers, adrenominetics, psychostimulants, antidepressants and soporifics were administered to rats prior to the injection of sodium nitrite, and evaluated according to animal survival rates and times. It is found that aminazin, apressin, inderal, dopegit, hemedyn and barbamyll all exhibit significant protective action in hematic hypoxia. This action may be connected with a reduced oxygen demand associated with the adrenal and sympathetic blockers, and a suppression of hypothalamic adrenoactivity by barbamyll.

A.L.W.

A82-25721 † The effect of dipilodor, diazepam, pipolphen, and their combinations on the vasomotor reflex and respiration (Vlianie dipilodora, seduksena, pipol'fena i ikh kombinatsii na vazomotorny refleks i dykhanie). B. S. Grishin (Sverdlovskii Meditsinskii Institut, Sverdlovsk, USSR). *Farmakologii i Toksikologii*, vol. 43, Nov.-Dec. 1980, p. 661-664. In Russian.

Tests performed on narcotized cats show that dipilodor and pipolphen inhibit vasomotor reflexes induced by pain stimulation while diazepam facilitates such reflexes. The administration of dipilodor after diazepam and pipolphen is conducive to the preservation of the inhibitory effect of the analgesic on the vasomotor reflexes, the depressant effect of the drug on respiration being eliminated.

B.J.

A82-25722 Nutrients that modify brain function. R. J. Wurtman (MIT, Cambridge, MA). *Scientific American*, vol. 246, Apr. 1982, p. 50-59.

The activities of three nutrients which, when administered in pure form or ingested as food, give rise to important changes in the chemical composition of the brain and thereby modify brain functions are discussed. The nutrients are the amino acids tryptophan and tyrosine, and the lecithin constituent choline, which are precursors of the neurotransmitters serotonin, catecholamine and acetylcholine, respectively. Increases in the brain levels of its precursor enhance the synthesis of a neurotransmitter, which in turn may cause the amplification of neuron signals due to increased neurotransmitter release. The observations relating nutrient intake to neurotransmission originated in studies in which it was found that the amount of tryptophan available for conversion into serotonin depended on plasma amino acid ratios, suggesting a mechanism governing food preferences. Nutrient-neurotransmitter relations have been used in a variety of clinical applications, including the treatment of tardive dyskinesia, and in prospective treatments of memory disorders associated with old age, Parkinson's disease, hypertension and depression.

A.L.W.

A82-25801 † The participation of estradiol and progesterone in animal body mass regulation mechanisms (Uchastie estradiola i progesterona v mekhanizmakh regulatsii massy tela u zhivotnykh).

T. M. Eroshenko (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR). *Problemy Endokrinologii*, vol. 28, Jan.-Feb. 1982, p. 82-88. 90 refs. In Russian.

A82-25802 † Reflexometry as an additional method of investigating hypoactivity in the thyroid gland (Refleksometriia kak dopolnitel'nyi metod issledovaniia pri gipofunktsii shchitovidnoi zhelezy). G. A. Gaidina, L. S. Matveeva, and S. P. Lazareva (Akademii Meditsinskikh Nauk SSSR, Moscow, USSR). *Problemy Endokrinologii*, vol. 28, Jan.-Feb. 1982, p. 34-38. 10 refs. In Russian.

In patients with severe and moderate hypothyroidism, a correlation is established between the Achilles tendon response time and certain biochemical indicators of thyroid activity. The study is carried out before treatment has begun or during substitution therapy with hormones. Also established is a correlation between the severity of the case and these indicators. It is found that the correlation continues to hold after treatment is begun, although restoration of the Achilles tendon response time lags behind the disappearance of other symptoms. It is concluded that this response time can serve as an additional criterion for diagnosing the existence and severity of hypothyroidism. C.R.

A82-25803 † The influence of the type of trophic interactions on the dynamics of a two-level ecosystem (Vliianie tipa troficheskikh vzaimodeistvii na dinamiku dvukhurovnevoi ekosistemy). D. A. Sarancha (Akademii Nauk SSSR, Vychislitel'nyi Tsent, Moscow, USSR). *Zhurnal Obshchei Biologii*, vol. 43, Jan.-Feb. 1982, p. 96-108. 6 refs. In Russian.

A mathematical model of an ecosystem comprising two trophic levels linked by interactions of the predator-prey type is considered. Each of the levels contains a large number of species. Equations are derived giving the total biomass of the levels. The behavioral dynamics of the biomass as a whole and of individual species is analyzed for various degrees of specialization in the predation. It is shown that trophic specialization leads to a stabilization of the ecosystem. C.R.

A82-25804 † The permeability of the lymphatic vessels of the muscles of the upper extremities in vibration sickness (Pronitsaemost' limfaticeskikh sosudov myshts verkhnikh konechnosti pri vibratsionnoi bolezni). D. K. Abramovich-Poliakov, N. I. Pilipenko, R. I. Voloshina, S. P. Krakovskaia, and N. I. Teslenko (Nauchno-Issledovatel'skii Institut Gigieny Truda i Profzabolevanii; Khar'kovskii Meditsinskii Institut; Khar'kovskaia Oblastnaia Klinicheskaia Bol'nitsa, Kharkov, Ukrainian SSR). *Vrachebnoe Delo*, Mar. 1981, p. 113-115. In Russian.

The permeability of the lymphatic capillaries of the muscles of the upper extremities in patients with vibration sickness is studied in a tracer experiment involving the use of I-131 labeled human serum albumin. The resorption of intramuscular labeled albumin into the lymphatic system is found to take place at a significantly faster rate in metal trimmers suffering from the first and second stages of vibration sickness than in controls, and to depend on the level of the disease. In addition, subjects suffering from the angiodystonic syndrome exhibited increased lymphatic vessel permeability only on the left side, while those with angiospastic syndrome exhibited a more marked enhancement in permeability on both sides. Results are explained by the effects of vibration and compensatory changes associated with it in increasing lymph capillary permeability due to the increased spasm activity of the blood capillaries. A.L.W.

A82-25805 † The significance of the pulmonary gas-exchange response in physical exercise testing for the evaluation of the effectiveness of mitral commissurotomy (Znachenie reaktivnoi legochnogo gazoobmena na fizicheskuiu nagruzku v otsenke effektivnosti mitral'noi komissurotomii). L. F. Sherdukhalova and L. O. Avakian (Ministerstvo Zdravookhraneniia Armianskoi SSR, Institut Kardiologii, Yerevan, Armenian SSR). *Sovetskaia Meditsina*, no. 1, 1982, p. 15-19. 10 refs. In Russian.

A82-25806 † Characteristics of oxygen metabolism in patients with chronic ischemic heart disease during physical exercise (Osobennosti kislorodnogo obmena u bol'nykh khronicheskoi

ishemicheskoi bolezniu serdtsa pri fizicheskoi nagruzke). E. Iu. Maichuk (Moskovskii Meditsinskii Stomatologicheskii Institut, Moscow, USSR). *Sovetskaia Meditsina*, no. 1, 1982, p. 7-10. 13 refs. In Russian.

Changes in oxygen consumption, oxyhemoglobin dissociation and tissue oxygen levels at various levels of physical exercise are studied in patients with chronic ischemic heart disease. Measurements were performed on 120 patients with varying levels of exercise tolerance and 20 healthy controls during bicycle ergometer exercise at stepwise increasing levels. Increases in oxygen consumption are found in proportion to the level of exercise, however are lower in patients with low exercise tolerance than in the controls of patients with high tolerance. Increases in tissue oxygen content were practically absent in the low-tolerance group, while in those with a moderate tolerance increases were significantly lower than in the controls. An increase in the oxygen tension at which 50% of oxyhemoglobin was dissociated is observed equally in all groups, depending only on exercise performed. Tissue oxygen content is shown not to be strictly dependent on oxygen consumption, but to vary in response to additional factors including oxyhemoglobin dissociation. A.L.W.

A82-25807 † Computer analysis of tests involving physical stress (Komp'iuternyi analiz proby s fizicheskoi nagruzko). R. A. Charchoglian, A. P. Golikov, L. S. Zingerman, I. Iu. Avdeeva, N. N. Esin, and S. P. Levshunov (Moskovskii Nauchno-Issledovatel'skii Institut Skoroi Pomoshchi, Moscow, USSR). *Sovetskaia Meditsina*, no. 1, 1982, p. 3-7. 8 refs. In Russian.

The goal is to assess the diagnostic possibilities of computer systems and to establish criteria for myocardial ischemia using computer data. The computer is found to shorten the time required for the test and to eliminate subjectivism in the diagnosis. In many cases, the computer is able to detect the ischemia earlier than a standard EKG. Ischemia is indicated by changes in the ST integral from values of +7 and above and in the ST index from values of -0.68 and below. C.R.

A82-25808 † The combined use of sulfamonomethoxine and UV radiation in the treatment of chronic pneumonia (Kompleksnoe primeneniye sul'famonometoksina i UF-oblucheniia pri khronicheskoi pnevmonii). S. A. Matveeva (Riazanskii Meditsinskii Institut, Ryazan, USSR). *Sovetskaia Meditsina*, no. 12, 1981, p. 85-87. 19 refs. In Russian.

A82-25809 † Kinetics of lipid peroxidation in cellular organelle anoxia under different conditions (Kinetika perekisnogo oksleniia lipidov v kletochnykh organellakh, perenesshikh anoksiu v razlichnykh usloviakh). A. I. Dzhabarov (Akademii Nauk Azerbaidzhanskoi SSR, Institut Fiziologii, Baku, Azerbaidzhan SSR). *Biulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 92, Oct. 1981, p. 425-427. 11 refs. In Russian.

A82-25810 † Damage to the Ca²⁺-transporting system in the sarcoplasmic reticulum of the heart during emotional and nociceptive stress (Povrezhdenie Ca²⁺-transportiruiushchei sistemy sarkoplazmaticheskogo retikuluma serdtsa pri emotsional'no-bolevoem stresse). F. Z. Meerson, Iu. V. Arkhipenko, I. I. Rozhitskaia, and V. E. Kagan (Akademii Meditsinskikh Nauk SSSR; Moskovskii Gosudarstvennyi Universitet, Moscow, USSR). *Biulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 91, Apr. 1981, p. 405, 406. In Russian.

A82-25811 † Mitotic activity and chromosome aberrations in the regenerated liver of rats after irradiation by X rays (Mitoticheskaia aktivnost' i khromosomnye aberratsii v regeneriruiushchei pecheni krys posle rentgenovskogo oblucheniia). K. Kropacova and E. Misurova (Univerzita Pavla Jozeta Safarika, Kosice, Czechoslovakia). *Biulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 91, Mar. 1981, p. 359-361. 13 refs. In Russian.

A82-25812 † Regulation of heart rhythm in depressor baroreflex (Regulatsiia serdechnogo ritma pri depressornom barorefleksie). S. F. Dugin and E. A. Gorodetskaia (Akademii Meditsinskikh Nauk SSSR, Moscow, USSR). *Biulleten' Eksperimental'noi*

Biologii i Meditsiny, vol. 92, Oct. 1981, p. 387-389. 12 refs. In Russian.

It is noted that there is no consensus on the efferent mechanisms acting to increase the heart rate in depressor baroreflex. Experiments are carried out on unanesthetized cats 3-4.4 kg in weight in order to determine the dependence of the chronotropic reaction on the initial heart rate. It is found that the magnitude of this reaction depends on the spontaneous fluctuations in the original heart rate. C.R.

A82-25813 † Indicators of the erythrocytic system of rabbits in hot, humid climates (Pokazateli eritrotsitarnoi sistemy krolikov v usloviakh zharkogo viazhnogo klimata). A. N. Bulygin (Ivanovskii Meditsinskii Institut, Ivanovo, USSR), R. O. Fernández, and P. L. Souti (Habana, Universidad, Havana, Cuba). *Bulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 92, Oct. 1981, p. 394, 395. 8 refs. In Russian.

A82-25814 † Effects of whole-body vibration and noise on the toxicity and risk parameters of chemical substances (Vliianie obshchei vibratsii i shuma na parametry toksichnosti i opasnosti khimicheskikh veshchestv). R. Ia. Shterengarts and N. I. Solomatina. *Gigiena i Sanitariia*, May 1981, p. 86, 87. In Russian.

The effects of whole-body vibration and accompanying noise as found in transportation and manufacturing work environments on the toxicity and risk factors associated with the basic ingredients of exhaust gases are investigated. Experiments involved the exposure of animals to vibration at 4-63 Hz and 0.12-0.21 m/sec per sec and associated noise for 4 hours daily for a period of 2 months. Vibration and noise are found to decrease measured LD50 and CL50 for benzole, formaldehyde, SO₂ and NO₂ by 10-30%, while the thresholds for acute and chronic effects are decreased two- to six-fold, and more. The cumulation coefficient for the substances with cumulative properties (benzole, formaldehyde) is increased from 2 to 4 times by vibration and noise, most likely due to the slowing of toxin elimination processes. Results suggest the advisability of lowering maximum chemical exposure limits in vibration environments. A.L.W.

A82-25815 † Thermoregulation and morbidity in coal miners (Sostoianie termoregulatsii i zabolevaemost' gornorabochikh ugol'nykh shakht). L. M. Poliakh (Vostochnyi Nauchno-Issledovatel'skii Institut po Bezopasnosti Rabot v Gornoj Promyshlennosti, Kemerovo, USSR) and F. Kh. Zinger (Donetskii Nauchno-Issledovatel'skii Institut Gigeny Truda i Profzabolevaniy, Donetsk, Ukrainian SSR). *Gigiena i Sanitariia*, July 1981, p. 73, 74. In Russian.

The thermal status of coal miners is evaluated and compared with their morbidity experience. Measurements of skin temperature and visual-motor reaction time were made four times during a work shift: in the changing room, immediately before descent into the mine, after exit from the shaft, and after arrival at the changing room from the mine. Skin temperature is found to decline and reaction time to increase in proportion to the time spent in travelling to and from the mine on foot or in an unheated transport while wearing the mining outfit. Examination of morbidity statistics reveals a significantly greater proportion of respiratory diseases in miners transported to the shaft in an unheated transport than in those using a covered walkway, and a significant incidence of pyodermitis, which is attributed to both cooling and coal dust in the work environment. Results suggest the potential of heated transports and covered walkways in reducing miner morbidity and increasing productivity. A.L.W.

A82-25816 † Dose loads to personnel engaged in the preparation of radioisotope thickness gages (Dozovyie nagruzki personala, zaniatogo izgotovleniem radioizotopnykh tolshchinomerov). M. I. Kostenetskii (Zaporozhskaia Oblastnaia Sanepidstantsiia, Zaporozhe, Ukrainian SSR). *Gigiena i Sanitariia*, Aug. 1981, p. 69, 70. In Russian.

A82-25817 † Experience with the development and practical introduction of operational reference levels for radiation safety (Opyt razrabotki i prakticheskogo vnedreniia rabochikh kontrol'nykh urovnei radiatsionnoi bezopasnosti). A. V. Epishin (Gor'kov-

skaia Oblastnaia Sanepidstantsiia, Gorki, USSR). *Gigiena i Sanitariia*, Aug. 1981, p. 70-72. In Russian.

A82-25818 † Use of mathematical modeling for the determination of allowable quantities of chemical fibers in clothing (Ispol'zovanie matematicheskogo modelirovaniia dlia opredeleniia dopustimogo kolichestva khimicheskikh volokon v odezhde). K. A. Rapoport, S. F. Iokina, and E. V. Isaeva (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Gigiena i Sanitariia*, Aug. 1981, p. 46-48. In Russian.

A82-25819 † Effects of emotional stress in bus drivers (Vliianie emotsional'nogo napriazheniia u voditelei avtobusov). T. I. Akhmedov (Ukrainskii Institut Usovershenstvovaniia Vrachei, Kharkov, Ukrainian SSR). *Gigiena i Sanitariia*, May 1981, p. 75, 76. 7 refs. In Russian.

The effects of the nervous and emotional stresses encountered in operator activity on intersensory interactions are investigated in bus drivers of various levels of experience. Evaluations of subject optical, kinetic and auditory thresholds and the correlations between them were performed before and after the work shift in drivers exhibiting different motivational and emotional states. Results demonstrate the feasibility of using intersensory correlation levels and changes in them during the work shift in the evaluation of nervous and emotional fatigue, the assessment of readiness for specialized functions, and the development of optimal work-rest cycles. A.L.W.

A82-25820 † Biophysical methods for the study of ecosystems and the control of biosynthesis within them (Biofizicheskie metody issledovaniia ekosistem i upravleniia ikh biosintezom). I. A. Terskov (Akademiia Nauk SSSR, Institut Fiziki, Krasnoyarsk, USSR). *Akademiia Nauk SSSR, Sibirskoe Otdelenie, Izvestiia, Seriia Biologicheskikh Nauk*, Dec. 1981, p. 59-67. 95 refs. In Russian.

Work carried out in the period 1975-1980 concerning the organizational principles of cellular systems of various levels of complexity and technological means for their control is reviewed. Theoretical and experimental efforts included the development of steady-state biophysical systems performing high-rate biosynthesis studies of the development of open and closed ecosystems, and highly closed ecosystems containing man. Studies with practical applications involved the growth of high-protein hydrogen bacterial biomass as well as carboxidobacteria, iron-oxidizing bacteria, luminescent bacteria, and thermophilic blue-green algae, plant growth under high illumination, the growth of invertebrates in nonproportional flow cultures, the remote sensing of ecosystem conditions, and bathyphotometric sounding. Future efforts with practical applications are planned in the areas of the biophysical bases for biosynthesis control in cells and organisms, the homeostasis control, the construction of artificial ecosystems and biophysical systems for monitoring natural environments. A.L.W.

A82-25821 † Theoretical and experimental analysis of material turnover in a closed microecosystem. I - Construction of a mathematical model (Teoretiko-eksperimental'nyi analiz krugovorota veshchestva v zamknoiti mikroekosisteme. I - Postroenie matematicheskoi modeli). N. S. Abrosov, V. G. Gubanov, and B. G. Kovrov (Akademiia Nauk SSSR, Institut Fiziki, Krasnoyarsk, USSR). *Akademiia Nauk SSSR, Sibirskoe Otdelenie, Izvestiia, Seriia Biologicheskikh Nauk*, Dec. 1981, p. 68-75. 25 refs. In Russian.

A mathematical model of a simple closed microecosystem is developed which takes into account the dynamics of the fundamental elements limiting biological processes and the consumption of light energy, and may be used as a basis for experiments on an actual microcosm. The model considers a homogeneous ecosystem containing one type of producer (autotroph) and one type of reducer (heterotroph), which is capable of supporting the processes of biomass growth, respiration, and death and the mineralization of nonliving organic matter. Equations are formulated within the framework of the concept of systems with limiting factors. A.L.W.

A82-25822 † Equipment for artificial pulmonary ventilation and inhalation anesthesia (Apparaty iskusstvennoi ventilatsii legkikh i ingaliatsionnogo narkoza). R. I. Burlakov, Iu. S. Gal'perin, and A. I. Trushin (Vsesoiuznyi Nauchno-Issledovatel'skii Institut Meditsin-

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skogo Priborostroeniia, Moscow, USSR). *Meditsinskaia Tekhnika*, Mar.-Apr. 1981, p. 24-27. In Russian.

Equipment currently available for use in artificial pulmonary ventilation and inhalation anesthesia applications is reviewed. The artificial ventilation equipment may be divided into two categories: that intended for the provision of prolonged pulmonary ventilation, which utilize two energy sources for breath generation and control and show an increasing tendency to incorporate electronic measurement and control circuits, and that intended for short-term use during anesthesia or emergency resuscitation, which are also using electronic control to expand their functional capabilities. Inhalation anesthesia equipment is developing in the areas of improved measuring equipment and features assuring ease of operation, including portability and gas analysis. A.L.W.

A82-25823 † Diurnal rhythm of sleep and wakefulness in arctic suslik /*Citellus parryi*/ during summer season (Sutochanaia periodika sna i bodrstvovaniia u arkticheskogo suslika *Citellus parryi* v letnii period). I. E. Chepkasov (Akademiia Nauk SSSR, Institut Biologicheskikh Problem Severa, Magadan, USSR). *Zhurnal Evoliutsionnoi Biokhimii i Fiziologii*, vol. 17, Jan.-Feb. 1981, p. 77-80. 10 refs. In Russian.

A82-25824 † Effect of low ambient temperatures on sleep-wakefulness periodicity in lemming /*Dicrostonyx torquatus*/ (Vliianie nizkikh temperatur sredy na periodiku bodrstvovanie-son u lemminga *Dicrostonyx torquatus*). V. S. Sazonov (Akademiia Nauk SSSR, Institut Biologicheskikh Problem Severa, Magadan, USSR). *Zhurnal Evoliutsionnoi Biokhimii i Fiziologii*, vol. 17, July-Aug. 1981, p. 391-394. 17 refs. In Russian.

A82-25825 † Results of the treatment of patients with chronic bronchitis at health resorts in contrasting climatic zones during different seasons (Rezultaty kurortnogo lecheniia bol'nykh khronicheskim bronkhitom v kontrastnykh klimaticheskikh zonakh v razlichnoe vremia goda). D. A. Iakhontov (Novosibirskii Meditsinskii Institut, Novosibirsk, USSR). *Voprosy Kurortologii, Fizioterapii i Lechebnoi Fizicheskoi Kul'tury*, Sept.-Oct. 1981, p. 16-18. 5 refs. In Russian.

A82-26047 Cockpit automation and workload reduction - Too much of a good thing. C. Bulloch. *Interavia*, Mar. 1982, p. 263, 264.

Three important lines of inquiry in the area of cockpit automation and pilot workload reduction involve the definition and measurement of aircrew workload, the consideration of what is optimum workload, and examination of disadvantages of automation. Growing evidence indicates that people have multiple capacity pools of intellect that can be tapped simultaneously, particularly when the tasks performed by the brain are different in nature. Physiological tools such as infrared video cameras and electroencephalographs show that the eye and brain are stimulated by and respond to both internal and external events. Extensive automation tends to degrade the pilot's skills and may actually increase hazards for some aircraft. The chief driving force toward automation is not safety, but reduction of personnel costs. C.D.

A82-26228 Cardiorespiratory assessment of 24-hour crash-diet effects on altitude, +Gz, and fatigue tolerances. M. T. Lategola, P. J. Lyne, and M. J. Burr (FAA, Civil Aeromedical Institute, Oklahoma City, OK). *Aviation, Space, and Environmental Medicine*, vol. 53, Mar. 1982, p. 201-209. 30 refs.

The effects of crash dieting, defined as total abstinence from food but not water, on pilot tolerances to fatigue under a submaximum physical workload, simulated +Gz exposure and moderate altitude are investigated. Subjects medically qualified as pilots underwent physiological monitoring for hemodynamic and respiratory functions during 2 min of lower body negative pressure of -40 torr (equivalent to +2Gz), 118 min of exposure to a simulated altitude of 3810 m, and ergometry at 50 W for 6 min, all preceded or not by a 24-hour fast. Ten out of the 11 subjects maintained adequate blood oxygenation during altitude exposure and tolerated 2 min of LBNP at altitude and pedal ergometry after fasting or not

fasting, while a single subject experienced syncope during LBNP after fasting. Results suggest the advisability of warning general aviation pilots to avoid maneuvers with accelerations greater than +2Gz immediately after a total food fast of 24 h or more. A.L.W.

A82-26229 Physiological, biochemical, and performance responses to a 24-hour crash diet. E. A. Higgins, H. W. Mertens, J. M. McKenzie, and G. E. Funkhouser (FAA, Civil Aeromedical Institute, Oklahoma City, OK). *Aviation, Space, and Environmental Medicine*, vol. 53, Mar. 1982, p. 210-217. 26 refs.

The effects of a 24-h crash diet, during which no food is taken, on pilot task performance, and physiological and biochemical parameters are investigated. Twelve healthy but overweight male subjects, able to pass a Class III pilot medical examination, were monitored for hemodynamic parameters, blood and urinary composition and subjective fatigue and performed a series of multiple task performance tests while breathing a gas mixture equivalent to 3310 m altitude during 28 h of either fasting or a standardized eating regimen. Whereas no significant differences between fasting and control periods were found in heart rate, blood pressure, serum electrolytes, subjective fatigue and urinary excretion of K(+), epinephrine and norepinephrine, body temperatures were lower during fasting and serum glucose levels decreased. Hematocrit increased more for the crash diet than the normal, while urinary 17-ketogenic steroid excretion during sleep was less. Complex task performance showed no significant differences at low workloads, however performance was enhanced at medium and high workloads during fasting. A.L.W.

A82-26230 * Conditioned feeding suppression in rats produced by cross-coupled and simple motions. R. A. Fox (San Jose State University, San Jose, CA) and N. G. Dauntion (NASA, Ames Research Center, Moffett Field, CA). *Aviation, Space, and Environmental Medicine*, vol. 53, Mar. 1982, p. 218-220. 16 refs. Grant No. NCA2-OR-675-801.

Results are presented of an experiment on the induction of motion sickness in rats by the use of cross-coupled accelerations of magnitudes similar to those used in human experiments. Accelerations were produced in a seesaw apparatus with rotating disks supporting the animal cages mounted on each seesaw arm, and motion sickness was assessed according to the consumption of a sweet food previously offered to the animals immediately before the motion treatment. During a 1-hour test session 72 h after motion treatment and after a 24-h fast, rats having undergone cross-coupled vertical sinusoidal and rotational motion are observed to consume less food than those having experienced either type of motion alone, or no motion. The ordering of the conditioned suppressive feeding effects is consistent with the amounts of vestibular stimulation produced by the respective motions. The results support the existence of motion sickness effects in rats, even though they are unable to vomit. A.L.W.

A82-26231 Phenytoin - Ineffective against acute mountain sickness. R. L. Burse, M. Landowne, A. J. Young, and J. T. Maher (U.S. Army, Research Institute of Environmental Medicine, Natick, MA). *Aviation, Space, and Environmental Medicine*, vol. 53, Mar. 1982, p. 221-225. 26 refs.

A82-26232 Hemodynamic responses in orthostasis following 5 hours of sitting. E. Shvartz, R. C. Reibold, R. T. White, and J. G. Gaume (Douglas Aircraft Co., Long Beach, CA). *Aviation, Space, and Environmental Medicine*, vol. 53, Mar. 1982, p. 226-231. 39 refs.

The effects of a prolonged period of quiet sitting on hemodynamic responses during orthostasis are determined in light of the possible adverse effects of sitting fatigue on pilot performance. Subjects were administered an orthostatic test consisting of 20 min of quiet standing before and after 5 h of quiet sitting, and hemodynamic responses, including heart rate, blood pressure, stroke volume and calf and thigh blood flow, were recorded. During the 5-h sitting period, increases in blood pressure and total peripheral resistance are found, along with a decrease in calf blood flow and an increase in venous pooling in the calf. With respect to the pre-sitting orthostatic test, subjects exhibited decreased heart rate and cardiac output, increased pressure and total peripheral resistance, decreased calf blood flow and increased calf venous pooling during the second

test. Results demonstrate that prolonged sitting constitutes a mild orthostatic stress in which an increase in venous pooling is compensated by an increase in blood pressure, whereas the subsequent transition to standing elicits insufficient compensation resulting in a low cardiac output. A.L.W.

A82-26233 **G-tolerance enhancement - Straining ability comparison of aircrewmembers, nonaircrewmembers, and trained centrifuge subjects.** J. E. Whinnery (USAF, School of Aerospace Medicine, Brooks AFB, TX). *Aviation, Space, and Environmental Medicine*, vol. 53, Mar. 1982, p. 232-234. 9 refs.

A comparative study is presented of the abilities of fully trained aircrewmembers, nonaircrewmembers and trained centrifuge subjects to increase their acceleration tolerance by the use of a protective straining maneuver. Tolerances to +Gz acceleration were measured in 198 aircrewmembers, 131 nonaircrew and 27 trained acceleration subjects during relaxed gradual onset acceleration runs and gradual onset acceleration runs using straining maneuvers. Although no significant differences are found between the relaxed tolerances of any of the groups, the trained centrifuge subjects exhibited an approximately 1 G greater enhancement in straining tolerance over relaxed than both the nonaircrewmembers and the aircrewmembers, who included trained fighter, attack and reconnaissance pilots. It is suggested that significant enhancements in pilot acceleration tolerance may be achieved by specific G training, preferably during undergraduate pilot training. A.L.W.

A82-26234 **The wearing of hydrophilic contact lenses aboard a commercial jet aircraft. I - Humidity effects on fit.** W. G. Eng, L. K. Harada, and L. S. Jagerman (Eye Clinic, Alameda, CA). *Aviation, Space, and Environmental Medicine*, vol. 53, Mar. 1982, p. 235-238. 12 refs. Research supported by the Barnes-Hind Pharmaceutical Co.

The environmental conditions in a commercial jet aircraft cabin are evaluated in relation to possible changes in the fit of hydrophilic (soft) contact lenses during flight. Measurements of cabin pressure, humidity and temperature were made during a round-trip flight between Oakland, CA, and Honolulu, HI, concurrently with keratometer measurements of lens fit in seven subjects fitted with hydrophilic lenses. Data indicate the cabin environment to be essentially the same for both flights, with humidity declining from 47% to 11% shortly after takeoff, pressure declining immediately after takeoff, and temperature remaining constant. No significant differences in fit are found between subjects using and not using hydrating eyedrops. A moderate blurring and distortion of the projected pattern on the lens surface was observed, which is closely related to the change in cabin humidity. A.L.W.

A82-26235 **Increase in jammed word intelligibility due to training of listeners.** C. W. Nixon, R. L. McKinley, and T. J. Moore (USAF, Aerospace Medical Research Laboratory, Wright-Patterson AFB, OH). *Aviation, Space, and Environmental Medicine*, vol. 53, Mar. 1982, p. 239-244. 5 refs.

The occurrence of a learning process associated with the understanding of voice communications in the presence of jamming signals is investigated. Work intelligibility was measured as a function of time for naive subjects wearing standard flight helmets and oxygen masks and communicating through a standard aircraft intercommunication system under typical communication conditions, in the presence of simulated cockpit noise, and in the presence of a jamming signal in the simulated noise. Subject performance is observed to improve with time in each communications environment, requiring periods of approximately 75 min, 60 min and 300 min to reach a learning plateau in the baseline, additional noise, and noise with jamming environments, respectively. Performance is also observed not to deteriorate following a two-week period away from the task. Recommendations are made for further study of such factors as jammer-specific performance, fatigue effects, individual differences and training models and specifications. A.L.W.

A82-26236 **An introduction to disaster - Some considerations of a psychological nature.** T. J. Singer (U.S. Navy, Pacific Fleet, Naval Air Station North Island, CA). *Aviation, Space, and Environmental Medicine*, vol. 53, Mar. 1982, p. 245-250. 42 refs.

Literature dealing with the psychological reactions of victims and relief personnel to disaster is reviewed. Individual and group

reactions, which are most often adaptive and responsible rather than panicked or psychotic, can be divided into phases, including a period of impact, period of recoil and post-traumatic period. The specific reactions encountered range from anger, guilt, defensive psychological reactions, fear of insanity, abnormal behavior resulting from medical problems, and panic to long-term reactions affecting physical and mental health, and are often encountered in rescue workers as well as disaster victims. Experience with disasters and crisis intervention has suggested the effectiveness of psychological first aid in alleviating psychological distress and preventing long-term emotional problems, and has pointed out the potential value of planning for the provision of post-disaster crisis intervention and psychological support. A.L.W.

A82-26237 **Serial personality evaluations of repatriated U.S. Air Force southeast Asia POWs.** R. D. Wheatley (USAF, School of Aerospace Medicine, Brooks AFB, TX) and R. J. Ursano (University of the Health Sciences, Bethesda, MD). *Aviation, Space, and Environmental Medicine*, vol. 53, Mar. 1982, p. 251-257. 19 refs. USAF-supported research.

Preliminary results of psychometric evaluations of all 332 repatriated U.S. Air Force former prisoners of war in southeast Asia are presented. The repatriated POWs (RPWs), who were divided into groups captured before and after 1969, responded to a Minnesota Multiphasic Personality Inventory (MMPI) within a year of return and after a period of 5 years. Group MMPI profiles of the pre- and post-1969 RPW groups fell within normal limits on each of the clinical scales and resembled fairly closely those of a reference group of current aircrewmembers. Observations suggest, however, that the pre-1969 group deviated farther from normal than the post-1969 group, showing increased repression and denial and greater suspicion and distrust, and remained essentially unchanged in serial evaluations while the post-1969 group moved toward the aircrew standard. It is concluded that the pre-1969 RPWs, who had a significantly longer and harsher captivity experience, may be at increased risk for psychological distress. A.L.W.

A82-26238 **Syncope in aircrew.** W. H. Sledge (Yale University, New Haven, CT) and J. A. Boydston (USAF, School of Aerospace Medicine, Brooks AFB, TX). *Aviation, Space, and Environmental Medicine*, vol. 53, Mar. 1982, p. 258-265. 6 refs. AF Project 7755-18-08.

A study is reported of the role of psychosocial factors in the onset of various forms of syncope in aircrew members. Aircrew referred for medical evaluation as a result of fainting episodes and unrelated problems underwent a standardized psychiatric interview, psychological tests and a complete medical evaluation. Comparison of groups diagnosed as exhibiting vasovagal, micturition and miscellaneous syncopes with the controls indicates little differences in personality and character traits, although differences on the mental status examination suggest that both the vasovagal and micturition syncope patients were more prone to anxiety and increased defensiveness. Psychological tests indicate some slight nonspecific differences between the vasovagal and control patients and the micturition and control patients. The vasovagal patients tended to be more anxious about their job and evidence increased affective arousal around the time of the fainting episode relative to the controls and the micturition patients, who exhibited a greater frequency of antecedent illness. Psychological consequences of syncope are similar in the three groups. A.L.W.

A82-26239 **Clinical and experimental evidence for the use of hypothermia in decompression sickness.** E. H. Simmons, S. W. O'Driscoll, and J. A. Gamarra (Toronto East General and Orthopaedic Hospital; Toronto, University, Toronto, Canada). *Aviation, Space, and Environmental Medicine*, vol. 53, Mar. 1982, p. 266-268. 11 refs. Research supported by the Rehabilitation Foundation for the Disabled and Workmen's Compensation Board of Ontario.

Clinical experience and experimental data concerning the use of hypothermia in the treatment of decompression sickness is presented. The clinical material was provided in observations of cases of decompression sickness in workers during the construction of a sewer and subway. In certain severe cases, recompression alone was insufficient to relieve major manifestations of decompression sickness, and improvement occurred only after the application of at first regional, then general, hypothermia. Experiments involved the

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exposure of rabbits to pressures of 60 or 70 psi for one hour, followed by sudden decompression over 70 sec. Mortality rates approached 100% in untreated rabbits or rabbits placed in air at 0 C after decompression, while cooling in water at 3 C for a period of 4 min significantly reduced the mortality. Results support the use of hypothermia as an adjunctive mode of therapy for decompression sickness, and justify further experimental and clinical investigations. A.L.W.

A82-26240 Sarcoidosis in aircrew. A. J. C. Balfour (RAF, Institute of Pathology and Tropical Medicine, Aylesbury, Bucks., England). (*Joint Committee on Aviation Pathology, Scientific Session, 12th, Aylesbury, Bucks., England, Oct. 14-16, 1980.*) *Aviation, Space, and Environmental Medicine*, vol. 53, Mar. 1982, p. 269-272. 10 refs.

The prevalence of sarcoidosis in military aircrew involved in fatal aircraft accidents is discussed in light of the recent finding that sarcoidosis is frequently capable of causing collapse and sudden death. Examination of the prevalence of sarcoid-like granulomata upon autopsy of aircraft accident fatalities reveals the lesions to be present in 3.06% of military aircrew, but only 1.4% and 1.03% of civil pilots, and passengers and glider pilots, respectively. When compared with the clinical incidence of sarcoidosis, the postmortem prevalence seems high, particularly in aircrew, however may be explained in part by the presence of subclinical disease. In the 13 accidents with sarcoid-like granulomata found at autopsy, seven may have been caused by pilot incapacitation, a consequence of 5-10% of all cases of sarcoidosis. The association between sarcoidosis and fatal accidents may then be causal, a result of predisposing factors in aviation to the development of the disease, or a chance finding. A.L.W.

A82-26241 The diving response in clinical medicine. B. A. Booden (Queen's Medical Centre, Nottingham, England; Repatriation General Hospital, Daw Park, Australia). *Aviation, Space, and Environmental Medicine*, vol. 53, Mar. 1982, p. 273-276. 42 refs.

The diving response has seen application in recent years to the therapeutic treatment of paroxysmal supraventricular tachycardia and the investigation of autonomic nervous system dysfunction, however its use has been limited due to user uncertainties. The present paper reviews current knowledge of the factors influencing the diving response in man, procedures for optimizing its clinical effectiveness and the relation of the response to evoked and pre-existing arrhythmias. The diving response depends upon features of breath-holding and face immersion, as well as general personal factors. It is best induced with the patient in a relaxed condition, with breath held for a period of 20 to 30 sec while the face is immersed in water at 20 to 10 C. Cardiac arrhythmias experienced during the diving response have included nodal rhythm, atrial and ventricular ectopic beats, escape beats and idioventricular rhythm, although none has been known to be irreversible or fatal. Evidence thus indicates that the procedure is safe, however it would be wise to use it with resuscitation facilities available. A.L.W.

A82-26242 Follow-up of 14 abnormal electroencephalograms in asymptomatic U.S. Air Force Academy cadets. W. D. Everett and M. S. Akhavi (USAF, School of Aerospace Medicine, Brooks AFB, TX). *Aviation, Space, and Environmental Medicine*, vol. 53, Mar. 1982, p. 277-280. 8 refs.

The paper reports a 10-15 year follow-up study of 14 former U.S. Air Force Academy cadets disqualified from flight training on the basis of electroencephalogram abnormalities. The individuals were identified as having Mayo Classification Grade III dysrhythmias, including focal or diffuse spikes, sharp waves or spike slow wave complexes, upon the screening of 2947 asymptomatic cadets from 1965 through 1969. The observed EEG abnormalities are not correlated with a past history of head trauma. In the 10-15 years following detection, none of the subjects developed a seizure disorder. Results thus do not provide justification for the current military practice of disqualifying asymptomatic individuals on the basis of abnormal EEG patterns alone, as the incidence of seizures in this population is quite low. A.L.W.

A82-26243 Tennis elbow in aviators. R. W. Farr (U.S. Navy, San Francisco, CA). *Aviation, Space, and Environmental Medicine*, vol. 53, Mar. 1982, p. 281, 282. 5 refs.

Three cases of lateral epicondylitis (tennis elbow) in aviators are described, and the symptomatology, etiology, treatment and prevention of the disorder are discussed. The presenting complaint of lateral epicondylitis is lateral elbow pain sometimes radiating down to the wrist, and the disorder is seen to develop in individuals performing activities involving repeated flexion and extension of the wrist against resistance, or repeated pronation and supination of the forearm with the elbow extended. Relief of symptoms can usually be achieved with conservative therapy, including a limitation of hand motion, splints, salicylates, steroid injections and isometric exercise. In the three case histories presented, two were attributed to duties involving flight operations, and symptoms were alleviated by a temporary suspension from flight operations, coupled, in one case, by changes in biomechanical modalities of performing the aggravating motion. A.L.W.

A82-26522 † The physiology and hygiene of the individual protection of man from the cold (Fiziologiya i gigiena individual'noi zashchity cheloveka ot kholoda). V. S. Koshcheev. Moscow, Izdatel'stvo Meditsina, 1981. 288 p. 388 refs. In Russian.

The hygienic and normal and pathological physiological aspects of the development and evaluation of equipment for the individual protection of man from the cold as encountered in polar and underwater environments are discussed. The physiological characteristics of heat exchange under conditions of cooling are examined, with attention given to thermoregulatory responses to whole-body and local cooling, the optimal and allowable thermal conditions for work in the cold, physiological limits to cooling, and means for the rapid normalization of thermal condition following cooling. Biotechnological questions of individual protection from the cold are then considered, including the construction and use of everyday winter clothing, individual protective systems and protective systems with supplemental heating, and the protection of the face and respiratory organs during work in the cold, and protective equipment for work in the cold is presented. A.L.W.

A82-26525 † Pathological anatomy and ultrastructure of the heart /Combined morphological investigation of the general pathological process in the myocardium/ (Patologicheskaya anatomiya i ul'trastruktura serdtsa /Kompleksnoe morfologicheskoe issledovanie obshchepatologicheskogo protessa v miokarde/). L. M. Nepomniashchikh (Akademii Meditsinskikh Nauk SSSR, Novosibirsk, USSR). Novosibirsk, Izdatel'stvo Nauka, 1981. 324 p. 730 refs. In Russian.

The morphogenesis, pathological anatomy and ultrastructural manifestations of myocardial pathologies are examined on the basis of light, polarization and electron microscopy, and stereological, and histochemical studies. Following a review of contemporary methods for the structural and histochemical study of the heart, results of electron microscopic, histochemical and stereometric studies of the normal heart and its development are presented. Attention is also given to cardiac morphology in models of localized myocardial damage, experimental myocardial infarction, experimental atherosclerosis and ischemic heart disease. The structural bases of the adaptive and compensatory responses in the development of general cardiac pathology are then discussed in relation to parenchymatous-stromal-microcirculatory interrelations. A.L.W.

A82-26547 † Systemic brain activity /Experimental investigation/ (Sistemnaya deiatel'nost' mozga /Eksperimental'noe issledovanie/). N. A. Shustin. Leningrad, Izdatel'stvo Nauka, 1980. 104 p. 180 refs. In Russian.

The book represents a synthesis of experimental investigations and literature data concerning the organization of the integrative functions of the brain during conditioned reflex activity as a model of more complex forms of systemic activity. Experiments involved the study of conditioned motor reflexes in the dog to the relations between two stimuli presented either simultaneously or in sequence, and the effects of the removal of the frontal lobe on the formation of these reflexes. The activities of the motion analyzer, stimulus properties, and the motor and secretory components is discussed, together with the role of the prefrontal lobes in the organization of the response. A.L.W.

A82-26550 † Physics and biology (Fizika i biologiya). M. V. Vol'kenshtein. Moscow, Izdatel'stvo Nauka, 1980. 152 p. 46 refs. In Russian.

Important problems in contemporary biological physics are discussed. Following a review of the historical development of biophysics as the branch of science concerned with the study of life based on the laws and methods of experimental physics, consideration is given to the fundamental principles of physics and chemistry, the properties of electron waves, strong and weak molecular interactions, and the physics of macromolecules. The fields of molecular biophysics and molecular biology are discussed, and questions of protein biosynthesis and the genetic code, cellular biophysics and bioenergetics, thermodynamics and information theory in biology, the physical and mathematical modeling of biological processes and biological development are examined.

A.L.W.

A82-26582 * **Plant response to solar ultraviolet radiation.** M. M. Caldwell. In: *Physiological plant ecology I*. Berlin, Springer-Verlag (Encyclopedia of Plant Physiology New Series. Volume 12 A), 1981, p. 169-197. 82 refs. NASA-sponsored research.

Plant reactions and mechanisms of reaction to solar UV radiation are reviewed, along with characteristics of plants which enhance UV tolerance. Wavelength regions to which proteins are particularly sensitive are examined and the possibility of synergistic effects from photoreactions to multiple wavelengths is considered, along with available evidence of nonadditive plant spectral responses to UV radiation. Decreases in atmospheric ozone content are explored in terms of UV wavelengths which would increase with the ozone decreases, particularly for UV-B, which depresses photosynthesis and would increase 1% with a 16% reduction of stratospheric ozone. Higher elevations are projected to display effects of increased UV incident flux first, and global distributions of UV increases due to atmospheric inhomogeneity and water surface clarity are examined. Finally, the response of plant nucleic acids, DNA, chlorophyll to enhanced UV are described, along with repair, avoidance, and optical mechanisms which aid plant survival.

M.S.K.

A82-26583 * **A model for protocellular coordination of nucleic acid and protein syntheses.** S. W. Fox (Miami, University, Coral Gables, FL). (*International Society for the Study of the Origin of Life, Symposium on Biochemical Evolution of the Genetic Apparatus, Potsdam, NY, July 2, 1980.*) In: *Science and scientists*. Tokyo, Japan Scientific Societies Press, 1981, p. 39-45. 41 refs. Grant No. NGR-10-007-008.

The proteinoid model for the coordination of protein synthesis with nucleic acid coding within the evolving protocell is discussed. Evidence for the self-ordering of amino acid chains, which would enhance the catalytic activity of a lysine-rich proteinoid, is presented, along with that for the preferential formation of microparticles, particularly proteinoid microparticles, in various solutions. Demonstrations of the catalytic activity of lysine-rich proteinoids in the synthesis of peptide and internucleotide bonds are pointed out. The view of evolution as a two stage sequence in which the geological synthesis of peptides evolved to the protocellular synthesis of peptides and oligonucleotides is discussed, and contrasted with the alternative view, in accord with the central dogma, that nucleic acids arose first then governed the production of proteins and protocells.

A.L.W.

A82-26589 * **Copolyamino acid fractionation and protobiochemistry.** S. W. Fox (Miami, University, Coral Gables, FL). *Journal of Chromatography*, vol. 215, 1981, p. 115-120. 39 refs. Grant No. NGR-10-007-008.

Investigation of the origins of living things by the uniquely appropriate method of successive approximation in attempted retracement of steps in molecular evolution has yielded: a comprehensive theoretical flowsheet from archaic inanimate matter to an infrastructured, microscopic, protoreproductive, protometabolic protocell; a laboratory model of the same; and an explanatory assessment of the natural variation component of Darwinian evolution. For each of these, the significance is dependent upon awareness of the intrinsic tendency of amino acids, in mixed sets, to order themselves. Without such awareness, it is believed these vistas would have been delayed for decades. Selfordering would have in turn been difficult to recognize and support were it not for the chromatographic developments in fractionation of copolyamino acids. (Author)

A82-26596 * **Models for protocellular photophosphorylation.** P. R. Bahn and S. W. Fox (Miami, University, Coral Gables, FL). *BioSystems*, vol. 14, 1981, p. 3-14. 69 refs. Grant No. NGR-10-007-008.

Several photoreactions for transducing light energy have been analyzed for their relevance as models for protocellular photophosphorylation. Inorganic ions and compounds could have played a role in protocellular photophosphorylation. Organic catalysts may have been the next significant agents used by protocells for photophosphorylation. Membranous photophosphorylation probably became the most recent type of photoenergy transduction to be acquired by protocells; it is still used by modern cells although components of the other types of phosphorylation are found in present day cells. Recorded yields of energy-rich phosphates from the model reactions discussed are small. Arguments are advanced that such yields could have been sufficient to have fueled protocellular metabolism, which was probably very slow compared to modern cellular metabolism. Future prospects for research in this area are discussed. (Author)

A82-26597 * **Formation of peptides from amino acids by single or multiple additions of ATP to suspensions of nucleoproteinoid microparticles.** T. Nakashima and S. W. Fox (Miami, University, Coral Gables, FL). *BioSystems*, vol. 14, 1981, p. 151-161. 47 refs. Grant No. NGR-10-007-008.

The synthesis of peptides from individual amino acids or pairs of amino acids and ATP in the presence of catalysis by nucleoproteinoid microparticles is investigated. Experiments were performed with suspensions formed from the condensation of lysine-rich and acidic proteinoids with polyadenylic acid, to which were added glycine, phenylalanine, proline, lysine or glycine-phenylalanine mixtures, and ATP either at once or serially. Peptide yields are found to be greatest for equal amounts of acidic and basic proteinoids. The addition of imidazole is found to alter the preference of glycine-phenylalanine mixtures to form mixed heteropeptides rather than homopeptides. A rapid ATP decay in the peptide synthesis reaction is observed, and a greater yield is obtained for repeated small additions than for a single addition of ATP. The experimental system has properties similar to modern cells, and represents an organizational unit ready for the evolution of associated biochemical pathways.

A.L.W.

A82-26602 * **Effects of ultraviolet-B irradiances on soybean. IV - Leaf ontogeny as a factor in evaluating ultraviolet-B irradiance effects on net photosynthesis.** A. H. Teramura (Maryland, University, College Park, MD) and M. M. Caldwell (Utah State University of Agriculture and Applied Science, Logan, UT). *American Journal of Botany*, vol. 68, Aug. 1981, p. 934-941. 26 refs. Contract No. NAS9-14871.

A82-26611 **Identification of the human operator in a closed-loop system (Identifikatsiia na cheloveka-operator v zatvorena sistema za upravlenie).** I. P. Popchev, I. D. Zaprianov, and K. I. Tropolov (B'lgarska Akademiia na Naukite, Institut po Tekhnicheska Kibernetika i Robotika, Sofia, Bulgaria). *Problemi na Tekhnicheskata Kibernetika i Robotikata*, vol. 13, 1981, p. 18-26. 12 refs. In Bulgarian.

The paper describes the synthesis of a nonlinear mathematical model of the human operator, viewed as a dynamic plant in a closed-loop system. The approach is based on a functional representation with Volterra-Wiener series. After two-step identification, a second-order nonlinear model is synthesized, with a significantly wider range of sufficiency than in quasi-linear models. As an example, the procedure is applied to the simulation of a one-dimensional system for the control of dynamic objects. B.J.

A82-26751 † **The sensitivity of silent and spontaneously active cat cerebral cortex neurons to anoxia (Chuvstvitel'nost' 'molchashchikh' i fonovoaktivnykh neuronov kory mozga koshki k anoksii).** M. O. Samoilov, D. G. Semenov, N. G. Iarantsev, and S. A. Evdokimov (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 68, Jan. 1982, p. 3-8. 20 refs. In Russian.

Changes in the bioelectrical activity and redox state of both

silent and spontaneously active neurons of the cat motor cortex with the onset of anoxia are investigated. Experiments involved the use of simultaneous morphophysiological and spectrophotometric studies of single pyramidal cells combined with *in vivo* microscopy under conditions of normal and interrupted oxygen supply. Neuron activation by a seizure discharge upon anoxia is observed to be accompanied by a well-defined, marked disturbance in the intracellular redox system, particularly in the silent cells. In contrast, the spontaneously active cells exhibited no noticeable increase in degree of reduction during the initial stages of the change in impulse activation associated with anoxia. A.L.W.

A82-26752 † The state of alpha 1- and beta 1-adrenergic reactions upon cold acclimatization (Sostoianie alpha 1- i beta 1-adrenergicheskikh reaktsii pri akklimatsii k kholodu). V. I. Sobolev and N. Dingamar (Donetskii Gosudarstvennyi Universitet, Donetsk, Ukrainian SSR). *Fiziologicheskii Zhurnal SSSR*, vol. 68, Jan. 1982, p. 34-38. 7 refs. In Russian.

Changes in adrenergic mechanisms not connected with thermogenesis which occur upon cold acclimatization are investigated in a study of the reactions mediated by the alpha 1- and beta 1-adrenergic adrenoceptors in acclimatized rats. Whereas no differences are observed in the quantitative relation between alpha and beta adrenoceptors in the vas deferens of acclimated and control male rats, acclimatization is observed to increase the affinity of the alpha receptors for nonadrenaline without increasing the maximum possible intensity of the adrenergic process. The prolonged effects of cold are also observed to produce an enhancement in cardiac adrenergic response with an elevation in cardiac affinity for the beta-agonist isadrine. A.L.W.

A82-26753 † Some physiological mechanisms for the effects of the hypothalamus on erythron (O nekotorykh fiziologicheskikh mekhanizmaxh vliianiia gipotalamusa na eritron). O. I. Moiseeva, I. K. Klemina, and V. M. Alekseev (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 68, Jan. 1982, p.39-44. 15 refs. In Russian.

Mechanisms of the influence of hypothalamic activity on circulating erythrocytes, erythrocyte precursors and erythrocyte production are studied in experiments involving the electrical stimulation of various hypothalamic structures of the rabbit. Stimulation of the anterior hypothalamus is found to produce a decrease in blood reticulocyte number and hematocrit, together with a redistribution of intrarenal blood flow indicative of reduced blood supply to the entire renal cortex. Posterior hypothalamic stimulation on the other hand leads to an increase in blood reticulocyte content, and an isolated increase in blood supply to the cortical nephron glomeruli. Changes in plasma erythropoietic activity are not observed. Data suggest hypothalamic effects on hemodynamics, particularly in the blood-forming and erythropoietin-producing organs, as a possible means for the influence of the hypothalamus on erythron. A.L.W.

A82-26754 † Oxygen, carbon dioxide and the calcium control of relaxation mechanisms in cerebral artery smooth muscles (Kislorod, uglekislota i kal'tsievii kontrol' mekhanizmov rasslableniia v gladkoi muskulature arterii golovnogo mozga). A. L. Azin (Sverdlovskii Gosudarstvennyi Meditsinskii Institut, Sverdlovsk, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 68, Jan. 1982, p. 59-63. 19 refs. In Russian.

The role of calcium ion control mechanisms in the relaxation of the smooth muscle cells of the cerebral arteries in response to oxygen insufficiency and excess carbon dioxide is investigated. Experiments were carried out on isolated strips of human internal carotid artery perfused with saline solution at oxygen tensions down to 20 mm Hg and CO₂ tensions up to 50-60 mm Hg. Measurements of muscular tonus upon the addition of the inhibitors of cellular calcium exchange verapamil and manganese ions reveal a complete suppression of the relaxation response to hypoxic and hypercapnic stimuli, while sodium nitroprusside partially maintained the response and intensified the reaction to CO₂. Inhibition of the intracellular calcium pump by dichlorodiphenyltrichloromethyl methane is also observed to reduce the relaxation effect. Results indicate that the responses to both stimuli induce, to different extents, the inhibition of Ca²⁺ influx into smooth muscle cells and activate the intracellular calcium pump. A.L.W.

A82-26755 † The effects of systemic arterial and venous pressures on blood volume in the cerebral vessels (Vliianie sistemnogo arterial'nogo i venoznogo davlenii na ob'em krovi v sosudakh golovnogo mozga). G. I. Mchedlishvili, N. V. Sikharulidze, M. L. Itkis, and S. Januszewski (Akademiia Nauk Gruzinskoi SSR, Institut Fiziologii, Tiflis, Georgian SSR; Polish Academy of Sciences, Experimental and Clinical Medicine Centre, Warsaw, Poland). *Fiziologicheskii Zhurnal SSSR*, vol. 68, Jan. 1982, p. 64-71. 17 refs. In Russian.

A82-26756 † The role of calcium in the activity of the smooth muscles of the pulmonary veins (Rol' kal'tsiia v deiatel'nosti gladkikh nyshts legochnykh ven). S. V. Molchanov (Sverdlovskii Gosudarstvennyi Meditsinskii Institut, Sverdlovsk, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 68, Jan. 1982, p. 79-83. 13 refs. In Russian.

A82-26757 † Characteristics of lipid hydrolysis and absorption in rats under motor activity restriction (Osobennosti gidroliza i vasyvaniia lipidov, u krysv pri ogranichenii dvigatel'noi aktivnosti). K. V. Smirnov, V. S. Nesterenko, I. L. Medkova, and L. V. Koroleva. *Fiziologicheskii Zhurnal SSSR*, vol. 68, Jan. 1982, p. 107-111. 9 refs. In Russian.

Changes in gastrointestinal lipolytic enzyme dynamics, the fundamental bile components involved in lipid transport and processes of fat absorption during hypokinesia are investigated in rats constrained to small volumes for various lengths of time. Analysis of bile composition, pancreatic lipase activities in the blood plasma, pancreas and small intestinal mucosa, monoglyceridlipase activities in the small intestinal mucosa and acid fatty acid absorption reveals the presence of a compensatory adaptive reorganization in cavity and membrane lipid hydrolysis and absorption after 20 and 30 days of motor restriction. Hypokinesia for a greater period of time (60 days) leads to a significant reduction in cavity lipid hydrolysis and the rate of triglyceride absorption. A.L.W.

A82-26776 The transfer of failure-detection skills between monitoring and controlling dynamic systems. C. J. Kessel and C. D. Wickens (Illinois, University, Urbana, IL). *Human Factors*, vol. 24, Feb. 1982, p. 49-60. 21 refs. Contract No. F44620-76-C-0009.

Eighteen subjects either controlled or monitored the system dynamics of a two-dimensional pursuit display. Detection of changes in system dynamics was faster and more accurate when subjects controlled than when they monitored. The skill acquired by controlling transferred positively to the monitoring mode, producing enhanced detection performance. There was no transfer from the monitoring mode to the controlling mode. Monitors of automatic systems who have had prior manual experience rely upon different perceptual cues in making their detection response than do those who have had no experience. The training implications of these findings are discussed. (Author)

A82-26777 Pilot judgment - Training and evaluation. R. S. Jensen (Ohio State University, Columbus, OH). *Human Factors*, vol. 24, Feb. 1982, p. 61-73. 23 refs. FAA-sponsored research.

The possibility of defining, teaching, and evaluating pilot judgment is considered, noting that faulty decision making comprises the cause of over half of all fatal air accidents. Judgment is a term covering a range of activities with spontaneous motor reflexes on one end and cognitive decisions at the other, differing mainly in time to reaction. A definition is offered which includes an information search of all alternatives and making an authoritative choice and subsequent action. Signal detection theory is suggested as a means to improve pilot judgment behavior by separating the stimulus into sensitivity and response modes. Instruction then becomes a period of observing correct decision-making actions by an expert to establish correct levels of sensitivity and response parameters. Methods of computer-assisted training and flight simulation are reviewed, and techniques for standardizing flight judgment evaluations are provided. M.S.K.

A82-26798 † Bioengineering approach to the study of the oculomotor apparatus of the human visual analyzer (Biotekhnikhskii podkhod k issledovaniiu glazodvigatel'nogo apparata zritel'-

nogo analizatora cheloveka). V. F. Ananin. *Problemy Bioniki*, no. 27, 1981, p. 88-93. 9 refs. In Russian.

The human oculomotor system is examined as a biological variant of a multiloop system, in which the regulation of each type of eye movement is accomplished in the frame of its own loop which is autonomous to some degree. Four such loops are postulated: voluntary, voluntary reflexive, involuntary, and tonic. The first three loops are formed by physical messages of nerve impulses, while the tonic loop is formed by a type of innervation. A diagram is presented illustrating the proposed regulation scheme for horizontal eye movements. B.J.

A82-26799 † Model of the mechanism of the regulation of the human cardiovascular system. I - Concerning the heart-regulation mechanism (Model' mekhnazma reguliatsii serdechno-sosudistoi sistemy cheloveka. I - O mekhanizme reguliatsii serdtsa). V. F. Ananin. *Problemy Bioniki*, no. 27, 1981, p. 93-103. 7 refs. In Russian.

The human heart-regulation system is considered as a 10-loop automatic control system. The various loops are associated with intracardiac afferent systems, reflexogenic zones, the sympathetic nervous system, the parasympathetic system, and hormones of the hypothalamo-hypophysial complex. This regulation scheme is found to be suitable for EKG interpretation, where the QRS complex is associated with the ventricles. B.J.

A82-26812 * Modulation of human sinus node function by systemic hypoxia. D. L. Eckberg, H. Bastow, III, and A. E. Scruby (U.S. Veterans Administration Medical Center; Virginia, Medical College, Richmond, VA). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 52, Mar. 1982, p. 570-577. 44 refs. Research supported by the U.S. Veterans Administration and Iowa Lung Association; Grants No. NIH-HL-22546; No. NIH-HL-22296; No. NsG-9063.

The present study was conducted to determine whether bradycardia develops during systemic hypoxia in supine conscious human volunteers when respiratory frequency and tidal volume are maintained at constant levels. The obtained results suggest that mild hypoxia provokes cardioacceleration in humans, independent of changes of ventilation or baroreflex responsiveness. The earliest cardioacceleration is more prominent in the inspiratory than in the expiratory phase of respiration, and occurs with very small reductions of arterial oxygen saturation. Moderate systemic hypoxia dampens fluctuations of heart rate during the respiratory cycle. G.R.

A82-26813 Effect of breathing patterns on the perceived magnitude of added loads to breathing. K. J. Killian, E. J. M. Campbell (McMaster University, Hamilton, Ontario, Canada), and D. D. Bucens. *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 52, Mar. 1982, p. 578-584. 30 refs. Research supported by the Medical Research Council of Canada.

Recently, studies using open magnitude scaling have shown that the perceived magnitude of externally added loads to breathing follows a predictable relationship in which the psychological magnitude grows as a power function of the added loads. The present investigation has the objective to elucidate the nature of load sensation, taking into account the effects of flow rate, tidal volume, pressure, and inspiratory duration on the perceived magnitude of a range of added resistive and elastic loads to breathing. It is found that the perceived magnitude of externally added loads to breathing is directly dependent on the inspiratory muscle force developed and its duration, and indirectly on the added load. G.R.

A82-26814 Ventilatory adaptations to resistive loading during wakefulness and non-REM sleep. C. Iber, A. Berssenbrugge, J. B. Skatrud, and J. A. Dempsey (Wisconsin, University; U.S. Veterans Administration Hospital, Madison, WI). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 52, Mar. 1982, p. 607-614. 33 refs. Research sponsored by the U.S. Veterans Administration.

It is pointed out that the interpretation of timing and ventilatory responses to loading during anesthesia may be complicated by alterations in pulmonary and chest wall mechanics. The present study uses, therefore, sleep as a more physiological model for examining load-compensating mechanisms during reduced suprapontine input. The results of the study demonstrate that the ability to defend minute ventilation in response to sustained loading is reduced

in sleep as compared to wakefulness and that arousal may be a ventilatory compensation to inspiratory resistance in sleep. G.R.

A82-26815 Arterial CO₂ response to low levels of inspired CO₂ in awake beagle dogs. P. Reischl and D. M. Stavert (California, University, Irvine, CA). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 52, Mar. 1982, p. 672-676. 27 refs. Research supported by the Electric Power Research Institute and Southern California Edison Co.

A study conducted by Reischl et al. (1980) has shown that 1% inspired CO₂ with a partial pressure of 7 torr administered at sea level to awake beagle dogs results in an increased end-tidal CO₂ pressure detectable with repeated measures of end-expiratory CO₂. The present investigation extends the work on low-level CO₂ inhalation to include arterial blood gases in the trained awake dog with an intact airway and an exteriorized carotid arterial loop. An examination is conducted of the steady-state arterial CO₂ pressure during control and 1% CO₂ inhalation periods, and results obtained by end-tidal measurements are compared. It is felt that the normal response in dogs to low levels of CO₂ inhalation is hypercapnic. None of the various mechanisms which have been proposed to account for the isocapnic response to low levels of CO₂ inhalation appears to play a significant role in the present study. G.R.

A82-26816 * Recovery time course in contractile function of fast and slow skeletal muscle after hindlimb immobilization. F. A. Witzmann, D. H. Kim, and R. H. Fitts (Marquette University, Milwaukee, WI). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 52, Mar. 1982, p. 677-682. 30 refs. Grant No. NIH-AM-22037; Contract No. NAS9-15711.

The present study was undertaken to characterize the time course and extent of recovery in the isometric and isotonic contractile properties of fast and slow skeletal muscle following 6 wk of hindlimb immobilization. Female Sprague-Dawley rats were randomly assigned to an immobilized group or a control group. The results of the study show that fast and slow skeletal muscles possess the ability to completely recover normal contractile function following 6 wk of hindlimb immobilization. The rate of recovery is dependent on the fiber type composition of the affected muscle. G.R.

A82-26817 Respiratory and inert gas exchange during high-frequency ventilation. H. T. Robertson, R. L. Coffey, T. A. Standaert, and W. E. Truog (Washington, University, Seattle, WA). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 52, Mar. 1982, p. 683-689. 21 refs. Research supported by the University of Washington; Grant No. NIH-HL-05777.

An investigation was conducted to compare inert and respiratory gas exchange during conventional ventilation (CV) and high-frequency ventilation (HFV). The extensive intraregional gas movement which appears to occur during HFV may cause changes in gas exchange efficiency secondary to the properties of the inspired gas mixture. The investigation included, therefore, a study of the influence of alterations in carrier gas density on gas exchange during HFV. Thirteen mongrel dogs were used in the investigation. On the basis of the information obtained in the present study and in other studies of HFV, a number of proposals concerning pulmonary gas exchange are advanced. G.R.

A82-26818 Thermoregulatory responses in the rat to exercise in the heat following prolonged heat exposure. R. Francesconi, R. Hubbard, and M. Mager (U.S. Army, Research Institute of Environmental Medicine, Natick, MA). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 52, Mar. 1982, p. 734-738. 23 refs.

A82-26819 Instrumentation simultaneously measuring carbon dioxide excretion and oxygen uptake in humans using titration methods. C. M. Tsoi, D. B. Raemer, and D. R. Westenskow (Utah, University, Salt Lake City, UT). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 52, Mar. 1982, p. 786-791. 10 refs. Grant No. NIH-GM-23095.

Continuous measurement of whole-body metabolism by indirect calorimetry is a useful procedure in intensive clinical medical care

and physiological research. Attention is given to an instrument, the Nutrimeter, which combines a technique for oxygen uptake determination using the replenishment principle with the new technique of absorption-titration for carbon dioxide excretion measurement. Measurement of these two parameters combined with an estimate of N₂ production makes it possible to conduct indirect calorimetric measurements simply, accurately, and dynamically. A description of the Nutrimeter is provided, and a theoretical analysis of the carbon dioxide excretion measurement technique is performed. G.R.

A82-26865 Athermal submillimeter-microwave biological effects. L. S. Taylor (U.S. Navy, Naval Surface Weapons Center, Silver Spring, Maryland, University, College Park, MD). In: *Lasers '80; Proceedings of the International Conference, New Orleans, LA, December 15-19, 1980.* McLean, VA, STS Press, 1981, p. 133-136. 18 refs.

There is no argument about the dangers of exposure to high level microwave fields, that is, fields which cause energy absorption rates large compared to metabolic rates. Such fields produce effects, notably cataracts, due to simple heating, by absorption of energy in tissue water molecules. Exposure to high-level fields is relatively rare. In connection with widespread exposure to low-level fields, the possibility has been considered of athermal biological effects due to selective coherent excitation of biological molecules. Questions regarding coherent interactions are investigated, and attention is given to experimental evidence. It is found that athermal biological effects are conceptually possible. Experimental difficulties prevent, however, currently the demonstration of microwave phenomena at the molecular level. G.R.

A82-26924 * Radiographic evidence of disuse osteoporosis in the monkey (*M. nemestrina*). D. R. Young (NASA, Ames Research Center, Biomedical Research Div., Moffett Field, CA) and V. S. Schneider (Public Health Service Hospital, San Francisco, CA). *Calcified Tissue International*, vol. 33, 1981, p. 631-639. 15 refs.

Radiological techniques were utilized for monitoring progressive changes in compact bone in the tibia of monkeys during experimentally induced osteopenia. Bone mass loss in the tibia during restraint was evaluated from radiographs, from bone mineral analysis, and from images reconstructed from gamma ray computerized tomography. The losses during 6 months of restraint tended to occur predominantly in the proximal tibia and were characterized by subperiosteal bone loss, intracortical striations, and scalloped endosteal surfaces. Bone mineral content in the cross section of the tibia declined 17-21%. In 6 months of recovery, the mineral content of the proximal tibia remained depressed. (Author)

A82-27096 # Orientation perception during aircraft coordinated turns. J. Borah (Gulf and Western Applied Science Laboratories, Waltham, MA) and L. R. Young (MIT, Cambridge, MA). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0258.* 7 p. 11 refs. Contract No. F33615-78-C-0062.

Effective design of aircraft simulator devices requires an understanding of how aircraft motions are perceived. Perceptual responses previously have not been quantified for several roll maneuvers, including the coordinated turn. Psychophysical measurements of subjective roll and pitch orientation as well as roll angular velocity sensations, in the absence of visual cues, were made during coordinated turns and uncoordinated rolls on the Air Force Total-In-Flight Simulator (TIFS). The pattern of orientation illusions can be explained in terms of the biological sensory mechanisms, and is compared to the predictions of an optimal estimator model for human dynamic spatial orientation. (Author)

A82-27222 * Simplicity in command and control systems - A human factors consideration. R. L. Chafin (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA). In: *ITC/USA/80; Proceedings of the International Telemetering Conference, San Diego, CA, October 14-16, 1980.* Research Triangle Park, NC, Instrument Society of America, 1980, p. 519-525. 9 refs. Contract No. NAS7-100.

The importance of simplicity in the man computer interface (MCI) is stressed because of the effect it has on the system containing the MCI. Results are used from an MCI study at the Jet

Propulsion Laboratory to find an area where the system MCIs can be simplified. The circumstances under which these simplifications are appropriate are listed. The concepts of cognitive simplicity and process simplicity are presented as design alternatives for the MCI. In addition, the concepts of understandability, operation, learnability, level of learning, and usability are presented as tools for the system designer. The use of these concepts in developing a systematic MCI design is discussed. C.R.

A82-27503 † Scientific-technical and organizational problems of cosmonaut training (Nauchno-tekhnicheskii i organizatsionnye problemy podgotovki kosmonavtov). G. T. Beregovoi. In: *Scientific lectures on aviation and astronautics 1980.* Moscow, Izdatel'stvo Nauka, 1981, p. 25-32. In Russian.

The development of cosmonaut training methods at the Gagarin Cosmonaut Training Center is reviewed. Particular consideration is given to flight and parachute training, technical training, and training on complex and specialized simulators. B.J.

A82-27512 † Principal results of medical studies carried out during long-term manned flights in the Salyut 6-Soyuz-Progress orbital complex (Osnovnye rezul'taty meditsinskikh issledovani, vypolnennykh vo vremia dlitel'nykh pilotiruemykh poletov na orbital'nom komplekse 'Saliut-6'-'Soyuz-Progress'). O. G. Gazenko and A. D. Egorov. In: *Scientific lectures on aviation and astronautics 1980.* Moscow, Izdatel'stvo Nauka, 1981, p. 122-136. In Russian.

After a brief review of space medical studies performed over 19 years of manned flight, the paper considers medical studies performed on the Salyut 6-Soyuz-Progress complex during 1977-1979. Methods and results pertaining to the monitoring of cosmonaut health are given; studies of body weight, the cardiovascular system, the motor apparatus, the vestibular functions, the water-salt metabolism, the blood, and biochemical immunological and allergic reactions are examined. Attention is also given to prophylactic measures undertaken against the effects of weightlessness, and to the theory of the adaptation of the human body to space flight. B.J.

A82-27513 † Mode of flight and a mathematical model of pilot activity relating to flight-vehicle control (Obraz poleta i matematicheskaya model' deiatel'nosti letchika po upravleniiu letatel'nykh apparatov). Iu. P. Dobrolenskii, V. A. Ponomarenko, and V. A. Tuvaev. In: *Scientific lectures on aviation and astronautics 1980.* Moscow, Izdatel'stvo Nauka, 1981, p. 137-140. In Russian.

The possibility of developing a model of pilot control activity that is superior to the transfer-function model is considered. It is shown that such a model can be constructed using the theories of optimal filtering and control and can account for the pilot's acquisition of data from a large number of sensors as well as the characteristic actions of the pilot when he simultaneously controls several control surfaces and the engine thrust. The model is shown to be highly effective despite its complexity. B.J.

A82-27515 † New trends in the development of aerospace medical technology (Novye napravleniia razvitiia aviakosmicheskoi meditsinskoi tekhniki). R. I. Utiamyshev. In: *Scientific lectures on aviation and astronautics 1980.* Moscow, Izdatel'stvo Nauka, 1981, p. 161-165. In Russian.

The current status of aerospace medical technology is briefly surveyed. Attention is given to such development trends as the use of microprocessing and macroprocessing, cryogenic equipment, and other advanced techniques. B.J.

A82-27518 † Problems of the development of life support and safety assurance system for space crews (Nekotorye problemy sozdaniia sistem obespecheniia zhiznediatel'nosti i bezopasnosti ekipazhei letatel'nykh apparatov). V. N. Pravetskii, N. M. Samsonov, R. I. Utiamyshev, and E. A. Kurmazenko. In: *Scientific lectures on aviation and astronautics 1980.* Moscow, Izdatel'stvo Nauka, 1981, p. 180-187. In Russian.

A systems approach is taken to the problem of developing life

support and safety assurance systems for manned space flights of various durations. It is shown that the choice of technological topology for a life support system and the choice of parameters of individual elements optimally effecting the conversion of technological flows can be made only on the basis of a complex examination of the system as a unified whole with allowance for its interaction with the crew, the environment, and other onboard systems. The use of mathematical modeling must be organically combined with other forms of modeling: physical, psychological, or their combinations.

B.J.

A82-27561 Statistical mechanics of biomembrane phase transition. I - Excluded volume effects of lipid chains in their conformation change. T. Izuyama and Y. Akutsu (Tokyo, University, Tokyo, Japan). *Physical Society of Japan, Journal*, vol. 51, Jan. 1982, p. 50-58. 16 refs.

A82-27726 † A bilocal model of a dissipative structure (Bilokal'naia model' dissipativnoi struktury). A. D. Bazykin and A. I. Khibnik (Akademiia Nauk SSSR, Nauchno-Issledovatel'skii Vychislitel'nyi Tsent, Pushchino, USSR). *Biofizika*, vol. 27, Jan.-Feb. 1982, p. 132-136. 7 refs. In Russian.

It is pointed out that the spatial arrangement of ecological systems often derives not so much from the heterogeneity of external nonbiogenic factors as from the mechanics governing the interactions between populations. Research that has been done on dissipative structures with the aid of mathematical and experimental models has shown that the existence of these structures in spatially distributed systems is often linked to self-oscillating patterns in the corresponding local systems. The dissipative structures usually appear when there are pronounced differences between the diffusion coefficients of the components. The relationship between the self-oscillating pattern in a local system and a dissipative structure in a spatially distributed system is investigated using a simple ecological model.

C.R.

A82-27727 † The interaction of alpha-actinin and tropomyosin with F-actin (Vzaimodeistvie alpha-aktinina i tropomiozina s F-aktinom). L. A. Tskhovrebova, S. Iu. Khaitlina, N. S. Shelud'ko, and Z. A. Podlubnaia (Akademiia Nauk SSSR, Institut Biologii i Fiziki, Pushchino; Akademiia Nauk SSSR, Institut Biologii Moria, Vladivostok, USSR). *Biofizika*, vol. 27, Jan.-Feb. 1982, p. 20-25. 29 refs. In Russian.

Characteristics of the interaction of the contractile protein alpha-actinin with F-actin in the presence and absence of tropomyosin are studied in order to determine the localization of alpha-actinin. Interactions of alpha-actinin isolated from the skeletal muscle of a warm-blooded animal (rabbit) and from a cold-blooded animal (scallop) with F-actin and F-actin in the presence of tropomyosin at temperatures of 0 and 37 C were monitored by means of disk electrophoresis, viscosity measurements, and electron microscopy. The temperature dependence of the extent of association of alpha-actinin and tropomyosin with F-actin is found to be similar in both types of alpha-actinin, with an increase in temperature resulting in decreased affinity of alpha-actinin for F-actin, and tropomyosin decreasing the amount of alpha-actinin bound at 37 C. At 0 C, actinin and tropomyosin interact independently with F-actin. Data indicate that tropomyosin and alpha-actinin have different binding sites on the F-actin molecule.

A.L.W.

A82-27728 † Changes in contractile protein composition and properties following space flight (Izmenenie sostava i svoisty sokratitel'nykh belkov posle kosmicheskogo poleta). V. S. Oganov, S. A. Skuratova, L. M. Murashko, M. A. Shirvinskaia, T. Szilagyi, A. Szoor, M. Rapsak, O. Takacs, S. S. Oganesian, and Zh. S. Davtian (Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR; Debreceni Orvostudományi Egyetem, Debrecen; Szegedi Orvostudományi Egyetem, Szeged, Hungary; Institut Kardiologii, Yerevan, Armenian SSR). *Biofizika*, vol. 27, Jan.-Feb. 1982, p. 26-30. 19 refs. In Russian.

The possible role of changes in the composition and properties of skeletal muscle structural and regulatory proteins in producing the muscle atrophy and contractile changes observed following space flight is investigated in rats flown in the Cosmos 1129 biosatellite. The soleus, extensor digitorum longus, triceps and brachialis muscles were evaluated for isometric tension and analyzed for myofibrillar

protein content, catalase activity and troponin-tropomyosin system components. In the post-flight period, muscle capacity to generate force is observed to decrease in all muscles but the extensor digitorum longus. Changes in the relative concentrations of the light chains of myosin and the troponin-tropomyosin system composition are also observed, along with an increase in catalase activity. Results are indicative of a transformation of fiber phenotypes in antigravitational muscles under space flight conditions.

A.L.W.

A82-27729 † The magnetic susceptibility of rhodopsin (Magnitnaia vospriimchivost' rodopsina). M. M. Vilenchik (Akademiia Nauk SSSR, Institut Biologicheskoi Fiziki, Pushchino, USSR). *Biofizika*, vol. 27, Jan.-Feb. 1982, p. 31-36. 31 refs. In Russian.

The cooperative interaction with a magnetic field of rhodopsin molecules aligned parallel to each other in the photoreceptor membrane is considered. The anisotropy of the magnetic susceptibility of rhodopsin is calculated, and it is shown that due to this anisotropy and the ordering of rhodopsin molecules in the photoreceptor membrane, the majority of rod outer segments will become oriented along the lines of force of a magnetic field of intensity 80 Oe. Observations of a low velocity for the orientation suggest that it is limited by kinetic constraints. The magnetic effect may be used as the basis for magnetic chemotherapy, in which a magnetic field is used to direct microspheres filled with a bioactive substance, for the inhibition of the growth of malignant tumors, and as an explanation of biological navigation mechanisms.

A.L.W.

A82-27730 † Antenna form of photosystem-2 chlorophyll in chloroplasts (Antenna forma khlorofilla fotosistemy II v khloroplastakh). V. G. Ladygin and K. Ia. Bil' (Akademiia Nauk SSSR, Institut Fotosinteza, Pushchino, USSR). *Biofizika*, vol. 27, Jan.-Feb. 1982, p. 37-41. 15 refs. In Russian.

A82-27731 † Effect of air ions on the ratio between direct and reverse electron transport in mitochondria under stress (Deistvie aeroinov na sootnoshenie priamogo i obratnogo perenosa elektronov v mitokhondriakh pri stresse). M. N. Kondrashova, I. B. Guzar, M. Brechkova, E. B. Okon, and E. V. Grigorenko (Akademiia Nauk SSSR, Institut Biologicheskoi Fiziki, Pushchino, USSR). *Biofizika*, vol. 27, Jan.-Feb. 1982, p. 76-80. 6 refs. In Russian.

Changes in direct (respiration) and reverse (from succinic acid to pyridin nucleotides) energy-dependent electron transport in rat liver mitochondria under stress are found to be mutually opposing. An increase in respiration due to added and, in particular, endogenous succinic acid is observed, with a corresponding acceleration in phosphorylation. This is accompanied by a weakening of reverse electron transport. Such electron flux redistribution does not involve any coupling loss and represents a physiological mechanism for controlling the ratio between external mitochondria function (ATP synthesis and ion transport) realized by direct electron transport and regenerative synthesis processes involving protons supplied by reverse electron transport. Treatment with air ions after stress reduces the changes described by limiting direct electron transport and stimulating reduction processes associated with reverse electron transport.

V.L.

A82-27732 † Study of the viscosity of free and protein-bound membrane lipids (Izuchenie viazkosti svobodnykh i svyazannykh s belkom lipidov v membranakh). I. S. Litvinov and V. V. Obratsov (Akademiia Nauk SSSR, Institut Biologicheskoi Fiziki, Pushchino, USSR). *Biofizika*, vol. 27, Jan.-Feb. 1982, p. 81-86. 16 refs. In Russian.

Temperature effects on the mobility of free and protein-bound lipids in a biological membrane are measured in a study of a possible mechanism for the regulation of membrane-bound enzymes. Lipid viscosity was determined from measurements of pyrene fluorescence intensity upon inductive-resonance energy transfer from tryptophan residues in the membrane proteins of the sarcoplasmic reticulum of rabbit skeletal muscle. Phase transitions in the lipid bilayer and in lipids bound to membrane proteins are found to occur within the same temperature intervals. In the temperature range 10-35 C, the viscosity of lipids in the immediate vicinity of proteins is observed to be greater than that of free lipids, but to become equal to that of the latter at temperatures of 36-39 C. Results suggest the importance of

membrane conditions for the optimal functioning of membrane-bound enzymes such as Ca(2+)-ATPase. A.L.W.

A82-27733 † Localization of adeninnucleotides in striated fibers of skeletal muscles (O lokalizatsii adeninnukleotidov v pope-rechnopolosatykh voloknakh skeletnykh myshts). L. K. Srebnitskaia and A. A. Budnitskii (Akademiia Nauk SSSR, Institut Biologicheskoi Fiziki, Pushchino, USSR). *Biofizika*, vol. 27, Jan.-Feb. 1982, p. 91-94. 9 refs. In Russian.

A82-27734 † The possible role of hydrogen bonds in the mechanism of muscular contraction (Vozmozhnaia rol' vodorodnykh sviazei v mekhanizme myshechnogo sokrashcheniia). K. B. Tolpygo (Akademiia Nauk Ukrainskoi SSR, Fiziko-Tekhnicheskii Institut, Donetsk, Ukrainian SSR). *Biofizika*, vol. 27, Jan.-Feb. 1982, p. 95-98. 11 refs. In Russian.

A model is proposed for the process of energy transfer from ATP to the mechanical work of muscular contraction involving the creation of hydrogen bonds. Based on the observation that the activation energy of hydrogen bonds is comparable with the energy released upon the hydrolysis of ATP, the model states that this energy released goes into the excitation of hydrogen bonds in the actin-myosin system. Such bonds would be strong and far-acting enough to cause the mutual sliding of actin and myosin fibers, thus giving rise to macroscopic muscular contraction. The model allows the evaluation of muscle effort and its dependence on contraction rate and muscle efficiency. A.L.W.

A82-27735 † Model of a 'two-headed' myosin cross-bridge and the possibility of its motion in skeletal muscles (Model' 'dvukhголовogo' miozinovogo mostika i vozmozhnost' ego dvizheniia v skeletnykh myshtsakh). N. P. Sidorenko (Akademiia Nauk SSSR, Institut Biologicheskoi Fiziki, Pushchino, USSR). *Biofizika*, vol. 27, Jan.-Feb. 1982, p. 99-105. 29 refs. In Russian.

A82-27736 † Intracellular local changes in resistance in muscle fibers as a function of membrane potential (Vnutrikletochnye lokal'nye izmeneniia soprotivleniia v myshechnykh voloknakh v zavisimosti ot membrannogo potentsiala). Iu. A. Trifonov, N. K. Satybal'dina, and M. A. Kamenskaia (Akademiia Nauk SSSR, Institut Problem Peredachi Informatsii; Moskovskii Gosudarstvennyi Universitet, Moscow, USSR). *Biofizika*, vol. 27, Jan.-Feb. 1982, p. 106-110. In Russian.

A82-27737 † The accuracy of laser diffraction measurements of sarcomere lengths in contracting muscles (O tochnosti izmereniia dliny sarkomerov sokrashchaiushcheisia myshtsy metodom lazernoi difraktsii). A. A. Klimov and O. A. Andreev (Akademiia Nauk SSSR, Institut Biologicheskoi Fiziki, Pushchino, USSR). *Biofizika*, vol. 27, Jan.-Feb. 1982, p. 111-113. In Russian.

A82-27738 † Physical model of the initial stages of energy transformation during oxidative phosphorylation (Fizicheskaia model' nachal'nykh stadii transformatsii energii pri oksilitel'nom fosforilirovanii). D. S. Chernauskii, N. M. Chernavskaia, and L. S. Iaguzhinskii (Akademiia Nauk SSSR, Fizicheskii Institut; Moskovskii Gosudarstvennyi Universitet, Moscow, USSR). *Biofizika*, vol. 27, Jan.-Feb. 1982, p. 114-119. 15 refs. In Russian.

A physical model is developed for the coupling of the rapid electron tunneling reaction with the slow process of proton transport from water to the membrane as the initial stage of energy transfer from electron to proton in oxidative phosphorylation. The model is based on the proposal of weak interactions providing the primary electron trap in which an electron would lose an insignificant amount of energy as the time spent in the trap becomes comparable with the proton transport time. The energized proton formed in the protein membrane will thus have sufficient energy for phosphorylation. It is noted that the model applies equally well to chloroplasts and mitochondria. A.L.W.

A82-27739 † Study of the initial stage of fibroblast attachment by means of reflective interference microscopy (Izuchenie nachal'noi stadii prikrepleniia fibroblastov metodom otrazhatel'noi interferentsionnoi mikroskopii). Zh. L. Bliokh, A. E. Platonov, and V. V. Smolianinov (Moskovskii Gosudarstvennyi Universitet; Akademiia Nauk SSSR, Institut Problem Peredachi Informatsii, Moscow,

USSR). *Biofizika*, vol. 27, Jan.-Feb. 1982, p. 120-125. 13 refs. In Russian.

A82-27740 † Diffusion model of the dynamics of initial fibroblast attachment (Diffuzionnaia model' dinamiki nachal'nogo prikrepleniia fibroblastov). A. E. Platonov and V. V. Smolianinov (Akademiia Nauk SSSR, Institut Problem Peredachi Informatsii, Moscow, USSR). *Biofizika*, vol. 27, Jan.-Feb. 1982, p. 126-131. 5 refs. In Russian.

A82-27741 † Properties of stable dissipative structures in mathematical models of morphogenesis (Svoistva ustoiichivnykh dissipativnykh struktur v matematicheskikh modeliakh morfogeneza). B. S. Kerner and V. V. Osipov. *Biofizika*, vol. 27, Jan.-Feb. 1982, p. 137-143. 15 refs. In Russian.

The critical selection of a model of morphogenesis or embryogenesis is examined in relation to the properties of corresponding stable dissipative structures. Differences between the stable dissipative structures corresponding to the Turing, Gierer, and Meinhard models in one-, two-, and three-dimensional cases are determined. The obtained pattern of dissipative-structure stability is used to investigate organism-shape changes corresponding to various models of morphogenesis in relation to external stimuli. B.J.

A82-27742 † Mechanism of the natural oscillations of water metabolism in plants (Mekhanizm avtokolebanii vodnogo obmena v rastenii). V. G. Karmanov and S. N. Meleshchenko (Agrofizicheskii Nauchno-Issledovatel'skii Institut, Leningrad, USSR). *Biofizika*, vol. 27, Jan.-Feb. 1982, p. 144-149. 20 refs. In Russian.

A82-27743 † The role of membrane structures in the formation of the myofibrillar system in myogenesis (O roli membrannykh struktur v formirovanii miofibrillarnogo apparata v miogeneze). Iu. S. Larin, N. V. Samosudova, S. O. Erenko, and V. E. Shungskaia (Akademiia Nauk SSSR, Institut Biologicheskoi Fiziki, Pushchino, USSR). *Biofizika*, vol. 27, Jan.-Feb. 1982, p. 159-162. 7 refs. In Russian.

The determining role of membranes in the formation of the myofibrillar system at different stages of chick-embryo development (on the 8th, 12th, and 15th day) was investigated. At the early stages the myofibrillar assembly depends mainly on the plasma membrane (myofibrils are located beneath the sarcolemma), while later it depends on the developing sarcoplasmic reticulum and T-system. It is shown that transverse tubules invaginating from the plasma membrane are the framework for the forming myofibrillar system, and thin filaments are attached to the transverse tubules at sites of future Z-lines. Destruction of the membrane elements causes disorganization of myofibrillar contractile material. B.J.

A82-27744 † Effects of a high-frequency electromagnetic field on tetraphenyl borate transport through bilayer lipid membranes (Vliianie vysokochastotnogo elektromagnitnogo polia na transport tetrafenilborata cherez bisloinye lipidnye membrany). S. I. Alekseev, V. V. Tiazhelov, L. Kh. Faizova, and V. V. Chertishchev (Akademiia Nauk SSSR, Institut Biologicheskoi Fiziki, Pushchino, USSR). *Biofizika*, vol. 27, Jan.-Feb. 1982, p. 162, 163. 8 refs. In Russian.

The effects of a microwave frequency electromagnetic field on tetraphenyl borate transport through a lipid bilayer membrane are studied taking into account concentrations of the indifferent electrolyte. Experiments were performed using a lecithin membrane with a 10% concentration of cholesterol in an electrolyte solution 0.1-1.6 M in NaCl and 0.00001 M in tetraphenyl borate, irradiated at 0.9 GHz. Increases in membrane saturation current indicative of tetraphenyl borate transport are found upon the activation of the microwave field, with the increase in transport proportional to the NaCl concentration of the solution. Results are attributed to local microwave heating of the electrolyte layers near the membrane. A.L.W.

A82-27745 † NMR-imagery - A new method of biophysical investigation (IaMR-introskopiia - Novyi metod biofizicheskogo issledovaniia). V. P. Kutysheiko, V. N. Bushuev, and M. S. Okon (Akademiia Nauk SSSR, Institut Biologicheskoi Fiziki, Pushchino,

USSR). *Biofizika*, vol. 27, Jan.-Feb. 1982, p. 170-178. 65 refs. In Russian.

The use of NMR techniques to obtain two-dimensional cross-sectional images of biological structures for applications in medical diagnosis is discussed. The fundamental principles of NMR imagery, which detects variations in nuclear density, mobility and magnetic environment, are reviewed, and selected methods currently in use for obtaining proton NMR images reflecting the distribution of free water are examined, including the sensitive points methods, projective image reconstruction, selective excitation, the multiplanar and planar methods, linear scanning, and the echo-planar method. Advantages of specificity, noninvasiveness and the avoidance of ionizing radiation of NMR imagery with respect to other methods of diagnostic imagery are noted, and the potentials of nuclear imagery based on P-31 and F-19 are considered. A.L.W.

A82-27746 † Participation of pheophytin in primary electron transfer processes in the reaction centers of photosystem II (Uchastie feofitina v pervichnykh protsessakh perenosa elektrona v reaktsionnykh tsentrakh fotosistemy II). V. V. Klimov (Akademii Nauk SSSR, Institut Fotosinteza, Pushchino, USSR) and A. A. Krasnovskii (Akademii Nauk SSSR, Institut Biokhimii, Moscow, USSR). *Biofizika*, vol. 27, Jan.-Feb. 1982, p. 179-189. 53 refs. In Russian.

Evidence for the role of pheophytin a, a magnesium-less derivative of chlorophyll, as the primary acceptor of electrons from chlorophyll in the photosystem II reaction centers of green plants is reviewed. Experiments have revealed the reversible photoreduction of pheophytin a in photosystem II preparations in which the presumed primary electron acceptor, designated Q, was reduced in the dark, indicating the function of pheophytin as the primary electron acceptor between the primary electron donor and Q. Further studies of chlorophyll luminescence, the photofilling of long-lived intermediates, pheophytin interactions with reaction system components, oxidation-reduction potentials and charge separation and stabilization in photosystem II reaction centers have demonstrated similarities between the characteristics of green plant photosystem II reaction centers and the reaction centers of purple photosynthetic bacteria. A.L.W.

A82-27747 † General characteristics of the development of the body's reaction to external stimuli (Obshchie zakonomernosti razvitiia reaktsii organizma na vneshnie vozdeistviia). V. I. Kopanev and V. V. Vlasov (Voenno-Meditsinskaiia Akademiia, Leningrad, USSR). *Akademiia Nauk SSSR, Izvestiia, Serii Biologicheskaiia*, Jan.-Feb. 1982, p. 44-55. 44 refs. In Russian.

A theoretical study is presented of the dynamic characteristics of the body's reaction to external stimuli of differing intensity. An attempt is made to synthesize data on the dependence of the temporal and quantitative characteristics of the reaction on the stimulus intensity. Individual features of reactivity and resistance are analyzed on the basis of the initial value law. The possibilities of the prognosis of the body's reaction to external stimuli are assessed. B.J.

A82-27748 † Hematopoietic tissue development in Japanese quail embryogenesis (Razvitie krovetvornoi tkani v embriogeneze Iaponskogo perepela). R. V. Latsis and E. I. Deriugina (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR). *Arkhiv Anatomii, Gistologii i Embriologii*, vol. 82, Feb. 1982, p. 91-99. 17 refs. In Russian.

A82-27749 † Structural and functional organization of the microcirculatory bed in skeletal muscle (Strukturno-funktsional'naia organizatsiia mikrotsirkulatornogo rusla v skeletnoi mysh'tse). V. I. Kozlov, N. D. Vasil'ev, and Zh. T. Iskakova (Akademii Pedagogicheskikh Nauk SSSR, Moscow, USSR). *Arkhiv Anatomii, Gistologii i Embriologii*, vol. 82, Jan. 1982, p. 7-21. 58 refs. In Russian.

The spatial organization of microvessels in skeletal muscle is discussed, and the vascularization of red and white muscle fibers is compared. Data from in vivo microscopy of the spinotrapezius and quadriceps muscles of albino rats is presented which supports the principle of the polymeric homonomic organization of the muscle microcirculatory bed, with the intramuscular angioarchitectonics governed by functional units of the microcirculatory bed designated

myoangions. Calculations of capillary bed capacity and reserve potential in white and red muscle fibers based on injection and staining studies show that in the muscle at rest, 40% of the capillaries of the red muscle fibers and 30% of the white muscle fiber capillaries function at any one time. The distribution of the functioning capillaries is also found to ensure optimal muscle metabolism and transorganic circulation reliability. A.L.W.

A82-27750 † Mechanisms of the reaction of dividing cells to hypothermia (Mekhanizmy reaktsii deliashchikhsia kletok na gipotermiiu). I. A. Alov (Akademii Meditsinskikh Nauk SSSR, Moscow, USSR). *Uspekhi Sovremennoi Biologii*, vol. 93, Jan.-Feb. 1982, p. 64-72. 75 refs. In Russian.

The effect of cooling on mitosis and its mechanisms is examined. An analysis is presented of mitosis blockade in the metaphase and changes in chromosomes typical for hypothermia, and attention is given to alterations in division associated with the reaction induced by cooling. The restoration of normal mitosis under moderate hypothermia is examined, and possible mechanisms of reversibility are discussed. The role of the activation of the adrenal glands in the depression of mitosis under hypothermia is considered. B.J.

A82-27751 † Cerebral hemodynamics in healthy individuals and the recognition of subclinical signs of insufficient blood supply to the brain (Sostoianie tserebral'noi gemodinamiki u zdorovykh liudei i diagnostika subklinicheskikh proiavlenii nedostatochnosti krovoobrazheniia mozga). V. D. Troshin, E. P. Semenova, and L. L. Kuznetsova (Gor'kovskii Meditsinskii Institut, Gorki, USSR). *Zhurnal Nevropatologii i Psikhatrii im. S. S. Korsakova*, vol. 82, no. 1, 1982, p. 12-16. 11 refs. In Russian.

A82-27752 † Stenoses of the carotid artery and disorders of the cerebral circulation (clinical and angiographic comparisons) (Stenozы sonnoi arterii i narusheniia mozgovogo krovoobrazheniia /kliniko-angiograficheskie sopolavleniia/). D. N. Dzhibladze and L. K. Bragina (Akademii Meditsinskikh Nauk SSSR, Moscow, USSR). *Zhurnal Nevropatologii i Psikhatrii im. S. S. Korsakova*, vol. 82, no. 1, 1982, p. 16-23. 28 refs. In Russian.

A82-27753 † Bilateral disturbances of the perception function of the brain in patients with unilateral disorders due to acute disturbances of the cerebral circulation (Dvustoronnie narusheniia vosprinimaiushchei funktsii mozga u bol'nykh s odnostoronnim porazheniem vsledstvie ostrogo narusheniia mozgovogo krovoobrazheniia). L. I. Sumskaia and N. S. Kuksova (Nauchno-Issledovatel'skii Institut Skoroi Pomoshchi, Moscow, USSR). *Zhurnal Nevropatologii i Psikhatrii im. S. S. Korsakova*, vol. 82, no. 1, 1982, p. 23-27. 26 refs. In Russian.

A82-27754 † Age-related features of blood-coagulation changes in the treatment of cerebral ischemias with indirect-action anticoagulants (Vozrastnye osobennosti izmeneniia gemokoaguliatsii pri lechenii tserebral'nykh iskhemii antikoagulantami nepriamogo deistviia). E. M. Burtsev and V. V. Shpakh (Irkutskii Institut Usovshenstvovaniia Vrachei, Irkutsk, USSR). *Zhurnal Nevropatologii i Psikhatrii im. S. S. Korsakova*, vol. 82, no. 1, 1982, p. 32-35. 14 refs. In Russian.

A82-27755 † Rheoencephalographic signs of inadequate cerebral blood supply in incipient cerebrovascular insufficiency (Rheoentsefalograficheskie znaki nepolnotnosti krovoobrazheniia mozga pri nachal'noi tserebrovaskuliarnoi nedostatochnosti). N. N. Loginova (Gor'kovskii Meditsinskii Institut, Gorki; Oblastnaia Klinicheskaiia Bol'nitsa, USSR). *Zhurnal Nevropatologii i Psikhatrii im. S. S. Korsakova*, vol. 82, no. 1, 1982, p. 47-51. 15 refs. In Russian.

A82-27756 † The use of ultrasonic Doppler techniques in the diagnosis of arterial occlusions in the basis cerebri - A Doppler angiography study (Metod ul'trazvukovoi Dopplerografii v diagnostike okkluziruiushchikh porazhenii arterii osnovaniia mozga - Doppleroangiograficheskoe issledovanie). Iu. M. Nikitin (Akademii Meditsinskikh Nauk SSSR, Moscow, USSR). *Zhurnal Nevropatologii i Psikhatrii im. S. S. Korsakova*, vol. 82, no. 1, 1982, p. 36-39. 6 refs. In Russian.

A82-27757 † The participation of adrenergic mechanisms in microcirculation changes under stress (Uchastie adrenergicheskikh mekhanizmov v izmeneniakh mikrotsirkulatsii pri stresse). M. P. Gorizontova and A. M. Chernukh (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Biulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 93, Jan. 1982, p. 5-8. 12 refs. In Russian.

Biomicroscopy was employed to investigate microcirculation changes in the mesentery of rats exposed to single or repeated stressors (immobilization or electric stimulation) after adrenalectomy or the administration of adrenergic blockers. It is found that catecholamines released from the adrenergic nerve terminals play an important role in microcirculation changes, including the formation of erythrocyte aggregates. These same catecholamines also play an active role in the development of adaptation responses to the repeated stressor effect in the microcirculation system. B.J.

A82-27758 † The effect of adapting to high-altitude hypoxia on certain indicators of catecholamine metabolism in rats in the case of spontaneous hereditary hypertension (Vliianie adaptatsii k vysokoi gipoksii na nekotorye pokazatei obmena katekholaminov pri spontanno nasledstvennoi gipertonii u krysov). N. A. Barbarash, G. Ia. Dvurechenskaia, E. V. Volina, L. V. Berdysheva, T. G. Putintseva, B. N. Manukhin, and F. Z. Meerson (Kemerovskii Meditsinskii Institut, Kemerovo; Akademiia Nauk SSSR, Institut Biologii i Razvitiia; Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Biulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 93, Jan. 1982, p. 22, 23. 10 refs. In Russian.

A82-27759 † The content of RNA in structures of the autonomic nervous system of rabbits under acute emotional stress (Soderzhanie RNK v strukturakh avtonomnoi nervnoi sistemy krolikov pri ostrom emotsional'nom stresse). A. V. Gorbunova, S. I. Kashtanov, and V. V. Portugalov (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Biulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 93, Jan. 1982, p. 29-31. 6 refs. In Russian.

A82-27760 † Ultrasonic method for measuring of hepatic portal blood flow in rats under conditions of contact biomicroscopy (Ul'trazvukovoi metod izmereniia pechenochnogo portal'nogo krvotoka u krysov v usloviakh kontaktnoi biomikroskopii). N. Ia. Kovalenko and D. D. Matsievskii (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Biulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 93, Feb. 1982, p. 66-68, 122. 5 refs.

A method for measuring the linear and volumetric rate of hepatic portal blood flow in rats is described. The method is based on the application of miniature ultrasonic transducers, contact biomicroscopy of the terminal microvessels of the intestine and liver, and the measurement of the systemic arterial blood pressure. B.J.

A82-27761 † Mechanism for the antihypoxic effects of depakin (K mekhanizmu antigipoksicheskogo efekta depakina). R. U. Ostrovskaia (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Biulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 93, Feb. 1982, p. 42-44. 15 refs. In Russian.

The effects of the antiepileptic depakin (valproate) and other GABA-ergic substances on hypoxia tolerance are investigated. Experiments involved the measurement of survival, cerebral and cardiac lactate and pyruvate levels and the hypoxic lactate excess in mice under conditions of normobaric hypoxic hypoxia, and electrocardiogram changes in rats under hypoxic hypoxia, upon the administration of depakin, the alpha-ketoglutarate GABA transferase inhibitors aminooxyacetic and aminooxybutyric acids and hydroxylamine and the succinic semialdehyde dehydrogenase inhibitor diphenylhydantoin. A dose-dependent effect of depakin in increasing lifetimes, delaying the appearance of rhythm disturbances and preventing lactate accumulation is obtained. The magnitude of the response is similar to that to hydroxybutyrate and succinic semialdehyde, and significantly exceeds that to piracetam, while the succinic semialdehyde dehydrogenase inhibitors elicited no response. Results suggest that the inhibition of succinic semialdehyde dehydrogenase accompanied by the enhanced reduction of succinic semialdehyde plays an important role in the mechanism of action of depakin. A.L.W.

A82-27762 † Phosphorylating oxidation during changes in physiological condition (Fosforiliruiushchee okislenie pri izmeneniakh funktsional'nogo sostoiianiia organizma). T. A. Allik (Vsesoiuznyi Nauchno-Issledovatel'skii Institut Fiziko-Tekhnicheskikh i Radiotekhnicheskikh Izmerenii, Moscow, USSR). *Biulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 93, Feb. 1982, p. 28-30. 14 refs. In Russian.

Changes in the rate of phosphorylating (mitochondrial) and free (microsomal) oxidation with physiological condition ranging from the optimal norm to profound pathology are investigated. Measurements of total and amythal-sensitive respiration were made in rats and mice in physically trained and normal conditions, prepathological conditions of fatigue or early neurosis, pathological conditions of pronounced multiple aseptic inflammation or pronounced neurosis, and prelethal forms of the above pathologies. The trained condition is found to be characterized by a reduced oxygen demand with respect to the norm, which is attributed to a decrease in phosphorylating oxidation. In the prepathological condition, oxygen demand increases, again due to the phosphorylating component, while in pronounced pathology of any etiology phosphorylating oxidation rises further and free oxidation declines sharply. The prelethal condition is characterized by a catastrophic increase in phosphorylating oxidation and a significant increase in total respiration despite a severe reduction in free respiration. A.L.W.

A82-27763 † Effects of microwaves on acupuncture points under conditions of acute emotional stress in rabbits (Deistvie mikrovoln na biologicheski aktivnye tochki v usloviakh ostrogo emotsional'nogo stressa u krolikov). Iu. E. Vagin and S. I. Kashtanov (Akademiia Meditsinskikh Nauk SSSR, and I Moskovskii Meditsinskii Institut, Moscow, USSR). *Biulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 93, Feb. 1982, p. 21-23. 12 refs. In Russian.

A82-27764 † Changes in the level of catecholamines in the noradrenaline-synthesizing structures of the rat brain following immobilization (Izmeneniia urovnia katekholaminov v noradrenalinsinteziruiushchikh strukturakh mozga krysov posle immobilizatsii). T. I. Belova, R. Kvetnansky, M. Dobrakovova, I. Ponev, and Z. Oprsalova (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR; Slovenska Akademia Vied, Ustav Eksperimentalnej Endokrinologie, Bratislava, Czechoslovakia). *Biulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 93, Feb. 1982, p. 8, 9. 6 refs. In Russian.

A82-27765 † Effects of acoustic stress on rat sensorimotor cortex morphology (Vliianie akusticheskogo stressa na morfologiu sensomotornoj kory krysov). N. I. Artiukhina and I. P. Levshina (Akademiia Nauk SSSR, Institut Vyshei Nervnoi Deiatel'nosti i Neurofiziologii, Moscow, USSR). *Biulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 93, Jan. 1982, p. 98-100. 10 refs. In Russian.

Changes in the structural and ultrastructural characteristics of the rat sensorimotor cortex upon prolonged exposure to high noise levels are examined and compared with corresponding changes in the auditory cortex. Animals were exposed for 14 hours a day to frequencies between 250 and 3500 Hz at an intensity 80 to 90 dB higher than the human audibility threshold for up to 21 days. After 7 days of exposure, focal pericapillary hemorrhages are found in the sensorimotor cortex, with microglial cells and fibrous astrocytes accumulated around the site of the hemorrhages. Following longer exposures, fresh hemorrhages are not apparent, and signs of chromatolysis are evident in the neurons and neuroglia. Increases in the numbers of lysosomes containing pigmented granules and the accumulation of a turbid substance in the rough endoplasmic reticulum are also observed. The observations, which represent a more diffuse form of the changes seen in the auditory cortex, may account for the observed disturbances in motor function under conditions of acoustic stress. A.L.W.

A82-27766 † A study of cerebral microvessels by means of automatic image analysis (Izlučenje mikrosudov mozga metodom avtomaticheskogo analiza izobrazhenii). V. S. Shinkarenko and V. N. Larina (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Biulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 93, Jan. 1982, p. 3-5. 6 refs. In Russian.

The technique of automatic image analysis is evaluated as a potential means for the study of the quantitative characteristics of the structure of the cerebral microvascular network, a potential indicator of pathological changes. Analysis of histological sections of dog brain with the vascular network filled with ink were performed with a texture analysis system. Measurements of total vascular fragment area, length and number, the area and lengths of fragments of a given diameter, measurement field area, specific vascular length per tissue volume and mean vessel diameter obtained for various areas of the brain by automatic analysis are found to be in general agreement with those obtained by hand, however require considerably less time and manpower than manual methods. A.L.W.

A82-27767 † Regeneration of skeletal muscle after mechanical trauma in reptiles (Regeneratsiia skeletnoi myshtsy posle mekhanicheskoi travmy u reptilii). I. L. Novoselova, R. P. Zhenevskaya, and M. M. Umova (Akademiia Nauk SSSR, Institut Evoliutsionnoi Morfologii i Ekologii Zhivotnykh, Moscow, USSR). *Biulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 93, Jan. 1982, p. 89-91. 15 refs. In Russian.

A82-27768 † Problems of the operational medical in-flight monitoring of pilots (Nekotorye voprosy operativnogo meditsinskogo kontrolya za sostoianiem letchika v polete). V. V. Litovchenko, I. D. Malinin, and A. Z. Mnatsikan'ian. *Voenno-Meditsinskii Zhurnal*, Nov. 1981, p. 71-73. 15 refs. In Russian.

A brief review is presented of the literature on the use of biotelemetry systems for the operational medical in-flight monitoring of pilots. The characteristics of aviation biotelemetry systems are presented, and future trends in the development of such systems are briefly discussed. B.J.

A82-27769 † The effect of the circadian rhythm of physiological functions on the mental work capacity of operators (K voprosu o vliianii sutochnogo ritma fiziologicheskikh funktsii na umstvennuiu rabotosposobnost' operatorov). A. N. Popov and V. V. Romanov. *Voenno-Meditsinskii Zhurnal*, Dec. 1981, p. 49-51. 13 refs. In Russian.

Experiments were conducted on persons 19 to 25 years old in order to find a correlation between the circadian rhythm of physiological functions and mental work capacity. It is found that the work of operators with a low circadian amplitude of body temperature tends to be more stable than that of operators with a high circadian amplitude of body temperature. It is recommended that the circadian amplitude of body temperature be used as one of the criteria of the selection of operators for night and shift work. B.J.

A82-27770 † Microionophoretic analysis of the chemical sensitivity of neurons of the medial thalamus and ventromedial hypothalamus to acetylcholine in the case of immobilization-produced emotional stress in rats (Mikroionoforeticheskii analiz khimicheskoi chuvstvitel'nosti neironov medial'nogo talamusa i ventromedial'nogo gipotalamusa k atsetilkholinu pri immobilizatsionnom emotsional'nom stresse u krysa). E. A. Kiiatkin (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Zhurnal Vysshei Nervnoi Deiatel'nosti*, vol. 32, Jan.-Feb. 1982, p. 136-143. 19 refs. In Russian.

A82-27771 † Daily rhythms of physiological functions during shift work (Sutochnye ritmy fiziologicheskikh funktsii pri smennoi rabote na proizvodstve). A. A. Sorokin and D. F. Galimova (Akademiia Nauk Kirgizskoi SSR, Institut Fiziologii i Eksperimental'noi Patologii Vysokogor'ia, Kirgiz SSR). *Akademiia Nauk Kirgizskoi SSR, Izvestiia*, Nov.-Dec. 1981, p. 41-45. 14 refs. In Russian.

The daily rhythms of persons working three shifts in a factory are investigated. It is shown that when cosinor analysis is used to study the daily rhythm it is necessary to take into account not only the circadian rhythm but also the infracircadian rhythm (less than 20 hours). It is suggested that criteria of the optimal organization of shift work be sought on the basis of relationships between circadian and infracircadian rhythms. B.J.

A82-27772 † Adaptive changes in the rat hypophysial-adrenal system upon altitude hypoxia (Adaptivnye izmeneniia gipofizarno-nadpocheknikovoi sistemy krysa na vysokogornuiu gipoksiyu). D. Zakirov and E. A. Iangalycheva (Akademiia Nauk Kirgizskoi SSR, Institut Fiziologii i Eksperimental'noi Patologii Vysokogor'ia, Kirgiz SSR). *Akademiia Nauk Kirgizskoi SSR, Izvestiia*, no. 6, 1981, p. 46-51. 20 refs. In Russian.

A combined biochemical and morphological study is presented of the reactions of the hypophysial-adrenal system during adaptation to altitude hypoxia in rats exposed for various lengths of time to an altitude of 3200 m. Measurements after up to 20 days of exposure reveal increases in the levels of corticosterone and catecholamines in the blood and adrenal glands, indicative of a stress response, followed by decreases in all levels with the exception of blood noradrenalin. A short-term decline in hypophysial ACTH and hypothalamic corticosterone-stimulating activity, followed by an increase and subsequent decrease is also observed. Histological data reveal a significant widening in vascular diameters and increase in nuclear areas in the adrenal cortex and neurohypophysis, which are correlated with variations in alkaline phosphatase and ATPase contents, respectively. Results suggest the enhanced secretion of endogenous vasopressin in the later stages of adaptation accompanied by a decrease in the antidiuretic activity of the hypothalamus. A.L.W.

A82-27773 † Seventy-five days in space (75 sutok v kosmose). S. D. Grishin and A. D. Egorov. *Zemlia i Vselennaia*, Jan.-Feb. 1982, p. 2-7. In Russian.

Experiments performed on the fifth main flight of Salyut-6 are briefly described. Particular attention is given to the biomedical experiments, which involved the study of adaptation to conditions of weightlessness. The experiments did not reveal any significant alterations in the physiological state of the cosmonauts which could prevent a further increase of space-flight duration. B.J.

A82-27775 † Electroacupuncture in the complex treatment of trifacial neuralgia (Elektroakupunktura v kompleksnom lechenii nevralgii troinichnogo nerva). E. L. Macheret, I. Z. Samosiuk, V. P. Lyseniuk, and L. P. Drigant (Kievskii Institut Uovershenstvovaniia Vrachei, Kiev, Ukrainian SSR). *Voprosy Kurortologii, Fizioterapii i Lechebnoi Fizicheskoi Kul'tury*, Jan.-Feb. 1982, p. 46-49. 12 refs. In Russian.

A82-27776 † Electromyographic pattern of muscular activity during pushing-off and methods for its directed correction in young ski-jumpers on a trampoline (Elektromiograficheski risunok aktivnosti myshts pri ottalkivanii i puti ego napravlennoi korektsii u iunyh prygunov na lyzhakh s trampolina). O. V. Bogdanov, N. M. Iakovleva, A. A. Smetankin, and O. K. Khimich (NIEM; Nauchno-Issledovatel'skii Institut Fizicheskoi Kul'tury, Leningrad, USSR). *Teoriia i Praktika Fizicheskoi Kul'tury*, Jan. 1982, p. 35-38. In Russian.

A82-27777 † Effects of increased carbohydrate resources on aerobic work capacity (Carbohydrate loading method) (Vliianie povysheniia uglevodnykh resursov na fizicheskuiu aerobnuiu rabotosposobnost' /metod uglevodnogo nasyshcheniia - MUN/). Ia. M. Kots, L. I. Alikhanova, and O. L. Vinogradova (Gosudarstvennyi Tsentral'nyi Institut Fizicheskoi Kul'tury, Moscow, USSR). *Teoriia i Praktika Fizicheskoi Kul'tury*, Feb. 1982, p. 20-23. 16 refs. In Russian.

Previous studies have implicated muscle glycogen content as the limiting factor in determining human submaximal aerobic work capacity. The present paper presents a study of the effects of an increase in carbohydrate resources on work capacity during the performance of near-maximal aerobic exercise (80-90% maximal oxygen consumption). Male subjects performed bicycle ergometer exercise at levels of 70%, 80% and 90% of maximal to exhaustion while following a normal mixed dietary regimen, and after a regimen consisting of carbohydrate-poor foods immediately after the exercise period, then three days of carbohydrate-rich foods (carbohydrate loading). The carbohydrate loading regime is found to increase aerobic work capacity at all levels tested, with the amount of increase inversely related to work power. An increase in the total quantity of carbohydrate oxidized during exercise without change in the mean rate of carbohydrate consumption is also observed. A.L.W.

A82-27778 † Method for the determination of muscle cross-sectional area and dermato-adipose layer thickness using ultrasonic scanning (Metodika opredeleniia ploshchadi poperechnogo secheniia myshts i tolshchiny kozhno-zhirovogo sloia ul'trazukovym skanirovaniem). D. Iu. Bravaia (Gosudarstvennyi Tsentral'nyi Institut Fizicheskoi Kul'tury, Moscow, USSR). *Teoriia i Praktika Fizicheskoi Kul'tury*, Feb. 1982, p. 25, 26. 10 refs. In Russian.

A82-27779 † Effects of periodization in the yearly training cycle on cardiac volume in young athletes (Vliianie periodizatsii v godichnom trenirovochnom tsikle na ob'em serdtsa iunykh sportmenov). V. I. Il'nitskii (Ternopol'skii Meditsinskii Institut, Ternopol, Ukrainian SSR). *Teoriia i Praktika Fizicheskoi Kul'tury*, Jan. 1982, p. 38, 39. In Russian.

The dependence of the cardiac volume of young athletes of different specializations on their level of training during various phases of the yearly training cycle is investigated. Measurements of cardiac volume were performed by means of biplanar teleradiography during the first and second stages of the preparatory period, the base period and the transitional period in long- and middle-distance runners, short-distance runners and wrestlers aged 13 to 16. Both absolute and relative (with respect to body weight) cardiac volumes are observed to vary in accordance with the stage and type of training, being greater in the endurance-trained athletes. Changes in absolute heart volume are, however, noted to become less marked with age. A.L.W.

A82-27780 † A model of the dynamics of athlete condition during the yearly cycle and its role in the management of training (Model' dinamiki sostoiianiia sportsmena v godichnom tsikle i ee rol' v upravlenii trenirovochnym protsessom). Iu. V. Verkhoshanskii, I. N. Mironenko, T. M. Antonova, O. V. Khachatryan, S. V. Nikitin, and A. V. Levchenko (Gosudarstvennyi Tsentral'nyi Institut Fizicheskoi Kul'tury, Moscow, USSR). *Teoriia i Praktika Fizicheskoi Kul'tury*, Jan. 1982, p. 14-19. 8 refs. In Russian.

A82-27781 † The determination of overall physical endurance in athletes (Opredelenie obshchei fizicheskoi vynoslivosti u sportsmenov). Iu. D. Safonov, I. M. Sezin, and V. A. Siluanova (Voronezhskii Meditsinskii Institut, Voronezh; I Moskovskii Meditsinskii Institut, Moscow, USSR). *Teoriia i Praktika Fizicheskoi Kul'tury*, Jan. 1982, p. 26-28. 7 refs. In Russian.

A method is proposed for the determination of overall physical endurance based in the measurement of a number of cardiorespiratory parameters at rest and during exercise. The parameters employed, respiratory minute volume, oxygen uptake, and the rheographic index, were chosen so as to allow the evaluation of the three fundamental stages of oxygen supply: pulmonary uptake, absorption in the blood, and transport to the tissues. A physical endurance coefficient, defined as a product of the ratios of these parameters recorded at rest and during exercise, allows a distinction to be made between trained and untrained individuals, and among individuals at different levels of training for purposes of monitoring and selection. A.L.W.

A82-27782 † The norm and pathology in sports (Norma i patologiia v sporte). R. E. Motylianskaia (Ministerstvo Zdravookhraneniia RSFSR, Respublikanskii Vrachebno-Fizkul'turnyi Dispanser, Moscow, USSR). *Teoriia i Praktika Fizicheskoi Kul'tury*, Jan. 1982, p. 24-26. 14 refs. In Russian.

Problems of the assessment of health and pathology in sports medicine are examined. Particular attention is given to the development of an automated method for the statistical prediction of cardiovascular pathology as well as the pathology of other body systems. B.J.

A82-27783 † The prognostic significance of electrocardiogram parameters in macrofocal myocardial infarction (Prognosticheskoe znachenie pokazatelei elektrokardiogrammy pri krupnoochagovom infarkte miokarda). A. I. Gritsiuk and E. N. Amosova (Kievskii Meditsinskii Institut, Kiev, Ukrainian SSR). *Kardiologiia*, vol. 22, Jan. 1982, p. 22-25. 17 refs. In Russian.

A82-27784 † Electron-histochemical and functional evaluation of the effects of aspirin on the thrombocytes of healthy people

and patients with ischemic heart disease (Elektronno-gistokhimeskaia i funktsional'naia otsenka vliianiia aspirina na trombotsity zdorovykh lits i bol'nykh ishemicheskoi bolezn'iu serdtsa). V. A. Almazov, V. K. Vashkinel, L. V. Safronnikov, V. A. Lapotnikov, and M. N. Petrov (Ministerstvo Zdravookhraneniia RSFSR, Leningradskii Nauchno-Issledovatel'skii Institut Kardiologii, I Leningradskii Meditsinskii Institut, Leningrad, USSR). *Kardiologiia*, vol. 22, Feb. 1982, p. 72-76. 34 refs. In Russian.

A82-27785 † Effects of exercise adaptation on the age variation of human cardiac contractile function and left ventricular mass (Vliianie adaptatsii k fizicheskim nagruzkam na vozrastnuiu dinamiku sokratitel'noi funktsii i massy levogo zheludochka serdtsa cheloveka). F. Z. Meerson and Z. V. Beresneva (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Kardiologiia*, vol. 22, Jan. 1982, p. 85-90. 10 refs. In Russian.

A82-27786 † Protective effects of unsaturated fatty acids in adrenaline pulmonary edema and hypobaric hypoxia (The biological significance of catecholamine hyperlipidemia/ (Zashchitnoe deistvie nenasyshchennykh zhirnykh kislot pri adrenalinovom oteke legkikh i gipobaricheskoi gipoksii /K voprosu o biologicheskom znachenii katekolaminovoi giperlipidemii/). A. Kh. Kogan, L. O. Luk'ianova, and A. N. Kudrin (I Moskovskii Meditsinskii Institut, Moscow, USSR). *Patologicheskaiia Fiziologiia i Eksperimental'naia Terapiia*, Jan.-Feb. 1982, p. 50-56. 9 refs. In Russian.

A82-27787 † Contribution of the kallikrein-kinin system to microcirculation disorders in the case of immobilization stress (Uchastie kallikrein-kininovoi sistemy v narusheniakh mikrotsirkulatsii pri immobilizatsionnom stresse). M. P. Gorizontova, N. V. Komissarova, and A. M. Chernukh (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Patologicheskaiia Fiziologiia i Eksperimental'naia Terapiia*, Jan.-Feb. 1982, p. 7-10. 10 refs. In Russian.

The state of the kallikrein-kinin system (KKS) and the effect of the antikin agent paminin and the protease inhibitor trasylol on microcirculation and vascular permeability were studied in the case of immobilization stress in rats. The blood KKS was found to be activated after immobilization for 1, 3, and 24 hours. Paminin and trasylol improved microcirculation in the mesentery in the case of 1 hour of immobilization and had no appreciable effect on the mesenteric blood flow in the case of 24 hours of immobilization. These agents reduced disorders of vascular permeability caused by immobilization of 1 or 3 hours; in the case of immobilization for 24 hours, only trasylol was effective. B.J.

A82-27788 † Central pain mechanisms (Tsentral'nye mekhanizmy boli). L. N. Smolin (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Patologicheskaiia Fiziologiia i Eksperimental'naia Terapiia*, Jan.-Feb. 1982, p. 76-82. 100 refs. In Russian.

Malzack and Wall's (1965) gate control theory is examined, and it is shown that, according to this theory, not only the segmentary but also the supraspinal pain-suppression mechanisms are activated exclusively by low-threshold primary afferents. It is argued that this theory has certain defects which cannot be overcome without a radical reworking of the theory. Instead, another theory is proposed, which involves the formation of a 'pain flow' in the spinal cord and the transmission of this flow to the supraspinal structures. B.J.

A82-27789 † Complex technique for studying the oxygen regimen and hemodynamics of the oral mucosa under hypoxia (Kompleksnaia metodika izucheniia kislorodnogo rezhima i gemodinamiki v slizistoi obolochke polosti RTA pri gipoksii). N. K. Loginova and S. I. Vol'vach (Ministerstvo Zdravookhraneniia SSSR, Tsentral'nyi Nauchno-Issledovatel'skii Institut Stomatologii, Moscow, USSR). *Patologicheskaiia Fiziologiia i Eksperimental'naia Terapiia*, Jan.-Feb. 1982, p. 67-69. 6 refs. In Russian.

The paper describes a complex rheographic-polarographic instrument for investigating the oxygen regimen and hemodynamics of the oral mucosa under hypoxia. A block diagram of the instrument is presented, and some results obtained with the instrument are discussed. B.J.

A82-27790 † Mathematical modeling of microhemodynamics in the resistant part of the regional vascular bed (Matematicheskoe modelirovanie mikrogemodinamiki v rezistivnom otdete regionalnogo sosudistogo rusla). A. M. Chernukh, O. V. Alekseev, B. I. Balanter, and I. M. Mikhailova (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Patologicheskaiia Fiziologiiia i Eksperimental'naia Terapiia*, Jan.-Feb. 1982, p. 64-66. 6 refs. In Russian.

A82-27791 † Hemodynamics and external respiration in patients with bronchial asthma at rest and during exercise (Gemodinamika i vneshnee dykhanie u bol'nykh bronkhial'noi astmoi v pokoe i pri fizicheskoi nagruzke). L. L. Orlov, K. A. Memetov, and V. K. Trofimov (Moskovskii Meditsinskii Stomatologicheskii Institut, Moscow, USSR). *Sovetskaia Meditsina*, no. 1, 1982, p. 19-24. 17 refs. In Russian.

A82-27792 † Bicycle ergometry in the differential diagnosis of cardialgia (Veloergometriia v differentsial'noi diagnostike kardi- algi). V. M. Sheverda (Vinnitskii Meditsinskii Institut, Vinnitsa, Ukrainian SSR). *Vrachebnoe Delo*, Jan. 1982, p. 54-56. 7 refs. In Russian.

A clinical study involving the use of bicycle ergometry in the diagnosis of cardialgia of different etiologies is presented. The study involved 120 men aged 30 to 50 years, 90 of whom had expressed complaints of pain in the cardiac region. Ergometric testing with concurrent recording of the EKG revealed significant differences between the work capacity, maximum oxygen uptake, oxygen energy equivalent and EKG responses of the control group and the work capacity of all patients, and the maximal oxygen uptake, oxygen energy equivalent and EKG response of patients diagnosed as having chronic coronary insufficiency. Results indicate the effectiveness of ergometry in distinguishing between chronic coronary insufficiency and functional heart diseases in difficult clinical cases.

A.L.W.

A82-27793 † Incidence of ischemic heart disease and arterial hypertension in sedentary workers (Rasprostranennost' iskhemicheskoi bolezni serdtsa i arterial'noi gipertonii u rabotnikov umstvennogo truda). Iu. I. Kundiev, A. O. Navakatikian, L. I. Tomashevskaiia, A. M. Nagornaia, V. V. Kal'nish, and O. P. Petrenko (Kievskii Nauchno-Issledovatel'skii Institut Gigeny Truda i Profzabolevanii, Kiev, Ukrainian SSR). *Vrachebnoe Delo*, Feb. 1982, p. 57-61. 11 refs. In Russian.

A82-27794 † The combined effects of ionizing radiation and certain other environmental factors /Review of the literature/ (Kombinirovannoe deistvie ioniziruiushchei radiatsii i nekotorykh drugikh faktorov srede /Obzor literatury/). L. A. Dobrovolskii (Kievskii Nauchno-Issledovatel'skii Institut Gigeny Truda i Profzabolevanii, Kiev, Ukrainian SSR). *Vrachebnoe Delo*, Dec. 1981, p. 11-16. 62 refs. In Russian.

Studies of physiological effects on the cellular and tissue levels of ionizing radiation combined with other factors in the environment are reviewed. Attention is given to studies of cell responses to radiation combined with high temperatures and the mechanism of the interaction, skin responses to radiation in the presence of hypothermia, the effects of combined hyperthermia and gamma radiation and of combined microwave and X-ray radiation on survival, and interactions of ionizing radiation with ozone and other products of air radiolysis, and it is pointed out that the additional environmental factors tend to modify the effects of ionizing radiation. Effects of incorporated radionuclides of various energies and distributions within the body in the presence of moderate hyperthermia on the structure and function of the gonads, fertility and future generations are also discussed.

A.L.W.

A82-27795 † Effects of physical factors in the environments on the diurnal and seasonal periodicity of bronchial asthma attacks (Vliianie fizicheskikh faktorov vneshnei srede na sutochnoe i sezonnoe raspredelenie chastoty pristupov bronkhial'noi astmy). V. A. Ignat'ev, N. I. Egurnov, and A. N. Lapin (Ministerstvo Zdravookhraneniia SSSR, Vsesoiuznyi Nauchno-Issledovatel'skii Institut Pul'monologii, Leningrad, USSR). *Vrachebnoe Delo*, Dec. 1981, p. 71-74. 10 refs. In Russian.

A82-27796 † Use of a constant magnetic field for the treatment of vibration sickness (Primenenie postoiannogo magnitnogo polia dlia lecheniia vibratsionnoi bolezni). B. S. Naumenko, G. P. Pidpalyi, and I. S. Starodubtsev (Krivorozhskii Nauchno-Issledovatel'skii Institut Gigeny Truda i Profzabolevanii, Krivoi Rog, Ukrainian SSR). *Vrachebnoe Delo*, Dec. 1981, p. 106-108. 6 refs. In Russian.

Experience in the medical rehabilitation of patients with vibration sickness by the use of a constant magnetic field is reported. Magnetotherapy at a field intensity of 150-200 Oe was used in combination with vitamin therapy in the treatment of 50 miners with stage I vibration sickness, predominantly exhibiting autonomic neuritis, and results of treatment were compared with that of conventional vitamin and sympatolytic, spasmolytic or ganglioblocker treatment of patient controls. As with conventional therapies, the magnetic field is observed to have a positive action on certain nervous system functions, with particularly marked effects on pain, tendon and peristaltic reflexes, peripheral vascular reactivity and rheographic parameters, as well as catecholamine excretion.

A.L.W.

A82-27797 † Physiological criteria and methods for increasing the effectiveness of correction of hypoxic states (Fiziologichni kriterii i shliakhi pidvishchennia efektyvnosti korektsii gipoksichnikh staniv). M. M. Seredenko, L. I. Zhukovskii, V. A. Tsurul'nikov, I. V. Brushko, N. V. Parkhomenko, V. P. Pozharov, K. V. Rozova, and L. D. Fesenko. *Akademiia Nauk Ukrain'skoi RSR, Visnik*, Feb. 1982, p. 31-40. 6 refs. In Ukrainian.

A82-27798 † Development of the hypothesis of the system quantization of behavior with reference to human work activity (Razvitie gipotezy o sistemnom kvantovanii povedeniia na primere proizvodstvennoi deiatel'nosti cheloveka). G. V. Ryzhikov (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Akademiia Meditsinskikh Nauk SSSR, Vestnik*, no. 2, 1982, p. 14-17. 7 refs. In Russian.

Anokhin's theory of functional systems is applied to the objective evaluation of the functional state of persons performing monotonous work on a conveyor. Somatovegetative parameters characterizing the attainment of intermediate and end results of work activity were investigated for 72 female workers 18 to 28 years old engaged in the assembly and control of electrooptical systems. In the course of the establishment and sequencing of behavioral acts, the significance of the intermediate results was found to decrease, while that of the end result was found to increase, reflecting the degree to which the work activity was automated and the reduction of the time necessary to achieve the system result. The synchronization between the achievement of intermediate results and the variability of this synchronization between the achievement of intermediate results and the observed somatovegetative alterations and the variability of this synchronization reflected the extent of nervous and emotional tension.

B.J.

A82-27799 † Self-stimulation response as an anti-stress factor in animals (Reaktsiia samorazdrzheniia u zhivotnykh kak antistressornyi faktor). V. I. Badikov (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Akademiia Meditsinskikh Nauk SSSR, Vestnik*, no. 2, 1982, p. 69-75. 30 refs. In Russian.

Experimental results are presented on the time variations of cardiac activity and morphological abnormalities in the myocardium of rabbits resulting from daily stimulation for two weeks of negative emotiogenic zones (avoidance behavior) or from alternate stimulation of negative and positive zones (self-stimulation) of the hypothalamus. Particular attention is given to the occurrence of self-stimulation in the presence of subthreshold stimulation of negative emotiogenic hypothalamic zones and after their subsequent exclusion. It is found that there are no simple reciprocal relationships between mechanisms of positive and negative emotional responses. It is concluded that under certain conditions positive emotional states may play the role of an anti-stress factor.

B.J.

A82-27800 † Suction-type EKG electrodes with a remote vacuum pump for stress testing (Prosasyvaiushchiesia EKG-elektrody s vnesennym vakuum-nasosom dlia obsledovaniia pri fizicheskoi

nagruzke). G. P. Kolesova, V. A. Cherniak, V. N. Gedrazhko, and G. F. Mamchenko (Odesskii Meditsinskii Institut, Odessa, Ukrainian SSR). *Meditsinskaia Tekhnika*, Jan.-Feb. 1982, p. 44-46. In Russian.

A82-27801 † The bactericidal activity of various clothing fabrics and dressing materials (Bakteritsidnaia aktivnost' razlichnykh tkanei odezhdy i pereviazochnykh materialov). S. Sh. Umanskii, V. A. Naumov, and Iu. V. Filippovich (Tallinskii Nauchno-Issledovatel'skii Institut Epidemiologii, Mikrobiologii i Gigieny, Tallin, Estonian SSR). *Gigiena i Sanitariia*, Jan. 1982, p. 87, 88. 7 refs. In Russian.

A82-27802 † Meteorological radars as a source of microwave electromagnetic field energy and questions of environmental health (Meteorologicheskie radiolokatory kak istochnik energii elektromagnitnogo polia sverkhvysokochastotnogo diapazona i voprosy gigieny okruzhaiushchei sredy). Iu. D. Dumanskii, N. G. Nikitina, L. A. Tomashevskaiia, F. R. Kholiavko, K. S. Zhupakhin, and V. A. Iurmanov (Kievskii Nauchno-Issledovatel'skii Institut Obshechi i Kommunal'noi Gigieny, Kiev, Ukrainian SSR; Glavnaia Geofizicheskaia Observatoriia, Leningrad; Tsentral'naia Aerologicheskaiia Observatoriia, Dolgoprudny, USSR). *Gigiena i Sanitariia*, Feb. 1982, p. 7-11. 6 refs. In Russian.

Consideration is given to the electromagnetic fields found in the vicinity of meteorological radar stations and the significance of these fields to human health. The technical and operating characteristics of the three major types of meteorological radar, intended for use in determining cloud cover, conditions in the free atmosphere and the characteristics of thunderclouds and hail formations, are reviewed, and results of electromagnetic field surveys are presented which indicate meteorological radars to be significant sources of time- and spatially-varying microwave fields. Results of experiments in which rats were exposed to flux densities characteristic of those near meteorological radars (5 to 115 microwatt/sq cm) are indicated which have demonstrated significant changes in sensitivity to electrocutaneous stimulation, static work capacity, conditioned reflex activity as well as enzyme activities and metabolism following chronic exposure at the higher levels. Results thus demonstrate the need for the regulation of radar fields and the development of differentiated population norms. A.L.W.

A82-27803 † A method for the determination of the antimicrobial activity of clothing fabrics (K metodike opredeleniia antimikrobnnoi aktivnosti tkani odezhdy). Iu. V. Koval'skii and V. P. Padalkin (Vsesoiuznyi Nauchno-Issledovatel'skii Biotekhnicheskii Institut, Moscow, USSR). *Gigiena i Sanitariia*, Jan. 1982, p. 54-56. 6 refs. In Russian.

A82-27804 † Comprehensive evaluation of the human functional state using ergometry (Kompleksnaia otsenka funktsional'nogo sostoiianiia cheloveka pri ergometricheskikh issledovaniiax). V. A. Buzanov and V. V. Kal'nish (Ministerstvo Zdravookhraneniia Ukrain-skoi SSR, Institut Gigieny Truda i Profzabolevanii, Kiev, Ukrainian SSR). *Gigiena i Sanitariia*, Jan. 1982, p. 51-54. 10 refs. In Russian.

The paper proposes a method for calculating integral statistical characteristics (the arithmetical mean and the variance) of a set of dimensionless quantities characterizing the human functional state. Results of ergometric studies are presented for healthy and practically healthy persons 20 to 60 years old with reference to a set of physiological indices, including respiration and hemodynamics. B.J.

A82-27805 † Physiological, hygienic and psychological questions in the adaptation of sailors to conditions of year-round arctic navigation (Fiziologo-gigienicheskie i psikhologicheskie voprosy adaptatsii moriakov v usloviakh kruglogodovoi arkticheskoi navigatsii). D. I. Lazarenko, Iu. I. Rezina, S. A. Radzievskii, and S. A. Vinogradov (Ministerstvo Zdravookhraneniia SSSR, Nauchno-Issledovatel'skii Institut Gigieny Vodnogo Transporta, Moscow, USSR). *Gigiena i Sanitariia*, Jan. 1982, p. 15-17. 6 refs. In Russian.

A82-27806 † The possibility of maintaining the temperature and work capacity of the extremities (O vozmozhnosti podderzhanii temperatury i rabotosposobnosti konechnostei). V. S. Koshchev, V.

I. Makarov, and G. V. Bavro. *Gigiena i Sanitariia*, Feb. 1982, p. 24-26. 6 refs. In Russian.

An experimental study was conducted to study the work capacity and temperature of wrists that were unprotected from cold when the rest of the body was heated. For this purpose, a liquid-heated suit was used, with water being supplied from a temperature of 33 to 47 C, at intervals of 1.5-2 C. It is shown that at a water temperature of 42-43 C it is possible to maintain the wrist temperature at 30 C (if the body is at rest) and to make possible the execution of tasks requiring heightened finger mobility. B.J.

A82-27807 † A diagram for rapid analysis of albino rat electrocardiograms (Diagramma dlia ekspress-analiza elektrokardiogramov belykh krysov). N. N. Govorunova (Donetskii Meditsinskii Institut, Donetsk, Ukrainian SSR). *Gigiena i Sanitariia*, Feb. 1982, p. 58. In Russian.

A82-27808 † Effect of sodium fluoroacetate on oxygen consumption in rat and cat liver tissue and skeletal muscles (Vliianie fluoratsetata natriia na potreblenie kisloroda pechen'iu i skeletnymi myshtsami krysa i kosheka). V. A. Artiushkova and V. N. Timeiko (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR). *Voprosy Meditsinskoi Khimii*, vol. 28, Jan.-Feb. 1982, p. 77-81. 18 refs. In Russian.

A82-27809 † Mathematical modeling and analysis of death dynamics in irradiated mouse populations (Matematicheskoe modelirovanie i raschety dinamiki gibeli populatsii myshei pod deistviem oblucheniia). B. I. Rozenfel'd, P. G. But, and V. M. Chibrikina (Akademiia Nauk SSSR, Institut Khimicheskoi Fiziki, Pushchino, USSR). *Radiobiologiya*, vol. 22, Jan.-Feb. 1982, p. 133-136. 6 refs. In Russian.

A82-27810 † Microdosimetric analysis of the variability of radiobiological effects in experiments with high-energy radiation (Mikrodosimetriceskii analiz variabel'nosti radiobiologicheskikh efektov v eksperimentakh s vysokoenergeticheskimi izlucheniiami). I. M. Dmitrievskii, V. I. Ivanov, V. S. Shcheglov, I. G. Akoev, and S. S. Iurov (Moskovskii Inzhenerno-Fizicheskii Institut, Moscow; Akademiia Nauk SSSR, Institut Biologicheskoi Fiziki, Pushchino, USSR). *Radiobiologiya*, vol. 22, Jan.-Feb. 1982, p. 88-93. 10 refs. In Russian.

A microdosimetric analysis of received radiation levels has been undertaken in an attempt to account for the observed variability of biological effects in space experiments. Experiments involved the irradiation of T4B bacteriophage with secondary radiation generated by the impact of 70-GeV protons with a target. The survival rates of the various phage ampules are found to follow a log-normal distribution. Results are consistent with a model taking into account spatial fluctuations in local energy absorption resulting from the short interaction lengths of the products of hadronic interactions. A.L.W.

A82-27811 † The dynamics of rat bone marrow CFUc content during prolonged fractionated irradiation (Dinamika KOEK kostnogo mozga krysa v protseesse dlitel'nogo fraktsionirovannogo oblucheniia). V. M. Luzanov and K. N. Muksinova. *Radiobiologiya*, vol. 22, Jan.-Feb. 1982, p. 44-48. 15 refs. In Russian.

Changes in the levels of granulocyte precursor cells in the bone marrow of rats during prolonged exposure to ionizing radiation are studied. Numbers of colony-forming units in culture (CFUc) in the rat bone marrow were determined by the agar colony method along with myelocaryocyte and leukocyte numbers in rat bone marrow following daily exposure to 0.48 gram-roentgen dose of gamma radiation for up to 60 days. A 15% reduction in femoral CFUc levels is evident following the first irradiation with subsequent doses producing after 5 days a level 12% of that in intact rats. A less marked decrease in the levels of nucleated cells is also found in the first five days of irradiation. Following subsequent irradiation, however, CFUc numbers increased slightly to a final level 74% less than the control, and nucleated cell numbers continued to decline. Leukocyte levels remained at nearly the control values during the entire irradiation period. The decreases in precursor cells are thus concluded to be indicative of disturbances in granulocytogenesis caused by radiation. A.L.W.

A82-27812 † **Conductors of the airways (Dirizhery vozdukhnykh trass).** N. Zykov. *Nauka i Zhizn'*, Dec. 1981, p. 58, 59. In Russian.

The profession of air traffic controllers is discussed. The importance of air traffic control in the crowded airspace of today is pointed out, and the duties of the controller are indicated. Attention is also given to the qualifications and training required of an air traffic controller in the Soviet Union. A.L.W.

A82-28025 **Sleep loss, recovery sleep, and military performance.** D. R. Haslam (Army Personnel Research Establishment, Farnborough, Hants., England). *Ergonomics*, vol. 25, Feb. 1982, p. 163-178. 35 refs.

The results of a sleep-loss followed by rest cycle experiment involving military exercises are reported. The trials comprised 90 hours of wakefulness during tactical field exercises, followed by six days of permitted 4 hr sleep, followed by a 30 hr rest period. Ten infantrymen served as subjects, and were kept constantly occupied during the wakefulness portion of the experiment. Measurements were performed on grouping accuracy during rifle-shooting episodes, and 20 min logical reasoning and 10 min decoding tests were given at 1300, 0100, and 0545 hr every day; EEG recordings were constantly monitored through portable instruments. A decrement of 20% was observed in the grouping accuracy, with recovery occurring on day six and continuing. Results for the logical reasoning tests were higher at 0100 than 1300, although overall scores declined, faster for the decoding test. Any amount of sleep improved the reasoning test performance. Finally, alpha-state increased throughout the sleep-deprived periods, and EEG recordings indicated that sleep deprivation produced traces definable as a need state. M.S.K.

A82-28094 **How life began.** P. Cloud (Baas-Becking Geobiological Laboratory, Canberra, Australia). *Nature*, vol. 296, Mar. 18, 1982, p. 198, 199.

The discussions that took place at an international symposium in Jindabyne, New South Wales, in December 1981 are summarized. It was pointed out that molecules available as building blocks of life came from (1) chemical evolution in the dark nebulae of the Galaxy; (2) chemical evolution in the presolar nebula followed by the arrival on earth of its products in planetesimal debris; and (3) chemical evolution in the earth's primitive atmosphere and hydrosphere. Considerable attention was given to the origin of replication, with opinion divided on which came first: RNA, DNA, or sugars. It was contended that replication would have been favored by day-to-night temperature variations, and it was shown why chirality may not pose as much of a problem as once supposed. Attention was also given to the earliest known forms of life and to their probable biochemical evolution. C.R.

A82-28099 **/H-3-noradrenaline release potentiated in a clonal nerve cell line by low-intensity pulsed magnetic fields.** R. Dixey (St. Bartholomew's Hospital, London, England) and G. Rein (Queen Charlotte's Maternity Hospital, London, England). *Nature*, vol. 296, Mar. 18, 1982, p. 253-256. 25 refs.

A82-28113 * **Symbiosis in cell evolution: Life and its environment on the early earth.** L. Margulis (Boston University, Boston, MA). Research supported by NASA, Boston University, and California Institute of Technology; Grant No. NGR-22-004-025. San Francisco, W. H. Freeman and Co., 1981. 438 p. 1061 refs. \$15.

The book treats cell evolution from the viewpoint of the serial endosymbiosis theory of the origin of organelles. Following a brief outline of the symbiotic theory, which holds that eukaryotes evolved by the association of free-living bacteria with a host prokaryote, the diversity of life is considered, and five kingdoms of organisms are distinguished: the prokaryotic Monera and the eukaryotic Protocista, Animalia, Fungi and Plantae. Symbiotic and traditional direct filiation theories of cell evolution are compared. Recent observations of cell structure and biochemistry are reviewed in relation to early cell evolution, with attention given to the geological context for the origin of eukaryotic cells, the origin of major bacterial anaerobic pathways, the relationship between aerobic metabolism and atmospheric oxygen, criteria for distinguishing symbiotic organelles from those that originated by differentiation, and the major classes of eukaryotic organelles: mitochondria, cilia, microtubules, the mitotic

and meiotic apparatuses, and pastids. Cell evolution during the Phanerozoic is also discussed with emphasis on the effects of life on the biosphere. A.L.W.

A82-28114 **Multiplication noise in the human visual system at threshold. I - Quantum fluctuations and minimum detectable energy.** M. C. Teich, P. R. Prucnal, G. Vannucci, M. E. Breton, and W. J. McGill (Columbia University, New York, NY). *Optical Society of America, Journal*, vol. 72, Apr. 1982, p. 419-431. 84 refs. Research supported by the National Institutes of Health and NSF.

A series of frequency-of-seeing experiments, similar to those performed by Hecht et al. (1942), was conducted. An Ar(+) laser operated at 514.5 nm was employed as the source of light in the experiments. The present experiments differed from those conducted by Hecht et al. in that high false-report rates were encouraged in certain blocks of trials. A quantitative relationship between the average number of photons required at the cornea, for 60% frequency of seeing, and the false-positive rate demonstrates that sensitivity and reliability are traded against each other over a broad range. A neural-counting model for threshold detection is developed. G.R.

A82-28115 **Motion and vision. IV - Isotropic and anisotropic spatial responses.** D. H. Kelly (SRI International, Menlo Park, CA). *Optical Society of America, Journal*, vol. 72, Apr. 1982, p. 432-439. 17 refs. Grant No. NIH-EY-01128.

The preceding investigations in this series have dealt with the visual effects of stabilizing the retinal image of a vertical sine-wave grating that either was stationary or was moving at a constant horizontal velocity determined by the experimenter. The present investigation is concerned with a more general class of stimulus patterns which cannot be described as functions of any single Cartesian coordinate. The stabilized thresholds for a number of multicomponent patterns were measured and compared with the corresponding single-component, stabilized thresholds. It is found that, unlike the results with unstabilized patterns, the multicomponent results with stabilized, stationary patterns can be predicted by linear summation of the component contrasts. That is, when more than one component is present, the threshold depends mainly on the total contrast of the stimulus, not on the contrasts of the individual components. G.R.

A82-28116 **Fading of stabilized retinal images.** U. Tulunay-Keesey (Wisconsin, University, Madison, WI). *Optical Society of America, Journal*, vol. 72, Apr. 1982, p. 440-447. 19 refs. Grants No. NIH-EY-00308; No. NIH-EY-02483.

It is well known that targets whose images are stabilized on the retina by optical means, as well as afterimages that are naturally stabilized on the retina, fade and eventually disappear. Comparative data are presented on the rate of disappearance of stabilized images and afterimages as a function of contrast and spatial frequency. The main finding is that they disappear in a similar fashion only when target contrast is low. (Author)

A82-28117 **Finding the illuminant direction.** A. P. Pentland (MIT, Cambridge, MA). *Optical Society of America, Journal*, vol. 72, Apr. 1982, p. 448-455. 15 refs.

Shading is important for estimation of three-dimensional shape from the two-dimensional image, for instance, for distinguishing between the smooth occluding contour generated by the edge of a sphere and the shape occluding contour generated by the edge of a disk. In order to use shading information to solve such problems, one must know the illuminant direction L. This is because variations in image intensity (shading) are caused by changes in surface orientation relative to the illuminant. Each illuminant direction L has a unique effect on the distribution of changes in image intensity dI, potentially permitting the estimation of L. However, because dI is a function of both L and the surface curvature, L can be estimated from the image only by making an assumption about the imaged surface curvature. One assumption that is sufficient to disentangle L and surface curvature is that changes in surface orientation are isotropically distributed. This condition is true of images of convex objects bounded by a smooth occluding contour and is true on average over all scenes. Estimates made by using this assumption agree with estimates of illuminant direction given by human subjects

for images of natural objects, even when both are objectively wrong. Further, there is a significant correlation between the variance of these estimates and the variance of the human subjects' estimates.

(Author)

A82-28123 Comparison of flicker-photometric and flicker-threshold spectral sensitivities while the eye is adapted to colored backgrounds. A. Eisner (Chicago, University, Chicago, IL). *Optical Society of America, Journal*, vol. 72, Apr. 1982, p. 517, 518. 8 refs. Grant No. NIH-EY-01711.

Eisner and MacLeod (1981) have reported that visual sensitivity as measured with flicker photometry on appropriately colored backgrounds is determined predominantly by the response from only one type of cone. The present investigation is concerned with the repetition of the chromatic-adaptation experiments in a modified form. This time the detection of flicker of a fully modulated test is used as a criterion in place of the flicker-photometric null or minimization of flicker. Since flicker thresholds provide an absolute measure of sensitivity and are amenable to a threshold versus intensity treatment, unlike flicker photometry, it is of interest to determine whether the two methods yield the same relative, i.e., spectral sensitivities for a given chromatic adapting field. It is found that there are no significant or systematic differences between the two measures of spectral sensitivity. Flicker photometry is the more precise measure. G.R.

A82-28218 Statistical optimization of interaction in man-machine systems. I. V. Kurochkin and A. A. Mal'tsev. (*Avtomatika i Telemekhanika*, Aug. 1981, p. 35-45.) *Automation and Remote Control*, vol. 42, no. 8, Jan. 10, 1982, pt. 1, p. 1024-1031. 11 refs. Translation.

Statistical optimization of the interaction in a man-machine system is considered on the basis of finding the optimal gains of the actuating and indicating devices as a function of the characteristics of the human operator and the system noise level. It is assumed that the human operator acts like a Kalman filter and within certain limits he can adjust (adapt) his parameters to the parameters of the controlled plant and the environment in accordance with his performance criterion functional; the latter represents the operator's influence on the accuracy of stabilization of the plant coordinate, the intensity of 'his' control action, and the overall energy expenditure of the system on control. An analytic solution is studied, and it is experimentally checked for the problem of statistically optimal interaction between the human operator and a first-order dynamic plant. (Author)

A82-28227 * Amino acid codes in mitochondria as possible clues to primitive codes. T. H. Jukes (California, University, Berkeley, CA). *Journal of Molecular Evolution*, vol. 18, Dec. 1981, p. 15-17. 15 refs. Grant No. NGR-05-003-460.

Differences between mitochondrial codes and the universal code indicate that an evolutionary simplification has taken place, rather than a return to a more primitive code. However, these differences make it evident that the universal code is not the only code possible, and therefore earlier codes may have differed markedly from the previous code. The present universal code is probably a 'frozen accident.' The change in CUN codons from leucine to threonine (*Neurospora* vs. yeast mitochondria) indicates that neutral or near-neutral changes occurred in the corresponding proteins when this code change took place, caused presumably by a mutation in a tRNA gene. (Author)

A82-28228 * Molecular relationships between closely related strains and species of nematodes. M. H. Butler, S. M. Wall, K. R. Luehrsen, G. E. Fox, and R. M. Hecht (Houston, University, Houston, TX). *Journal of Molecular Evolution*, vol. 18, Dec. 1981, p. 18-23. 45 refs. Grant No. PHS-HD-11071; Grant No. NsG-7440.

Electrophoretic comparisons have been made for 24 enzymes in the Bergerac and Bristol strains of *Caenorhabditis elegans* and the related species, *Caenorhabditis briggsae*. No variation was detected between the two strains of *C. elegans*. In contrast, the two species, *C. elegans* and *C. briggsae* exhibited electrophoretic differences in 22 of 24 enzymes. A consensus 5S rRNA sequence was determined for *C. elegans* and found to be identical to that from *C. briggsae*. By analogy with other species with relatively well established fossil records it can be inferred that the time of divergence between the two nematode species is probably in the tens of millions of years.

The limited anatomical evolution during a time period in which proteins undergo extensive changes supports the hypothesis that anatomical evolution is not dependent on overall protein changes.

(Author)

A82-28229 * Formation of pyrophosphate, tripolyphosphate, and phosphorylimidazole with the thioester, N, S-diacetylcysteamine, as the condensing agent. A. L. Weber (Salk Institute for Biological Studies, San Diego, CA). *Journal of Molecular Evolution*, vol. 18, Dec. 1981, p. 24-29. 56 refs. Grant No. NsG-7627.

The formation of pyrophosphate, tripolyphosphate and phosphorylimidazole from orthophosphate in the presence of the thioester N, S-diacetylcysteamine is reported. Reactions performed with 0.20 M orthophosphate and 0.20 M N, S-diacetylcysteamine in 0.40 M imidazole under drying conditions at 50 C yielded pyrophosphate and tripolyphosphate after six days in the presence and absence of divalent metal ions. Reactions carried out at ambient temperature yielded phosphorylimidazole in the presence or absence of 0.05 M MgCl₂, phosphorylimidazole and pyrophosphate in the presence of 0.05 M CaCl₂, and pyrophosphate and tripolyphosphate in the presence of 0.15 M CaCl₂. Such reactions represent potential pathways for the formation of energy-rich compounds providing free energy for use in prebiotic biopolymer synthesis. A.L.W.

A82-28230 Comparative biosequence metrics. T. F. Smith (Northern Michigan University, Marquette, MI), M. S. Waterman (Los Alamos National Laboratory, Los Alamos, NM), and W. M. Fitch (Wisconsin, University, Madison, WI). *Journal of Molecular Evolution*, vol. 18, Dec. 1981, p. 38-46. 15 refs. NSF Grant No. DEB-78-14197.

A comparison is presented of the algorithms of Needleman and Wunsch (1970) and of Sellers (1974) for comparing unaligned macromolecular sequences in order to obtain a measure of their evolutionary relatedness. The Needleman-Wunsch algorithm is shown to result in alignments having a maximum similarity measure, while the Sellers algorithm results in alignments having a minimal distance or dissimilarity measure. The algorithms are equivalent, however, and give the same results under the conditions that the weight assigned to gaps in the Sellers algorithm exceeds that in the Needleman-Wunsch algorithm by the product of half the gap length with the maximum match value, and the sum of the respective degrees of similarity and dissimilarity equals a constant. Applications of the two algorithms to studies of sequences incorporating functionally aligned elements are illustrated, and it is noted that the algorithms may be used to align anything from geological sequences to protein amino acids. A.L.W.

A82-28231 * The current status of REH theory. R. Holmquist and T. H. Jukes (California, University, Berkeley, CA). *Journal of Molecular Evolution*, vol. 18, Dec. 1981, p. 47-59; Reply, p. 60-67. 70 refs. Grant No. NGR-05-003-460.

A response is made to the evaluation of Fitch (1980) of REH (random evolutionary hits) theory for the evolutionary divergence of proteins and nucleic acids. Correct calculations for the beta hemoglobin mRNAs of the human, mouse and rabbit in the absence and presence of selective constraints are summarized, and it is shown that the alternative evolutionary analysis of Fitch underestimates the total fixed mutations. It is further shown that the model used by Fitch to test for the completeness of the count of total base substitutions is in fact a variant of REH theory. Considerations of the variance inherent in evolutionary estimations are also presented which show the REH model to produce no more variance than other evolutionary models. In the reply, it is argued that, despite the objections raised, REH theory applied to proteins gives inaccurate estimates of total gene substitutions. It is further contended that REH theory developed for nucleic sequences suffers from problems relating to the frequency of nucleotide substitutions, the identity of the codons accepting silent and amino acid-changing substitutions, and estimate uncertainties. A.L.W.

A82-28250 Oculoparalytic illusion - Visual-field dependent spatial mislocalizations by humans partially paralyzed with curare. L. Matin, E. Picoult, D. Young, R. MacArthur (Columbia University, New York, NY), J. K. Stevens (Toronto, University, Toronto, Canada), and M. W. Edwards, Jr. (Pennsylvania, University,

Philadelphia, PA). *Science*, vol. 216, Apr. 9, 1982, p. 198-201. 12 refs. Grant No. NIH-EY-03198; Contract No. N62269-80-C-0296.

In darkness, observers partially paralyzed with curare make large (greater than 20 deg) gaze- and dosage-dependent errors in visually localizing eye-level horizontal and median planes, in matching the location of a sound to a light, and in pointing at a light. In illuminated, structured visual fields, visual localization and pointing are accurate but errors in auditory-to-visual matches remain. Defects in extraretinal eye position information are responsible for all errors. The influence of extraretinal eye position information on visual localization is suppressed by a structured visual field but is crucial both in darkness and for intersensory localization if visual capture is prevented. (Author)

A82-28284 Basic nitrogen-heterocyclic compounds in the Murchison meteorite. P. G. Stoks and A. W. Schwartz (Nijmegen, Katholieke Universiteit, Nijmegen, Netherlands). *Geochimica et Cosmochimica Acta*, vol. 46, Mar. 1982, p. 309-315. 29 refs.

A fragment of the Murchison (C2) carbonaceous meteorite was analyzed for basic, N-heterocyclic compounds, by dual detector capillary gas chromatography as well as capillary gas chromatography/mass spectrometry, using two columns of different polarity. In the formic acid extract 2, 4, 6-trimethylpyridine, quinoline, isoquinoline, 2-methylquinoline and 4-methylquinoline were positively identified. In addition, a suite of alkylpyridines and quinolines and/or isoquinolines was tentatively identified from their mass spectra. The (iso)quinolines are found to contain methyl substituents exclusively. The distribution of the pyridines observed reveals a similarity to that observed from catalytic reactions of ammonia and simple aldehydes under conditions similar to those applied in Fischer-Tropsch reactions. (Author)

A82-28393 # Design and validation of a tracking test for forming matched groups for continuous tracking experiments. F. D. Pitrella and W. Krüger. Wachtberg-Werthhoven, West Germany, Forschungsinstitut für Anthropotechnik (Forschungsinstitut für Anthropotechnik, Bericht, No. 49), 1981. 29 p. 22 refs.

Questions regarding the appropriate selection of an experimental design are examined, taking into account within-subject designs, hybrid designs, and between-subject designs. The selection of a criterion task and the selection of a matching test control device are discussed, and a description is presented of the procedure employed to validate a matching test. A pilot experiment is considered along with validation experiments, questions of predictive validity, and aspects of matching validity. A data analysis is conducted, giving attention to test reliability data, the performance degradation problem, the selection of the correlation coefficient, and the validation coefficients. Validation coefficients for low error half blocks and high error half blocks are listed in tables. G.R.

A82-28394 # The evaluation of information display on the basis of the transinformation (Die Bewertung von Anzeigen durch den Transinformationsfluss). K. R. Kimmel. Wachtberg-Werthhoven, West Germany, Forschungsinstitut für Anthropotechnik (Forschungsinstitut für Anthropotechnik, Bericht, No. 52), 1981. 86 p. 92 refs. In German.

Investigations in the area of human engineering require, in addition to mathematical models describing the activities of man, also suitable parameters for an evaluation of the relevant ergonomic performance quantities. The present investigation is concerned with a comparison of two evaluative criteria, including the rms control error and the transinformation. The rms control error provides a measure concerning the control performance obtained for various parameter configurations. The parameter 'transinformation' can be used as a measure with respect to the capability of man to function as an information-processing system in connection with the performance of a control task. An understanding of a part of the arising transinformation-related effects could be obtained on the basis of theoretical considerations. The superiority of transinformation as a measure was found to be ultimately based on a greater general validity and the dimensionless properties. G.R.

A82-28453 † Tissue chemoreceptors (Tkanevye khemoreseptory). V. A. Lebedeva, L. V. Filippova, T. N. Bratus', and V. N.

Iartsev (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 68, Feb. 1982, p. 137-149. 36 refs. In Russian.

Results of studies conducted over the past 25 years on the role of tissue chemoreceptors in the reflex regulation of cardiovascular and respiratory activity are reviewed. Experimental modifications of the acid-base balance of the cat small intestine by perfusion or the administration of acid are presented which have shown an increase in mesenteric nerve firing and elevation of systemic arterial pressure upon induced acid concentrations within the normal range, with a greater sensitivity to metabolic than respiratory acidosis. Further studies have shown the skeletal muscle chemoreceptors to be less sensitive than the small intestine chemoreceptors, although thresholds for stimulation were still in the physiological range, and have demonstrated a possible action of the small intestine chemoreceptors in the reflex regulation of respiration. Results are noted to support the view of Chernigovskii concerning the role of the tissue chemoreceptors in providing the central nervous system with information on the rate of tissue metabolism. A.L.W.

A82-28454 † Trace reactions and the ambient temperature (Sledovye reaktzii i temperatura sredy). A. D. Slonim (Akademiia Nauk Kirgizskoi SSR, Institut Fiziologii i Eksperimental'noi Patologii Vysokogor'ia, Frunze, Kirgiz SSR). *Fiziologicheskii Zhurnal SSSR*, vol. 68, Feb. 1982, p. 172-176. 45 refs. In Russian.

Experimental data concerning thermoregulatory trace reactions on the organismal, organ and tissue levels in response to the effects of ambient temperatures is discussed. Observations have allowed three major types of reaction to be distinguished: adaptation upon continuous or intermittent exposure to temperature, the formation of a conditioned thermoregulatory reflex, and habituation following either single or repeated thermal stimuli. Reactions on the cellular and tissue levels are observed within 6 to 24 hours of the thermal stimulus, while reactions on the level of the entire organism form after 5 days of high-intensity intermittent exposure and persist for up to 30. The traces may be maintained after prolonged and repeated exposures for periods of months or even years, combining with natural physiological rhythms. The effects of thermal stimuli are observed to be greatest in the regulatory systems, and in complex behavioral acts, and lesser in effector systems and in the more simple behaviors. A.L.W.

A82-28455 † Some neurophysiological correlates of visual perception (O nekotorykh neirofiziologicheskikh korreliatakh zritel'nogo vospriiatiia). V. D. Glezer (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 68, Feb. 1982, p. 220-228. 33 refs. In Russian.

The role of the spatial frequency filter receptor fields of the visual cortex in shape and image perception is discussed on the basis of an examination of the structural organization of the simple and complex receptor fields of the visual cortex. The two dimensional weighting function determining the spatial frequency and orientation sensitivity of the spatial frequency filter is analyzed. Two types of modules, cortical neuron cylinders with overlapping visual fields but tuned to different spatial frequencies and orientations, are considered: those containing neurons which give a Fourier description of image portions and those which provide a power spectrum, which are suggested to function in texture description. Receptive field inhibition by side frequencies of the optimal frequency and orientations perpendicular to the optimal orientation is taken as evidence of the mutual inhibition of module neurons. A.L.W.

A82-28456 † Some mechanisms of central inhibition (O nekotorykh mekhanizmax tsentral'nogo tormozheniia). A. B. Kogan (Rostovskii Gosudarstvennyi Universitet, Rostov-on-Don, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 68, Feb. 1982, p. 256-262. 28 refs. In Russian.

The organization of the various complex processes of central inhibition, by which the central nervous system takes part in the organization, fine-structure specification and space-time determination of any nervous act, is discussed. On the neuronal level, inhibition is shown to be expressed by the reorganization of subcellular elements, while at the level of nerve centers it is achieved by the patterns of inhibited and excited neurons and at the level of systems of nervous activity by the hierarchical relations of interacting nervous centers. It is noted, however, that at all levels

inhibition or excitation is organized according to the specific space-time distribution of the activities of the components in question. A.L.W.

A82-28457 † The contribution of V. N. Chernigovskii to the development of diving physiology and medicine (Vklad V. N. Chernigovskogo v razvitie vodolaznoi fiziologii i meditsiny). I. A. Sapov. *Fiziologicheskii Zhurnal SSSR*, vol. 68, Feb. 1982, p. 263-266. 16 refs. In Russian.

Work done by V. N. Chernigovskii in the field of diving physiology and medicine during his tenure at the Soviet Naval Medical Academy and the Standing Commission on Underwater Physiology and Medicine of the Presidium of the Soviet Academy of Sciences is reviewed. His major contributions were in the organization of fundamental studies of physiological reactions to elevated pressures and the occupational pathology of divers, and the planning, interpretation and generalization of the results of fundamental and practical investigations covering a wide range of subjects in the physiology and medicine of diving. A.L.W.

A82-28458 † Mechanisms for the adaptive and trophic effects of the sympathetic nervous system on cerebral vessels and tissue (Mekhanizmy adaptatsionno-troficheskikh vliianii simpaticheskoi nervnoi sistemy na sosudy i tkan' golovnogo mozga). S. I. Teplov (Leningradskii Neirokhirurgicheskii Institut, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 68, Feb. 1982, p. 275-283. 19 refs. In Russian.

The adaptive and trophic role of sympathetic innervation is studied in experiments on the immediate and delayed effects of cervical sympathectomy and postganglionic fiber stimulation on cerebral blood flow, hypothalamic neurosecretion and cerebral metabolism. Acute experiments on cats have revealed the adaptive functioning of the sympathetic innervation of cerebral vessels during rapid changes in systemic arterial pressure by rapid autoregulation and the maintenance of the blood-brain barrier, as well as the dependence of the circulatory effects of desympathetization on basal vascular tonus. The delayed effects of sympathetic excitation, vasoconstriction and edema, are found to depend on vasopressin secretion. Biochemical investigations on rats also demonstrated changes in ATPase activity, oxidation and phosphorylation rates, cAMP cGMP and prostaglandin concentrations following cervical desympathetization and cerebral ischemia. Results have significance for the understanding of brain compensatory mechanisms for hypoxia and other damaging factors. A.L.W.

A82-28459 † The information content of indicators of cerebral vascular responses to adequate influences (Ob informativnosti pokazatelei reaktsii mozgovykh sosudov na adekvatnye vozdeistviia). Iu. E. Moskalenko, V. A. Khil'ko, G. B. Vainshtein, D. Kh. Gardovska, V. N. Semernia, B. V. Gaidar, and E. S. Hurguzhaev (Akademiia Nauk SSSR, Institut Evoliutsionnoi Fiziologii i Biokhimii, Leningrad, USSR; Voenna-Meditsinskaia Akademiia, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 68, Feb. 1982, p. 284-292. 8 refs. In Russian.

Possible indicators of cerebral vascular reactivity to adequate biomechanical effects are evaluated for their information content in the assessment of the physiological condition of cerebral circulatory regulation. Experiments involved the measurement of the level of cerebral blood flow, intracranial pressure, and cerebral blood-filling dynamics as well as central hemodynamic parameters in animals, healthy people including children of various ages and surgical patients with craniocerebral traumas under normal conditions and during the performance of the Valsalva, Quekenstedt, Stukkey and orthostatic tests. Changes in the levels of all the parameters measured during hemodynamic and liquorodynamic stresses are found to depend on the physiological condition of the organism, indicating that they may be used to provide objective criteria for the evaluation of the activity of regulatory processes in cerebral circulation. A.L.W.

A82-28478 The extraction and identification of drugs in aviation toxicology. R. W. Mayes (RAF, Institute of Pathology and Tropical Medicine, Halton, Bucks., England). (*Joint Committee on Aviation Pathology Scientific Session, 12th, Aylesbury, Bucks., England, Oct. 14-16, 1980.*) *Aviation, Space, and Environmental*

Medicine, vol. 53, Apr. 1982, p. 332-335. 6 refs.

The drug screen as used in Aviation Pathology is unique in toxicological analysis in that it seeks to identify the whole range of clinical drugs at or below therapeutic levels. Recently the introduction of proteolytic enzymes has enabled more efficient extraction of drugs from tissues. The measurement of the Gas Chromatographic Retention Index can provide an important parameter in the identification of drug substances. (Author)

A82-28479 G stress on A-10 pilots during JAWS II exercises. K. K. Gillingham, D. L. Makalous, and M. A. Tays (USAF, School of Aerospace Medicine, Brooks AFB, TX). *Aviation, Space, and Environmental Medicine*, vol. 53, Apr. 1982, p. 336-341. 9 refs.

It had been found that the jinking maneuvers employed by A-10 pilots to deprive the enemy of a readily trackable target resulted in a nearly constant exposure to moderate levels of G stress, with frequent excursions to relatively high G levels. The present investigation is, therefore, concerned with the contribution of G stress to fatigue experienced by pilots in connection with A-10 operations. Continuous time records of +G load on the aircraft were obtained on eight sorties with an Inflight Physiological Data Acquisition System module. It was found that defensive jinking maneuvers during combat necessitates numerous short exposures to G level in the 4-7 G range, but acute symptoms of G intolerance in A-10 pilots are nearly nonexistent. Repetitiveness of G exposure may contribute to pilot fatigue. However, the problem of task saturation is of far greater importance to the pilot than G stress. G.R.

A82-28480 Altitude and hypoxia as phase shift inducers. I. E. Ashkenazi, J. Ribak, D. M. Avgar, and A. Klepfish (Tel Aviv University, Tel Aviv; Israel Air Force, Aeromedical Centre, Israel). *Aviation, Space, and Environmental Medicine*, vol. 53, Apr. 1982, p. 342-346. 18 refs.

Experimental results to determine if an unnatural mechanism could be introduced so that circadian rhythm shifts could be accomplished abruptly, rather than over an adaptive period, are reported. Two females and one male practiced questionnaires and performance tests, maintained the same waking/rest cycles, and ate the same food for a week. Subsequent exposure to atmospheric pressure reduction and hypoxia in a flight simulator were followed by medical tests and performance of perceptual, recognition, and cognitive tests, and performance was tracked for 24 hr diurnal rhythms in performance ability. The tests were repeated for 6 days. The test results indicated a circadian rhythm phase shift immediately after exposure to simulated flight, which led to postulation of two kinds of biological synchronizers. One controls a slow adaptation to changes in the temporal order, letting each receptor (oscillator) in the body react in its own time, while a second mechanism reacts to alien cues not experienced by evolution, and which induces all receptors to react as one. M.S.K.

A82-28481 Evidence for the involvement of central alpha2 mechanisms in intrathoracic volume expansion-induced diuresis - A study with clonidine and propranolol. P. Montastruc, J.-L. Montastruc, and L. D. Tran (Toulouse III, Université, Toulouse, France). *Aviation, Space, and Environmental Medicine*, vol. 53, Apr. 1982, p. 347-353. 17 refs.

The inhibition of diuresis through use of clonidine, an alpha2-adrenergic agonist, induced by a rise in intrathoracic plasma volume in dogs was studied to define the role of alpha2 adrenoreceptors. Thirty anesthetized dogs were monitored for blood pressure, heart rate, respiratory frequency, and urinary volume, while the lungs were connected to a spirometer after tracheotomy. An incision was made in the fourth left intercostal space in order to insert a balloon into the left atrium, followed by inflation of the balloon with water. The dogs were exposed to negative pressure breathing for 30 min/hr. An intravenous or intracisternal clonidine injection inhibited the diuretic response to negative pressure breathing and left atrial distension. Intravenous yohimbine opposed the effects of the clonidine. The results indicated that the adrenergic receptor associated with the volumetric control of vasopressin secretion is an alpha2 subtype. M.S.K.

A82-28482 Ventilation and acid-base equilibrium for upper body and lower body exercise. M. N. Sawka, D. S. Miles, J. S. Petrofsky, S. W. Wilde, and R. M. Glaser (Wright State University;

U.S. Veterans Administration Medical Center, Dayton, OH). *Aviation, Space, and Environmental Medicine*, vol. 53, Apr. 1982, p. 354-359. 35 refs. Research supported by the U.S. Veterans Administration; Grant No. NIH-7-RO1-NS-16003-01; Contract No. F33615-78-C-0501.

Results of a comparison of pulmonary ventilation and blood acid-base responses of humans during arm crank and cycle ergometer exercise at various metabolic intensities are reported. Nine male subjects were monitored on ECG, cardiograph, spirometer, and gasometer, in addition to measurements of blood pH and flow, respiration rate, and alveolar ventilation. Oxygen uptake, pulmonary ventilation, alveolar ventilation and blood lactate values increased during submaximal exercise, and were lower in arm crank than in cycle ergometer maximal exercise. However, further investigation of the measured values in relation to peak oxygen uptake revealed identical response patterns, implying that the pulmonary ventilation and blood acid-base responses are more dependent on the relative exercise intensity than on the muscle groups employed. M.S.K.

A82-28483 **Effect of flight on the Eustachian tube function and the tympanic membrane system - A follow-up study.** P. Groth, A. Ivarsson, and O. Tjernstrom (Lund, Universitet, Lund; Malmo General Hospital, Malmo, Sweden). *Aviation, Space, and Environmental Medicine*, vol. 53, Apr. 1982, p. 360-364. 17 refs.

The Eustachian tube function in 32 aviation trainees was comprehensively tested in simulated flights in a pressure chamber on three occasions during their training. Their mean flight experience between tests comprised 150 h in jet training planes and 260 h in jet fighters. Their capacity to clear the ears in descent did not improve convincingly between tests, but the pressure opening level in ascent was significantly lowered. The elasticity of the eardrum system was significantly increased. The results suggest that the first test, before the flight training, is reliable for selection purposes. Reasons for difficulties in finding good agreement between test results and results of actual flight training are discussed. (Author)

A82-28484 **The strength-endurance relationship in skeletal muscle - Its application to helmet design.** J. S. Petrofsky and C. A. Phillips (Wright State University, Dayton, OH). *Aviation, Space, and Environmental Medicine*, vol. 53, Apr. 1982, p. 365-369. 17 refs. Grant No. DAMD17-80-C-0089.

The isometric strength and endurance of the neck muscles in man was measured in four male subjects during dorsal, ventral, and lateral flexion of the head in a helmet dynamometer. The purpose of these experiments was to quantify the maximum strength of the neck muscles in these directions and to examine the relationship between isometric strength and endurance for various submaximal isometric tensions. Isometric contractions were sustained to fatigue by these subjects at tensions of 25, 40, 55, 70, and 90% of the maximum isometric strength in each of the directions of movement. Generally, the endurance of the muscles involved in ventral flexion was less than that found in dorsal and lateral flexion of the head. However, the strength of the muscles involved was progressively greater for lateral, dorsal, and ventral flexion, respectively. The implication of these findings in helmet design and helmet loading are discussed. (Author)

A82-28485 **Effects of space flight factors at the cellular level - Results of the Cytos experiment.** H. Planel, R. Tixador, Yu. Nefedov, G. Grechko, and G. Richoille (Toulouse III, Université, Toulouse, France; Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR). *Aviation, Space, and Environmental Medicine*, vol. 53, Apr. 1982, p. 370-374. 20 refs.

Paramecium tetraurelia was cultivated aboard the Soviet orbital station Salyut 6. Each culture included one cell, bacterized culture medium, and two small glass tubes filled with a fixative. Cultures were kept at a low temperature before Soyuz-Salyut docking. Cultures were maintained at 25 plus or minus 0.1 C in orbit and were fixed every 12 h. The space flight resulted in an increase in cell growth rate and in cell volume. Measurements of cell dry weight and total protein content favor a higher cell water content. Respective roles of cosmic rays and microgravity are discussed. Cytos results are compared to those of previous space experiments. (Author)

A82-28486 * **A practical ultrasonic plethysmograph.** V. C. Wu, W. T. Nickell, and P. K. Bhagat (Kentucky, University, Lexington, KY). *Aviation, Space, and Environmental Medicine*, vol. 53, Apr. 1982, p. 375-378. 9 refs. Contract No. NAS9-15452.

An ultrasonic plethysmograph, which gives improved performance over the standard Whitney Strain Gauge, is described. This instrument monitors dimension changes in human limbs by measuring the transit times of acoustic pulses across two chords of the limb. In the case of a small uniform expansion, the percentage change in limb volume is shown to be proportional to twice the percentage change in either of the measured chords. Measurement of two chords allows correction for possible non-uniform expansion. In addition, measurement of two chords allows an estimate of the absolute cross-sectional area of the limb. The developed instrument incorporates a microprocessor, which performs necessary calculation and control functions. Use of the microprocessor allows the instrument to be self-calibrating. In addition, the device can be easily reprogrammed to incorporate improvements in operating features or computational schemes. (Author)

A82-28487 **Relationship of personality factors and some social habits to cardiovascular risk in submariners.** D. V. Tappan and B. B. Weybrew (U.S. Navy, Naval Submarine Medical Research Laboratory, Groton, CT). *Aviation, Space, and Environmental Medicine*, vol. 53, Apr. 1982, p. 383-389. 34 refs.

A82-28488 **Post-acceleration chaotic atrial rhythm.** J. E. Whinnery (USAF, School of Aerospace Medicine, Brooks AFB, TX). *Aviation, Space, and Environmental Medicine*, vol. 53, Apr. 1982, p. 390-392. 11 refs.

Chaotic atrial rhythm has traditionally been a dysrhythmia of the seriously ill elderly patient and commonly associated with pulmonary disease. It has been reported less frequently in young individuals with and without pulmonary disease. An apparently healthy asymptomatic centrifuge subject had reproducible episodes of chaotic atrial rhythm only in the recovery period after exhaustive +G2 simulated aerial combat maneuvering. The underlying mechanism responsible for initiation of chaotic atrial rhythm is unknown, but may be related to distension of atrial tissue. In lung disease with attendant pulmonary hypertension or post +G2 stress with the sudden increase in venous return, the necessary distension of the right atrium can be induced. The prognosis of individuals with chaotic atrial rhythm depends on the severity of the underlying illness and is probably benign in apparently healthy asymptomatic individuals with normal cardiovascular evaluation. (Author)

A82-28489 **Airline pilot disability - Economic impact of an airline preventive medicine program.** R. Anderson (Air Canada, Montreal, Canada) and C. C. Gullett (Harvey W. Watt and Co., Atlanta, GA). *Aviation, Space, and Environmental Medicine*, vol. 53, Apr. 1982, p. 398-402.

The current economic crisis facing most major United States airlines has forced a close examination of airline-sponsored activities. The effectiveness of one airline's pilot preventive medicine program was estimated by comparing disability experience of its pilots against the experience of a larger population of airline pilots. The preventive medicine program at the studied airline was shown to reduce disability experience by one-third, while saving the airline better than \$6 million annually. This program yielded the airlines better than a 6-1 return on investment during the years studied. (Author)

A82-28490 **Beta adrenergic blocking agents to control hypertension in aviation personnel.** C. L. Schamroth, R. Davidoff, J. M. Schamroth, and D. P. Myburgh (Institute for Aviation Medicine, Pretoria, Republic of South Africa). *Aviation, Space, and Environmental Medicine*, vol. 53, Apr. 1982, p. 403, 404. 6 refs.

Beta adrenergic receptor blocking agents were used in the treatment of 15 hypertensive aircrew who had failed to respond to thiazide diuretics. Atenolol (Tenormin) resulted in adequate control of blood pressure in all subjects. Side effects were minimal and insignificant. It is recommended that a cardio-selective, water-soluble beta blocker, such as atenolol, be made available to selected hypertensive aircrew. (Author)

A82-28500

A82-28500 **Evidence for a boundary effect in roll vection.**
J. T. Reason, A. R. Mayes, and D. Dewhurst (Manchester, Victoria University, Manchester, England). *Perception and Psychophysics*, vol. 31, no. 2, Feb. 1982, p. 139-144. 13 refs.

Experiments on the effects of the structural characteristics of large circular displays rotating around the line of sight on the magnitude and onset latency of the illusory tilt of the perceived true vertical are presented. In the first experiment, subjects viewed each of nine displays with varying numbers and areas of circular elements, and it was found that the tilt magnitudes increased and latency decreased as the sum of element diameters increased, suggesting the illusion of tilt to be linear related to the logarithm of total boundary length. A second experiment conducted with two displays of equal element boundary length but different spatial frequencies confirmed the determining influence of boundary length. A final experiment with four annular displays with the same number of equally sized elements at different retinal eccentricities showed that more peripheral displays produced a greater tilt magnitude and more rapid onset, indicating the boundary effect to be influenced by retinal location.

A.L.W.

STAR ENTRIES

N82-20828*# Utah State Univ., Logan.
HIGHER PLANT RESPONSE TO ELEVATED ULTRAVIOLET IRRADIANCE Final Report
 Martyn M. Caldwell 30 Dec. 1981 425 p refs
 (Contract NAS9-14871)
 (NASA-CR-167538; NAS 1.26:167538) Avail: NTIS
 HC A18/MF A01 CSCL 06C

The effect of ultraviolet irradiation on pollen germination, ultraviolet action spectra influencing photosynthesis, and plant adaptations to ultraviolet-B radiation are reported.

N82-20829*# Utah State Univ., Logan.
THE ULTRAVIOLET RADIATION ENVIRONMENT OF POLLEN AND ITS EFFECT ON POLLEN GERMINATION Final Report
In its Higher Plant Response to Elevated Ultraviolet Irradiance
 30 Dec. 1981 50 p refs

Avail: NTIS HC A18/MF A01 CSCL 06C

The damage to pollen caused by natural ultraviolet radiation was investigated. Experimental and literature research into the UV radiation environment is reported. Viability and germination of wind and insect pollinated species were determined. Physiological, developmental, and protective factors influencing UV sensitivity of binucleate, advanced binucleate, and trinucleate pollen grains are compared. J.D.H.

N82-20830*# Utah State Univ., Logan.
PROTECTIVE MECHANISMS AND ACCLIMATION TO SOLAR ULTRAVIOLET-B RADIATION IN OENOTHERA STRICTA Final Report
 Ronald Robberecht and Martyn M. Caldwell *In its* Higher Plant Response to Elevated Ultraviolet Irradiance 30 Dec. 1981 59 p refs
 Avail: NTIS HC A18/MF A01 CSCL 06C

Plant adaptations ameliorating or repairing the damaging effects of ultraviolet-B (UV-B) radiation on plant tissue were investigated. The degree of phenotype plasticity in UV protective mechanisms and acclimation in relation to the natural solar UV-B radiation flux and in an enhanced UV-B irradiance environment was also examined. Mechanisms by which plants avoid radiation, adaptations altering the path of radiation incident on the leaf, and repair processes were considered. Attenuation of UV-B by tissues, UV-B irradiation into the leaf, and the effects of UV-B on photosynthesis were investigated. J.D.H.

N82-20831*# Utah State Univ., Logan.
ACTION SPECTRA FOR PHOTOSYNTHETIC INHIBITION Final Report
 Martyn M. Caldwell, Stephan Flint, and L. B. Camp *In its* Higher Plant Response to Elevated Ultraviolet Irradiance 30 Dec. 1981 20 p refs
 Avail: NTIS HC A18/MF A01 CSCL 06C

The ultraviolet action spectrum for photosynthesis inhibition was determined to fall between that of the general DNA action spectrum and the generalized plant action spectrum. The characteristics of this action spectrum suggest that a combination of pronounced increase in effectiveness with decreasing wavelength, substantial specificity for the UV-B waveband, and very diminished response in the UV-A waveband result in large radiation amplification factors when the action spectra are used as weighting functions. Attempted determination of dose/response relationships for leaf disc inhibition provided inconclusive data from which to deconvolute an action spectrum. J.D.H.

N82-20832*# California Univ., Berkeley. Environmental Physiology Lab.
BODY COMPOSITION DATA FROM THE RAT SUBJECTS

OF COSMOS 1129 EXPERIMENT K-316

Nello Pace, Arthur H. Smith, Grover C. Pitts, Arkadyi S. Ushakov, and Tamara A. Smirnova 15 Jan. 1982 63 p refs
 (Grant NsG-7336)

(NASA-CR-168678; NAS 1.26:168678; EPL-82-1) Avail: NTIS HC A04/MF A01 CSCL 06C

The effects of 18.5 days of weightlessness on the body composition of young, growing, male laboratory rats were examined. Three groups of 5 rats each were examined. It is indicated that exposure of young, growing, male rats to 18.5 days of weightlessness produces: (1) no effect on the quantity of fat stored by the body; (2) a slight reduction in the quantity of fat free tissue laid down by the body; (3) a small reduction in the fraction of water contained by the fat free body mass; (4) a similar reduction in the fraction of water contained by the fat free skin and fat free carcass; (5) a shift in relative distribution of the total body water from skin to viscera; (6) a diminution in the fraction of extracellular water contained by the fat free body; (7) no effect on the fraction of total skeletal musculature contained by the fat free body, as indicated by body creatine content; (8) a sizeable reduction in the fraction of bone mineral contained by the fat free body, as calculated from body calcium content. The nature of the physiological changes induced by unloading from Earth gravity in the mammalian organism are illustrated. GRA

N82-20833# Office of Naval Research, London (England).
FIFTH INTERNATIONAL BIODETERIORATION SYMPOSIUM

E. C. Haderlie 2 Dec. 1981 12 p Symp. held at Aberdeen, Scotland, 7-11 Sep. 1981

(AD-A109858; ORNL-C-13-81) Avail: NTIS
 HC A02/MF A01 CSCL 06/1

The meeting covered most aspects of biodeterioration ranging from the degradation of library materials to woods, metals, petroleum products, and wool. Biodeterioration was defined as the degradation of materials as a result of the activities of living organisms. Author (GRA)

N82-20834# Joint Publications Research Service, Arlington, Va.

USSR REPORT: SPACE BIOLOGY AND AEROSPACE MEDICINE, VOLUME 16, NO. 1, JANUARY - FEBRUARY 1982

16 Mar. 1982 148 p refs Transl. into ENGLISH of Kosm. Biol. Aviakosm. Med. (Moscow), v. 16, no. 1, Jan. - Feb. 1982 (JPRS-80323) Avail: NTIS HC A07/MF A01

Articles addressing various aspects of aerospace medicine and space biology are presented. Physiological responses to space flight are emphasized along with problems relating to aircraft pilot performance.

N82-20835# Joint Publications Research Service, Arlington, Va.

EFFECT OF RADIOPROTECTIVE AGENTS ON REACTIVITY TO SPACE FLIGHT FACTORS

Ye. I. Vorobyev, V. I. Yefimov, and S. K. Karsanova *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 16, No. 1, Jan. - Feb. 1982 (JPRS-80323) 16 Mar. 1982 p 1-14 refs
 Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 16, no. 1, Jan. - Feb. 1982 p 4-12

Avail: NTIS HC A07/MF A01

The experimental and clinical data published during the last 15 years that concern the effect of radioprotector drugs on the reactivity of organisms exposed to acceleration, vibration, motion sickness, hypodynamics, hypo- and hyperoxia are summarized and discussed. It is concluded that it is possible to use drugs to enhance radioresistance during flights; however, one should proceed with some caution in recommending a specific in-flight radioprotective agent. The results of studies with the participation of man confirmed the assumption that intake of the short-acting radioprotector ambratin and prolonged-action protector amitetravit has no adverse effect on the human body according to tests with endurance of motion and prolonged accelerations. For this reason, they were recommended as radioprotective agents for use during manned flights aboard the Soyuz series of spacecraft. M.G.

N82-20837# Joint Publications Research Service, Arlington, Va.
STRESS AND BIOLOGICAL RHYTHMS

S. I. Stepanova *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 16, No. 1, Jan. - Feb. 1982 (JPRS-80323) 16 Mar. 1982 p 2025 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med. (Moscow)*, v. 16, no. 1, Jan. - Feb. 1982 p 16-20

Avail: NTIS HC A07/MF A01

It is noted that numerous data give evidence that the reactions of the human body to diverse stimuli vary in an oscillatory, wave-like pattern. This phenomenon is associated with a general biological law of the wave-like pattern of adaptive processes, according to which they are realized at any stage (anxiety, resistance, depletion) in an oscillatory pattern. The wave-like pattern of the adaptive process is an expression of the dialectic law of unity and struggle of opposites; in this case, unity and struggle of construction and destruction, maintaining continuous self-reproduction and self-preservation of a living system in its environment. Consideration of the law of undulatory nature of the adaptation process in space opens the way for reliable forecasting of the dynamics of general state and different functions of cosmonauts during flights. It is imperative to make a special study of this phenomenon in order to further refine the set of measures related to the support of man's life in space. M.G.

N82-20838# Joint Publications Research Service, Arlington, Va.

RESULTS OF STUDIES OF COSMONAUTS' VESTIBULAR FUNCTION AND SPATIAL PERCEPTION

I. Ya. Yakovleva, L. N. Kornilova, I. K. Tarasov, and V. N. Alekseyev *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 16, No. 1, Jan. - Feb. 1982 (JPRS-80323) 16 Mar. 1982 p 26-33 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med. (Moscow)*, v. 16, no. 1, Jan. - Feb. 1982 p 20-26

Avail: NTIS HC A07/MF A01

The results of studying the vestibular function and the function of spatial perception in 26 cosmonauts before and after 30 space flights are discussed. The typical postflight changes in these functions were: an increase in the reactivity of the otolith organ; a decrease in the sensitivity of semicircular canals; a decline in the accuracy of perception of spatial coordinates; asymmetry of most parameters, and development of illusionary reactions in flight. The cosmonauts also showed individual variations with respect to the degree of the above responses, the dynamics and length of adaptation, the development of the motion sickness symptom-complex, etc. At R+O some cosmonauts exhibited a change in the direction of the eye counter-rotation, i.e., the negative otolith reflex or at turn towards the tilt direction. Possible mechanisms of these vestibular changes are discussed. M.G.

N82-20839# Joint Publications Research Service, Arlington, Va.

PROBABILITY OF CAISSON DISEASE AFTER PRESSURE DROP FROM 840 TO 308 MM Hg

A. S. Barer, M. I. Vakar, G. F. Vorobyev, L. R. Iseyev, S. N. Filipenkov, and V. I. Chadov *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 16, No. 1, Jan. - Feb. 1982 (JPRS-80323) 16 Mar. 1982 p 34-37 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med. (Moscow)*, v. 16, no. 1, Jan. - Feb. 1982 p 26-28

Avail: NTIS HC A07/MF A01

The mode of decompression to a pressure of 308 mm Hg after exposure for 2 to 12 h to a hyperbaric air atmosphere at a pressure of 840 mm Hg was studied. The objective was to determine the effect of additional saturation of the body with nitrogen in the presence of elevated air pressure on probability of caisson disease (altitude decompression sickness) after changing to an absolute pressure of 308 mm, which is relatively safe in decompression from normal Earth atmosphere. The decompression from the hyperbaric air atmosphere with the pressure 840 + or - 5 mm Hg and subsequent 40 min exposure to the hypobaric atmosphere 308 + or - 1 mm Hg containing 40 to 95% O₂ caused a decompression disease in 5 to 40% cases. The probability of the disease depends on the duration of nitrogen saturation at an increased pressure, physical fitness and individual susceptibility to decompression sickness. M.G.

N82-20840# Joint Publications Research Service, Arlington, Va.

ION REGULATING FUNCTION OF HUMAN KIDNEYS

DURING LONG-TERM SPACE FLIGHTS AND IN MODEL STUDIES

A. L. Grigoryev, B. R. Dorokhova, G. S. Arzamazov, and B. V. Morukov *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 16, No. 1, Jan. - Feb. 1982 (JPRS-80323) 16 Mar. 1982 p 38-44 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med. (Moscow)*, v. 16, no. 1, Jan. - Feb. 1982 p 29-33

Avail: NTIS HC A07/MF A01

Ten cosmonauts who performed 30- to 175-day space flights onboard Salyut-4 and Salyut-6, and 50 test subjects exposed to head-down tilt (-4 deg) for 182 days were examined. In actual and simulated weightlessness renal excretion of calcium and potassium increased, reaching maximum during the 4 to 6th weeks. Before and after flight the test subjects were exposed to loading salt tests. Renal excretion of calcium and potassium in response to the loading tests with their salt postflight was much higher than preflight. During the potassium chloride load the aldosterone content in blood correlated with potassium excretion, and during the calcium lactate load an increase in calcium excretion was paralleled by a decrease in the parathormone content in blood. It is most likely that the negative balance of ions in weightlessness is associated with the reduced capacity of tissues to retain electrolytes due to the decreased ion pool. It was shown that electrolyte balance can be beneficially influenced by exercise. M.G.

N82-20841# Joint Publications Research Service, Arlington, Va.

STRUCTURAL AND FUNCTIONAL PROPERTIES, AND ENERGY METABOLISM OF ERYTHROCYTES DURING SPACE FLIGHTS VARYING IN DURATION

A. S. Ushakov, G. I. Kozinets, S. M. Ivanova, and V. P. Matviyenko *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 16, No. 1, Jan. - Feb. 1982 (JPRS-80323) 16 Mar. 1982 p 45-50 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med. (Moscow)*, v. 16, no. 1, Jan. - Feb. 1982 p 34-37

Avail: NTIS HC A07/MF A01

The structural and functional properties and energy metabolism of erythrocytes in peripheral blood of crew members who performed space flights of varying duration were investigated. Certain changes in the morphology, function, and energy metabolism of erythrocytes were seen after long-duration space flights. The demonstrated changes in energy metabolism (decline of ATP and increase in glycolytic activity) are probably related to triggering of compensatory mechanisms in response to the effects of space flight factors, and they are directed toward preserving the structural integrity of cells. On the whole, the obtained data indicate that short-term flights lasting up to 8 days do not elicit appreciable changes in structural and functional, as well as metabolic parameters of erythrocytes. M.G.

N82-20842# Joint Publications Research Service, Arlington, Va.

POSITIVE PRESSURE BREATHING AS A MEANS OF PREVENTING ADVERSE REACTIONS TO ANTIORTHOSTATIC POSITION

V. G. Voloshin, V. A. Karpusheva, B. F. Asyamolov, R. A. Bondarenko, and V. S. Panchenko *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 16, No. 1, Jan. - Feb. 1982 (JPRS-80323) 16 Mar. 1982 p 51-54 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med. (Moscow)*, v. 16, no. 1, Jan. - Feb. 1982 p 38-40

Avail: NTIS HC A07/MF A01

The experiments in which 15 healthy male test subjects were exposed to head-down tilts at -15 and -30 deg demonstrated that the central and cerebral circulation can be normalized by a positive pressure breathing of 15 to 20 mm Hg with a partial compensation. Author

N82-20843# Joint Publications Research Service, Arlington, Va.

RELATIONSHIP BETWEEN MICROFLORA AND IMMUNITY OF COSMONAUTS CARRYING STAPHYLOCOCCUS AUREUS IN THE NASAL CAVITY

T. N. Nikolayeva, Ye. V. Guseva, R. Yu. Tashpulatov, and G. D. Strykh *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 16, No. 1, Jan. - Feb. 1982 (JPRS-80323) 16 Mar. 1982 p 55-58 refs Transl. into ENGLISH from *Kosm. Biol.*

Aviakosm. Med. (Moscow), v. 16, no. 1, Jan. - Feb. 1982 p 40-43

Avail: NTIS HC A07/MF A01

The correlations between microflora and preflight parameters of immunological resistance of cosmonauts who were carriers of *S. aureus* in the nasal cavity and subjects who are not carriers of this microorganism were examined. The crewmembers who carried aureus in the nasal cavity preflight showed an increased content of immunoglobulins IgA and IgM in the nasal cavity and that of IgM in blood serum postflight. The increased content of IgM in the nasal cavity did not depend on the size of the microbial focus in that biotope because there was no significant correlation between the two parameters (local and serum). M.G.

N82-20844# Joint Publications Research Service, Arlington, Va.

CORRELATION BETWEEN INDIVIDUAL DISTINCTIONS OF FUNCTIONAL ASYMMETRY OF CEREBRAL HEMISPHERES AND PILOT PERFORMANCE

A. A. Gyurdzhian and A. G. Fedoruk *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 16, No. 1, Jan. - Feb. 1982 (JPRS-80323) 16 Mar. 1982 p 59-62 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med. (Moscow)*, v. 16, no. 1, Jan. - Feb. 1982 p 44

Avail: NTIS HC A07/MF A01

It was shown that the high professional characteristics of pilots (quality of their flight performance and low susceptibility to spatial illusions) are in close correlation with the more pronounced predominance of the left hemisphere of the brain. The most informative criterion of the left hemisphere predominance that correlates with the flight performance is the index of the right ear predominance, i.e., the index of the left hemisphere predominance with respect to the speech perception. The less demonstrative parameters are the predominance of the right hand and the leading right eye. R.J.F.

N82-20845# Joint Publications Research Service, Arlington, Va.

INFLUENCE OF ORIENTATION METHOD ON QUALITY OF PILOT'S SPATIAL ORIENTATION

V. V. Lapa and N. A. Lemeschenko *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 16, No. 1, Jan. - Feb. 1982 (JPRS-80323) 16 Mar. 1982 p 63-68 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med. (Moscow)*, v. 16, no. 1, Jan. - Feb. 1982 p 63-68

Avail: NTIS HC A07/MF A01

The efficiency of pilot's spatial orientation after disorientation was studied in relation to the coordinates system used, i.e., the method of orientation. It was found that the use of the geocentric system of coordinates (as compared to that of the geocentric system) caused an increase in the time of spatial perception and in the number of errors. It can therefore be concluded that the instrument-aided spatial orientation in flight (with the Earth unseen) must help the pilot to develop spatial perception, reflecting spatial relations in the geocentric system of coordinates. Author

N82-20846# Joint Publications Research Service, Arlington, Va.

DYNAMIC OF NUTRITIONAL STATUS DURING SIMULATION OF LONG-TERM AIRCRAFT FLIGHTS

I. G. Popov, A. A. Latskevich, V. Ye. Potkin, P. A. Lozinskiy, I. A. Romanova, and L. I. Kolesnikova *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 16, No. 1, Jan. - Feb. 1982 (JPRS-80323) 16 Mar. 1982 p 69-76 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med. (Moscow)*, v. 16, no. 1, Jan. - Feb. 1982 p 49-55

Avail: NTIS HC A07/MF A01

The dynamics of the nutrient status of the test subjects who performed a simulated 22 hour flight and consumed preflight and flight diets was investigated. Subjective and objective indications (body mass changes, carbohydrate, nitrogen, amino acid, mineral, and vitamin metabolism) of excessive nutrition and even acute overeating were seen. It is emphasized that, in order to prevent excessive nutrition of pilots and its harmful effects on their performance, special counter measures need to be developed. Author

N82-20847# Joint Publications Research Service, Arlington, Va.

SOME FEATURES OF EVALUATION OF WORK CAPACITY AND FATIGUE IN HELICOPTER PILOTS

Yu. N. Kamenskiy *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 16, No. 1, Jan. - Feb. 1981 (JPRS-80323) 16 Mar. 1982 p 77-81 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med. (Moscow)*, v. 16, no. 1, Jan. - Feb. 1982 p 55-58

Avail: NTIS HC A07/MF A01

In helicopter pilots the direct index of their work capacity increased while indirect indices decreased in the course of the flying shift. The peak of their professional performance occurred at the end of the flying shift coinciding with the expressed feeling of fatigue. Evaluation of professional work capacity using direct methods does not yield adequate information about the state of pilots, making them unsuitable to diagnose fatigue and to measure permissible work load. Proper diagnostics of fatigue does not necessarily require examinations of the pilot's state in flight. Adequate information can be obtained on the ground during the flying shift. Author

N82-20848# Joint Publications Research Service, Arlington, Va.

PHYSIOLOGICAL AND HYGIENIC RATING OF TRANSPORT HELICOPTER VIBRATION DAMPER

Yu. G. Matveyev and Yu. N. Kamenskiy *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 16, No. 1, Jan. - Feb. 1982 (JPRS-80323) 16 Mar. 1982 p 82-86 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med. (Moscow)*, v. 16, no. 1, Jan. - Feb. 1982 p 59-61

Avail: NTIS HC A07/MF A01

The vibration damper reduces vibrations in the helicopter cockpit two to three-fold during horizontal flight and four to five-fold at the braking stage. The use of the vibration damper improves reception of the panel information and helicopter control, improves the working conditions, and maintains the high performance of the crewmembers during the flying shift. R.J.F.

N82-20849# Joint Publications Research Service, Arlington, Va.

SIGNIFICANCE OF BONE DENSITY TO SPINAL TRAUMA RELATED TO PILOT EJECTION

A. P. Kozlovskiy, G. P. Stupkov, V. P. Dryannykh, A. B. Arsenyev, and V. V. Chuntul *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 16, No. 1, Jan. - Feb. 1982 (JPRS-80323) 16 Mar. 1982 p 87-89 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med. (Moscow)*, v. 16, no. 1, Jan. - Feb. 1982 p 62-63

Avail: NTIS HC A07/MF A01

The examinations of 27 pilots, 10 of which were catapulted, demonstrated that fractures of the spinal column occurred in those pilots (5 cases) whose heel bone density (as measured by the method of direct photon absorption) was lower than in the controls (17 cases) and in those pilots who did not have traumas, when being ejected. Author

N82-20850# Joint Publications Research Service, Arlington, Va.

SIGNIFICANCE OF VESTIBULAR ASYMMETRY TO GENESIS OF VESTIBULAR DYSFUNCTION

V. A. Kislyakov and Yu. K. Stolbkov *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 16, No. 1, Jan. - Feb. 1982 (JPRS-80323) 16 Mar. 1982 p 90-94 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med. (Moscow)*, v. 16, no. 1, Jan. - Feb. 1982 p 64-67

Avail: NTIS HC A07/MF A01

In the intact pigeons and pigeons with bilaterally cut saccular nerves, stimulation of the otolith organs did not produce asymmetric reactions from the semicircular canals, whereas in pigeons with unilaterally cut saccular nerves it resulted in the asymmetry of reactions from the semicircular canals. This asymmetry was enhanced by a combined stimulation of semicircular canals and otolith organs. Author

N82-20851# Joint Publications Research Service, Arlington, Va.

OPTOKINETIC FACTORS AND DEVELOPMENT OF SEASICKNESS SYMPTOMS

L. N. Kornilova, V. A. Shakhivaya, and I. Ya. Yakovleva *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 16, No. 1, Jan. - Feb. 1982 (JPRS-80323) 16 Mar. 1982 p 95-99

refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med.* (Moscow), v. 16, no. 1, Jan. - Feb. 1982 p 67-70

Avail: NTIS HC A07/MF A01

The effects of optokinetic stimulation of a healthy man and the development of motion sickness symptoms in response to the stimuli of different value and direction are discussed. Selective sensitivity of healthy people to optokinetic stimulation is also discussed. R.J.F.

N82-20852# Joint Publications Research Service, Arlington, Va.

HUMAN TOLERANCE OF ROTATION AT DIFFERENT LEVELS OF HYPERGRAVITY

A. M. Genin, A. R. Kotovskaya, R. R. Galle, L. N. Gavrilova, and I. Yu. Sarkisov *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 16, No. 1, Jan. - Feb. 1982 (JPRS-80323) 16 Mar. 1982 p 100-106 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med.* (Moscow), v. 16, no. 1, Jan. - Feb. 1982 p 70-74

Avail: NTIS HC A07/MF A01

The effects of acceleration of different values (up to 2 g) on the level of motion sickness, vestibular, and postural reactions to rotation were studied. The experiments were carried out in a centrifuge equipped with a cabin that could be mounted at a different distance from the axis of rotation. Three experimental runs were conducted with a rate of rotation of 15.3 and acceleration values of 1.09, 1.6, and 2.0 g. Vestibular stimulation was produced by heat movements of a predetermined number. It was found that with increase in the acceleration value the level of motion sickness decreased and the nystagmic reaction and balance dysfunction enhanced. Author

N82-20853# Joint Publications Research Service, Arlington, Va.

COMPARATIVE EVALUATION OF PRESSURE CHAMBER CONDITIONING AND MAN'S ADAPTATION TO HYPOXIA AT HIGH ALTITUDE

A. Yu. Katkov, R. N. Chabdarova, N. V. Pravetskiy, S. A. Vtoryy, V. V. Lenskiy, and A. A. Titov *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 16, No. 1, Jan. - Feb. 1982 (JPRS-80323) 16 Mar. 1982 p 107-110 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med.* (Moscow), v. 16, no. 1, Jan. - Feb. 1982 p 74-77

Avail: NTIS HC A07/MF A01

It was demonstrated that a 3 day pressure chamber training may increase the maximum tolerable altitude at rest from 8,600 to 8,900 m (depending on the onset rate of hypoxia) to 9,600 m. After pressure chamber training the maximum tolerable altitude increased from 8,200 m to 9,200 m, when exercising in a bicycle ergometer at 200 kgm/min and continuously ascending at a rate of 20 m/sec. A similar antihypoxic effect was also provided by a 7 day high altitude adaptation. Using polarographic measurements of oxygen tension in the skin, it was found that adaptation to hypoxia induced a more pronounced oxygen decrease at high altitudes. This can be attributed to a more distinct blood redistribution, i.e., a better blood supply of the vital organs at the expense of peripheral tissues. Author

N82-20854# Joint Publications Research Service, Arlington, Va.

ACTIVITY OF SOME RAT LIVER ENZYMES FOLLOWING FLIGHT ABOARD COSMOS-936 BIOSATELLITE

S. Nemeth and R. A. Tigranyan *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 16, No. 1, Jan. - Feb. 1982 (JPRS-80323) 16 Mar. 1982 p 111-115 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med.* (Moscow), v. 16, no. 1, Jan. - Feb. 1982 p 77-80

Avail: NTIS HC A07/MF A01

After the 18.5 day flight onboard the biosatellite Cosmos-936, the activity of 6 glucocorticoid-activated enzymes in the rat liver was investigated. It was found that at R+O activities of tyrosine aminotransferase and tryptophan pyrrolase, as well as fructose-1,6-diphosphatase, glucose-6-phosphatase, aspartate aminotransferase and alanine aminotransferase increased. Two former enzymes react rapidly (within several hours) to an increase in the glucocorticoid level, whereas those latter react only to a continuous prolonged effect of glucocorticoids. These increases were paralleled by a growth in the glycogen concentra-

tion in the liver. The findings indicate that during the flight the rats underwent a chronic stress induced by weightlessness.

Author

N82-20855# Joint Publications Research Service, Arlington, Va.

CATECHOLAMINE CONTENT OF RAT BLOOD AFTER FLIGHT ABOARD COSMOS-936 BIOSATELLITES

R. Kvetnansky and R. A. Tigranyan *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 16, No. 1, Jan. - Feb. 1982 (JPRS-80323) 16 Mar. 1982 p 116-119 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med.* (Moscow), v. 16, no. 1, Jan. - Feb. 1982 p 80-83

Avail: NTIS HC A07/MF A01

The content of epinephrine and norepinephrine was measured in plasma of the rats flown onboard the biosatellite Cosmos-936 in the weightless state and under artificial gravity. With respect to the norepinephrine content there was no difference between the two flight groups, while its level in the flight rats was higher than in the ground-based controls. The epinephrine content in the flight rats remained essentially unchanged. These data give evidence that a prolonged exposure to weightlessness is not a stressogenic factor as related to the sympathoadrenal system. Author

N82-20856# Joint Publications Research Service, Arlington, Va.

INFLUENCE ON UREA HYDROLYSIS OF TYPICAL MICROFLORA OF URINE AND PRESSURIZED HABITATS

T. Ye. Lebedeva, I. V. Yakimova, N. M. Nazarov, and S. V. Chizhov *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 16, No. 1, Jan. - Feb. 1982 (JPRS-80323) 16 Mar. 1982 p 120-123 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med.* (Moscow), v. 16, no. 1, Jan. - Feb. 1982 p 84-86

Avail: NTIS HC A07/MF A01

The intensive discharge of microorganisms from the human integument into the environment in a pressure chamber was investigated. The role of microflora in the process of dissociation of urea contained in urine was investigated. The ammonia released as a result of hydrolysis pollutes the atmosphere of the sealed space and has an adverse effect on the quality of water reclaimed from urine and complicates the regeneration process proper. The following areas were studied: (1) investigation of dynamics of total number of microorganisms of urine when stored for a long time under nonsterile conditions and comparison to dynamics of decomposition of urea and accumulation of ammonia in urine; (2) determination of quantity of microorganisms and intensity of decomposition of urea when sterile urine is used for monocultures of bacteria that are the most typical of the microflora of urine and sealed habitats; (3) comparative evaluation of urease activity of several strains of bacteria isolated from the interior surfaces of a manned spacecraft in flight and analogous stock strains. B.W.

N82-20857# Joint Publications Research Service, Arlington, Va.

HEMATOLOGICAL LESIONS AS A FUNCTION OF DOSAGE OF LONG-TERM RADIATION

V. G. Gorlov and O. V. Neyman *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 16, No. 1, Jan. - Feb. 1982 (JPRS-80323) 16 Mar. 1982 p 124-129 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med.* (Moscow), v. 16, no. 1, Jan. - Feb. 1982 p 86-89

Avail: NTIS HC A07/MF A01

The quantitative patterns of damage to the blood system in the course of prolonged exposure to the ionizing radiation inherent in space were studied as well as the time characteristics of development of lesions in different blast elements. An effort was made to determine the minimal volume of hematological tests during long-term exposure to radiation to assess the general state of the blood system, on the basis of comparison of dynamics of changes in bone marrow and peripheral blood. Experiments were conducted on 285 mongrel rats weighing 180 to 200 g. The animals were exposed to radiation at dose rates of 300, 100, and 50 R/day. They were exposed continuously for 22-23/day. Analysis of the findings revealed that the dynamics of decline in total number of bone marrow cells during the phase of primary depletion is governed by an exponential law.

There was distinct demonstration of the effects of cumulative dose and dose rate. A typical finding in all cell populations of bone marrow was an initial exponential decline in number of cells. B.W.

N82-20858# Joint Publications Research Service, Arlington, Va.

SEROTONIN AND HISTAMINE METABOLISM IN COSMONAUTS

Z. S. Dolgun, S. A. Meshcheryakova, M. S. Belakovskiy, and V. I. Legenkov *In its USSR Rept.: Space Biol. and Aerospace Med.* Vol. 16, No. 1, Jan. - Feb. 1982 (JPRS-80323) 16 Mar. 1982 p 130-133 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med. (Moscow)*, v. 16, no. 1, Jan. - Feb. 1982 p 89-91

Avail: NTIS HC A07/MF A01

The effects of space flight conditions on serotonin (S) and histamine (H) concentration in animal and human blood were studied. Excretion of 5-hydroxyindoleacetic acid (HIA) in urine, change under cold stress and high temperatures, anaphylactic shock, hypoxia and short- and long-term vibration were examined during prolonged hypokinesia. Certain changes were demonstrated in blood S content in animals examined after returning from a short-term space flight. B.W.

N82-20859# Joint Publications Research Service, Arlington, Va.

FIRST ALL-UNION SYMPOSIUM ON PROBLEMS OF EVALUATING AND FORECASTING MAN'S FUNCTIONAL STATES IN APPLIED PHYSIOLOGY

A. A. Maksimov *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 16, No. 1, Jan. - Feb. 1982 (JPRS-80323) 16 Mar. 1982 p 134-135 Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med. (Moscow)*, v. 16, no. 1, Jan. - Feb. 1982 p 91-92

Avail: NTIS HC A07/MF A01

Some aspects of the problems of man's functional states, his health, and work capacity were studied. The following topics were examined: forecasting man's functional state in aviation and cosmonautics; forecasting the functional state of athletes; forecasting the functional state of the body in industrial physiology; forecasting in human ecology; and reliability of man-machine systems. B.W.

N82-20860 California Univ., San Diego.

PATTERNS OF BACTERIOPLANKTON GROWTH IN THE SEA Ph.D. Thesis

Jed Alan Fuhrman 1981 122 p

Avail: Univ. Microfilms Order No. 8129243

The bacterioplankton role in organic matter flux from phytoplankton to higher trophic levels was studied. Two approaches were developed for measuring bacterioplankton growth. The first assumes only growing cells synthesize DNA; rates of tritiated thymidine incorporation into DNA are used to calculate bacterioplankton growth rates. The second approach measures the increase of bacterial numbers in seawater which had been filtered to remove bacteriophages. The thymidine incorporation approach was more sensitive, faster and easier to use at sea, and less subject to artifacts than the other approach, so it was chosen for most field studies almost exclusively by bacteria, and effectively all the 'active' bacteria utilize exogenous thymidine. Production estimates were lower in Antarctic waters than in temperate waters and the fraction of primary production which is channeled into bacterioplankton production in both eutrophic and oligotrophic waters was approx. 5% to 25%. Dissert. Abstr.

N82-20861 Michigan State Univ., East Lansing.

ULTRASONIC BLOOD FLOW IMAGING USING CORRELATION PROCESSING Ph.D. Thesis

Michael De Olinger 1981 58 p

Avail: Univ. Microfilms Order No. 8126538

A general investigation of those fundamental processes affecting the design of ultrasonic blood flow imaging instruments is presented. First, known physical attributes of the various biological issues are combined to formulate a simple model which describes the interaction of ultrasound with the human body. Using this model, it is shown that a periodic pulse train is the preferred transmitted signal and that significant performance improvement may be realized by implementing true correlation as opposed to the conventional correlation processing. The

desirability of having the true correlation receiver operate in a near optimum manner is demonstrated and the constraints imposed on signal bandwidth, effective signal duration, achievable velocity resolution and transducer angle are presented. In order to present the complex interrelationships which exist between these constraints, a unique set of design curves were generated. These curves indicate those combinations which insure near optimality. Dissert. Abstr.

N82-20862 Washington Univ., Seattle.

A QUANTITATIVE ANALYSIS OF TRANSCUTANEOUS OXYGEN MEASUREMENT Ph.D. Thesis

Daniel Wade Piraino 1981 207 p

Avail: Univ. Microfilms Order No. 8126136

The effects of skin blood flow, diffusion, and temperature each independently on the transcutaneous measurement of oxygen were determined. A model was derived to predict the transcutaneous oxygen partial pressure under varying conditions of blood flow, temperature, and arterial oxygen partial pressure. The model was then compared to data from twelve volunteer subjects under different conditions of blood flow and temperature. The following results were found. (1) The model is valid only after heating the sensor to 44-45 C. (2) There is a hysteresis with temperature in the quantity $d/x \text{ sub } 0$, where d is the diffusion constant and $x \text{ sub } 0$ is the distance from capillary to skin sensor. If skin is preheated to 44-45 C for one-half hour, transcutaneous oxygen measurements at a lower temperature will be higher than if the skin had not been preheated, at the same blood flow. (3) At 41 C, with the hemoglobin curve shift taken into account, skin blood flow is adequate for 97% arterialization. These results may be applied to the future correction of the transcutaneous oxygen value in adult patients in critical care areas. Dissert. Abstr.

N82-20863*# National Aeronautics and Space Administration, Washington, D. C.

STUDIES ON THE FLIGHT MEDICAL ASPECTS OF THE GERMAN LUFTHANSA NON-STOP ROUTE FROM FRANKFURT TO RIO DE JANEIRO, PART 1

H. M. Wegmann, K. E. Klein, K. M. Goeters, and A. Samel Feb. 1982 29 p refs Transl. into ENGLISH of rept. 1B-316-81-01 DFVLR (West Germany), 1981 26 p Transl. by Kanner (Leo) Associates, Redwood City, Calif.

(Contract NASw-3541)

(NASA-TM-76659; NAS 1.15:76659)

Avail: NTIS

HC A03/MF A01 CSCL 06S

The problem of crew size for regularly scheduled flights between Frankfurt and Rio de Janeiro is discussed. Factors affecting crew performance are examined, comparisons are drawn to regulations of other countries and crew questionnaires and tests are presented. S.L.

N82-20864*# National Aeronautics and Space Administration, Washington, D. C.

DETERMINATION OF OXYGEN TENSION IN THE SUBCUTANEOUS TISSUE OF COSMONAUTS DURING THE SALUT-6 MISSION

S. Baranski, R. Bloszczyński, M. Hermaszewski, J. Kubickowa, A. Piorko, R. Saganik, Z. Sarol, F. Skibniewski, J. Stendera, and W. Walichnowski Mar. 1982 8 p Transl. into ENGLISH from *Postepy Astronaut.* (Poland), v. 12, no. 4, 1979 p 75-80 Translation was announced as A80-30518 Transl. by Kanner (Leo) Associates, Redwood City, Calif.

(Contract NASw-3541)

(NASA-TM-76793; NAS 1.15:76793)

Avail: NTIS

HC A02/MF A01 CSCL 06P

A polarographic technique was used to measure the oxygen tension in subcutaneous tissue of the forearm of a cosmonaut prior to, after, and on the fourth day of a space mission performed by *Salut-6*. A drop in the oxygen exchange rate in the peripheral tissues during weightlessness was observed. The mechanisms of this change are studied, taking into consideration the blood distribution in the organism and microcirculation disorders reflected by a decreased blood flow rate in arterial-venous junctions. Author

N82-20865# Committee on Science and Technology (U. S. House).

NATIONAL TOXICOLOGY PROGRAM

Washington GPO 1981 189 p Hearing before the Subcomm. on Investigations and Oversight of the Comm. on Sci. and Technol., 97th Congr., 1st Sess., No. 32, 15 Jul. 1981

N82-20867

(GPO-85-397) Avail: Subcomm. on Investigations and Oversight

The activities, plans, and priorities of the national toxicology program are discussed. The aim of the program is to develop through research the scientific information needed to protect the public health from damage by exposure to hazardous toxic substances. The effectiveness of the program was discussed. Carcinogens, particularly asbestos, are discussed. Bioassays and other forms of analysis are evaluated. R.J.F.

N82-20867# Army Engineer Topographic Labs., Fort Belvoir, Va.

A STUDY OF THE HUMAN VISUAL SYSTEM IN SUPPORT OF AUTOMATED FEATURE EXTRACTION Research Note, Sep. 1979 - Sep. 1980

Frederick W. Rohde Oct. 1981 34 p refs

(DA Proj. 4A1-61101-A-91D)

(AD-A109139; ETL-0271) Avail: NTIS HC A03/MF A01 CSCL 06/16

An in-depth study of the anatomy and architecture of the visual system was conducted. Signal processing along the visual pathway was analyzed. The functions of the major components of the visual system were studied and the number of neurons determined. A comparison of the visual system with a computer was made. The concept of a feature extraction system was developed and discussed. Author (GRA)

N82-20868# Integrated Sciences Corp., Santa Monica, Calif. **FEMALE AND MALE SIZE, STRENGTH AND PERFORMANCE: A REVIEW OF CURRENT LITERATURE**

Mark D. Phillips, Anne Bogardt, and Ross L. Pepper San Diego, Calif. Naval Ocean Systems Center Oct. 1981 159 p refs (Contract N00123-80-D-0104)

(AD-A109270; ISC-342-1; NOSC/CR-107) Avail: NTIS HC A08/MF A01 CSCL 06/14

The increase in female personnel utilization aboard ship has initiated a need to examine gender based differences in anthropometrics, biomechanics, psychophysical performance, physiological attributes and the relationship of these factors to the design of shipboard equipment and fittings. Literature in this area was examined by Ayoub et al (1978). The purpose of the present report was to update and extend the baseline established by Ayoub et al (1978) by examining current work.

GRA

N82-20869# Thoratec Labs. Corp., Berkeley, Calif. **FABRICATION OF CARDIOVASCULAR DEVICES** Annual Report, Jun. 1980 - May 1981

David J. Farrar, John H. Lawson, Keith E. Buck, Robert S. Ward, and Kathleen O'Connor Apr. 1981 57 p refs

(Contract N01-HV-9-2906)

(PB82-120148; NIH-N01-HV-92906-2) Avail: NTIS HC A04/MF A01 CSCL 06L

The fabrication of components primarily related to left ventricular assist devices LVAD components, such as bladders, bodies, covers, pusher plates, cannulas, and valve housing were fabricated and the integration of Thoratec blood pumps and actuators developed. In addition, preparations were made for the fabrication of clinical quality ventricular assist devices. These activities included design drawings detailed fabrication procedures, boiling, and initial fabrication of pump components. Polymer processing and handling techniques during fabrication were improved and the test stations were modified for life tests of seamless bladder LVADs. GRA

N82-20870# Tracor Jitco, Inc., Rockville, Md. **ENVIRONMENTAL AND HEALTH ASPECTS OF CHLOROFORM: A COMPREHENSIVE BIBLIOGRAPHY OF PUBLISHED LITERATURE, 1930 - 1981**

Jun. 1981 311 p

(Contract EPA-68-01-5836)

(PB82-110115; EPA-560/7-81-011) Avail: NTIS HC A14/MF A01 CSCL 06T

The citations were selected from a thorough literature search, and broadly classified as having primarily environmental or biological emphasis. The sources used in the search are identified, and for the portion performed on line, the search strategies are also included. GRA

N82-20871# Navy Personnel Research and Development Center, San Diego, Calif.

COMPUTER-MANAGED INSTRUCTION IN NAVY TECHNICAL TRAINING: AN ATTITUDINAL SURVEY Final Report, Jun. 1980 - Mar. 1981

Carol Ann Robinson, Elizabeth A. Tomblin, and Archester Houston Dec. 1981 53 p refs

(AD-A109664; NPRDC-TR-82-19) Avail: NTIS HC A04/MF A01 CSCL 05/9

Relatively little reliable data exist concerning the attitudes of students and instructors toward computer-managed instruction. This study attempted to determine attitudes of students and instructors and to identify factors related to these attitudes. It was found that students were favorable toward CMI while instructors were generally not favorable. Also, the trainee's experiences with the Navy are related to attitudes toward the CMI system. The longer the trainee is in the service, the more negative the individual tends to be toward the system.

Author (GRA)

N82-20872# Naval Postgraduate School, Monterey, Calif. **AN EVALUATION OF THE EFFECTIVENESS OF COLOR CODED TACTICAL SYMBOLOGY APPLIED TO MILITARY MAPS** M.S. Thesis

Peter Kafurke Sep. 1981 88 p refs

(AD-A109675) Avail: NTIS HC A05/MF A01 CSCL 05/1

This thesis examined the effect of using color coded tactical symbology on military maps. It reviewed the basic aspects of color coding techniques and described a task paced experiment in which conventional monochrome (blue vs. red) coding techniques were compared to multiple color coding. The multicolor coded stimuli used were 5 standard symbols representing Artillery, Armor, Infantry, Mechanized Infantry and Engineers. The symbols were coded red, green, blue, orange and black respectively. The analysis of the data obtained from 20 subjects revealed that performance under multicolor coding condition was significantly superior with respect to response time, accuracy of response and accuracy of location transfer onto a copy of the displayed map. Author (GRA)

N82-20873# Maryland Univ., College Park. Computer Science Center.

RELATIVE DEPTH AND LOCAL SURFACE ORIENTATION FROM IMAGE MOTIONS

K. Prazdny Jan. 1981 34 p refs

(Contract DAAG53-76-C-0138; DARPA Order 3206)

(AD-A109565; CSC-TR-996) Avail: NTIS HC A03/MF A01 CSCL 05/8

A simple mathematical formalism is presented suggesting a mechanism for computing relative depth of any two texture elements characterized by the same relative motion parameters. The method is based on a ratio of a function of the angular velocities of the projecting rays corresponding to the two texture elements. The angular velocity of a ray cannot, however, be computed directly from the instantaneous characterization of motion of a 'retinal' point. It is shown how it can be obtained from the (linear) velocity of the image element on the projection surface and the first time derivative of its direction vector. A similar analysis produces a set of equations which directly yield local surface orientation relative to a given visual direction. The variables involved are scalar quantities directly measurable on the projection surface but, unlike the case of relative depth, the direction of (instantaneous) motion has to be computed by different means before the method can be applied. The relative merits of the two formalisms are briefly discussed. Author (GRA)

N82-20874# Maryland Univ., College Park. Computer Vision Lab.

DETERMINING THE INSTANTANEOUS DIRECTION OF MOTION FROM OPTICAL FLOW GENERATED BY A CURVILINEARLY MOVING OBSERVER

K. Prazdny Feb. 1981 30 p refs

(Contract DAAG53-16-C-0138; DARPA Order 3206)

(AD-A109566; CSC-TR-1009) Avail: NTIS HC A03/MF A01 CSCL 05/8

A method is described capable of decomposing the optical flow into its rotational and translational components. The translational component is extracted implicitly by locating the focus of expansion associated with the translational component of the relative motion. The method is simple, relying on minimizing an (error) function of three parameters. As such, it can also be applied, without modification, in the case of noisy input information. Unlike the previous attempts at interpreting optical

flow to obtain information about the three dimensional disposition of texture elements, the method uses only relationships between quantities on the projection plane. No 3D geometry is involved. Also outlined is a possible use of the method for the extraction of that part of the optical flow containing information about relative depth directly from the image intensity values, without extracting the 'retinal' velocity vectors. Author (GRA)

N82-20875# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
DISPLAY-CONTROL COMPATIBILITY IN 3-D DISPLAYS. 1: EFFECTS OF ORIENTATION

A. W. F. Huggins and David J. Getty 15 Nov. 1981 79 p refs

(Contract N00014-80-C-0750; NR Proj. 196-166)
 (AD-A109491; BBN-4724) Avail: NTIS HC A05/MF A01 CSCL 09/2

The recent development of true volumetric displays, such as SpaceGraph, has raised questions about display-control relationships that cannot be answered from earlier work with 2-D displays. We measured the speed and accuracy of simple control decisions when the displayed object was presented in orientations rotated away from congruence with the control orientation. Reaction times were measured for identifying the marked face of a static cube, presented with SpaceGraph, as a function of how much the cube image was rotated away from congruence with fixed physical cube on which the observer responded, and which dimension of the display corresponding to the rotation axis. The following results were obtained: The fastest and most accurate identifications occurred when there was a simple direct spatial mapping between the display and the control for all orientations presented. Decision times made with this strategy were relatively unaffected by orientation; Marked display-control incompatibility was found under some specific conditions; and The shape of the decision time functions suggest that decision strategies involved both propositioned coding and mental rotation. Author (GRA)

N82-20876*# Tulane Univ., New Orleans, La. Medical School.

GENETIC ENGINEERING POSSIBILITIES FOR CELSS: A BIBLIOGRAPHY AND SUMMARY OF TECHNIQUES Final Report

Emmett J. Johnson Mar. 1982 22 p refs

(NASA Order A-733088)
 (NASA-CR-166306; NAS 1.26:166306) Avail: NTIS HC A02/MF A01 CSCL 06C

A bibliography of the most useful techniques employed in genetic engineering of higher plants, bacteria associated with plants, and plant cell cultures is provided. A resume of state-of-the-art genetic engineering of plants and bacteria is presented. The potential application of plant bacterial genetic engineering to CELSS (Controlled Ecological Life Support System) program and future research needs are discussed. Author

N82-20877# Los Alamos Scientific Lab., N. Mex.
TESTING AND EVALUATION OF THE US NAVY SUPPLIED AIR SUIT

O. D. Bradley and James D. DeField Feb. 1981 42 p ref

(Contract W-7405-eng-36)
 (LA-8727-MS) Avail: NTIS HC A03/MF A01

An airline type supplied air suit for use during the asbestos removal operations is discussed. This supplied air suit was submitted for testing and evaluation of the degree of protection provided. Testing was limited to (1) evaluating interior sound pressure levels, (2) evaluating integrity of air lines and connectors, and (3) evaluating suit removal procedures. The testing was performed using a 16 cubic meter test chamber and a polydispersed dioctyl phthalate aerosol. Aerosol concentrations were measured with a light scattering photometer. The spunbonded olefin supplied air suit indicated protection factors in excess of 18K for all subjects tested and in all tests performed. R.J.F.

N82-20878*# University of Southern California, Los Angeles. Inst. for Technoeconomic Systems.

A STUDY OF INTERACTIVE CONTROL SCHEDULING AND ECONOMIC ASSESSMENT FOR ROBOTIC SYSTEMS Final Report

29 Jan. 1982 23 p refs

(Contracts NAS7-100; JPL-955332)
 (NASA-CR-168652; JPL-9950-645; NAS 1.26:168652; ITC-10-81) Avail: NTIS HC A11/MF A01 CSCL 05H

A class of interactive control systems is derived by generalizing interactive manipulator control systems. Tasks of interactive control systems can be represented as a network of a finite set of actions which have specific operational characteristics and specific resource requirements, and which are of limited duration. This has enabled the decomposition of the overall control algorithm simultaneously and asynchronously. The performance benefits of sensor referenced and computer-aided control of manipulators in a complex environment is evaluated. The first phase of the CURV arm control system software development and the basic features of the control algorithms and their software implementation are presented. An optimal solution for a production scheduling problem that will be easy to implement in practical situations is investigated. S.L.

N82-20879# National Research Inst. for Mathematical Sciences, Pretoria (South Africa).

HOMSIM: A SIMULATOR OF THREE-DIMENSIONAL HOMINOID DYNAMICS

H. Hatze and A. Venter Apr. 1981 56 p refs

(CSIR-SR-SWISK-23; ISBN-0-7988-2103-5) Avail: NTIS HC A04/MF A01

Model equations, and the FORTRAN IV computer program HOMSIM implementing these equations, of a 17 segment hominoid moving in three dimensional space are described. The motion is considered unconstrained and all external force (except gravity) and torque vectors acting on the 17 segments, as well as internal joint torques, must be specified by the user as input functions. Author

N82-20880# Aeronautical Research Labs., Melbourne (Australia).
A REVIEW OF AIRCRAFT CABIN CONDITIONING FOR OPERATIONS IN AUSTRALIA

Brian Rebbecki Oct. 1980 80 p refs

(AD-A109044; ARL/MECH-ENG-159) Avail: NTIS HC A05/MF A01 CSCL 13/1

A review is presented of aircraft cabin conditioning. This review has been undertaken because of the inadequate performance of many aircraft air conditioning systems in the hottest conditions encountered in Australia. The factors included in this study were the climatic conditions (both Australia and world-wide), human performance in hot conditions, the heat balance of aircraft cabins, cooling system performance, and specification of cabin environment control systems. It is concluded that climatic conditions in Australia are not severe in a world-wide context, and that there is no technological reason why the cabin conditioning systems of aircraft should be inadequate. Compliance with present RAAF specifications will provide an acceptable cabin environment for operation of aircraft in Australia. Author (GRA)

N82-20881# Naval Ocean Systems Center, San Diego, Calif. Man-Systems Interaction Div.

MODELS AND MOCKUPS AS DESIGN AIDS, REVISION A

N. J. Buchaca 29 Sep. 1981 123 p refs

(AD-A109511; NOSC/TD-266-Rev-A) Avail: NTIS HC A06/MF A01 CSCL 14/2

This report describes the application of models and mockups as design aids in initially determining or improving control panel layouts and equipment/compartament arrangements to facilitate personnel and personnel/equipment interactions during system operations and maintenance. The report describes how these models and mockups (M&M) have been used, types of M&M and their applications in various phases of the design development cycle, and finally, a description of the use of M&M for man-machine design and design improvements. Three appendices are included in the report and contain: (1) Descriptions of NOSC M&M applications; (2) Examples of M&M specifications; and (3) An M&M characteristics checklist to aid in the preparation of M&M specifications. Author (GRA)

N82-20882# Royal Aircraft Establishment, Farnborough (England).

A COMPARISON OF RAF AND ITALIAN AIRCREW: ANTHROPOMETRIC DATA

E. J. Lovesey London HMSO Nov. 1980 20 p refs

(RAE-TM-FS-367; BR77205) Avail: NTIS HC A02/MF A01

Means and standard deviations were taken from Hertzberg's anthropometric survey of Italian pilots and from a survey of 2,000 RAF aircrews. The results generally show that the Italian pilots have similar body and limb circumferences to RAF aircrews. The Italian linear dimensions are, however, considerably less than

those of the RAF aircrews. These differences need to be taken into account when designing cockpit and rear cabin work stations. Author (ESA)

N82-20883# European Space Agency, Paris (France). **SYSTEM SIMULATION APPLIED TO THE EVALUATION OF DISPLAYS FOR GUIDANCE AND CONTROL**

Uwe Teegen Sep. 1981 60 p refs Transl. into ENGLISH of "Moeglichkeiten der Systemsimulation zur Bewertung von Flugfuehrungsanzeigen". Rept. DFVLR-Mitt-79-10 DFVLR, Brunswick, Jul. 1979 (ESA-TT-659; DFVLR-Mitt-79-10) Avail: NTIS HC A04/MF A01; DFVLR, Cologne DM 12,60

The development of displays for monitoring and controlling complex technical systems is facilitated by employing a computer simulation of the man machine system during the theoretical design phase. A simulation model for the manual control task is described which leads to a method for evaluating displays. The capabilities and applications of this simulation model to a pilot airplane system restricted to aircraft motion in the vertical plane and a two channel pilot model are presented. Results suggest that the model should be further developed. Author (ESA)

N82-20884*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

LIFE IN THE UNIVERSE

John Billingham, ed. Jan. 1982 465 p refs Proc. of conf. held at Moffett Field, Calif., 19-20 Jun. 1979 Analytic primary previously announced in IAA as A82-22976; subsidiaries previously announced as A82-22977 through A82-23004 (NASA-CP-2156; A-8242; NAS 1.55:2156; LC-81-22350) Avail: NTIS MF A01; SOD HC \$8.00 as SN 033-000-0084-4 CSCL 06F

Papers are presented concerning the nature and distribution of life in the universe, particularly in the areas of the origins of life, life-supporting environments, the evolution of life in the Galaxy, and the detectability of technological civilizations. Specific topics include a preliminary discussion of the role of life in the universe, followed by examination of the role of water in thin films and cold environments in the origin of life, the relation between atmospheric composition and evolution, the possibility of planetary orbits in multiple star systems, and the prospects for detecting extrasolar planetary systems. Attention is also given to the origin of protein synthesis, the evolution of intelligence in multicellular organisms, the manifestations of advanced civilizations, and plans and principles for SETI. A.L.W.

N82-21151*# Control Data Corp., Minneapolis, Minn.

CABIN OZONE AND TROPOPAUSE DEFINITION

Arthur D. Belmont In NASA. Marshall Space Flight Center Proc.: 5th Ann. Workshop on Meteorol. and Environ. Inputs to Aviation Systems Dec. 1981 p 86-89 ref

Avail: NTIS HC A07/MF A01 CSCL 06K

A method to estimate ozone profiles is based on knowing the total ozone which may come from any observational system available such as Dobson photometers that are available from NMC forecasts and used operationally in flight planning. From this an ozone profile at selected pressure levels is obtained. The technique was based on five years of ozonesonde data. So far, models have been developed for winter, spring, and fall. A.R.H.

N82-21866*# National Aeronautics and Space Administration, Washington, D. C.

ROLE OF IMMOBILIZATION OF IRRADIATED RATS IN THE PROTECTIVE EFFECT OF BONE MARROW SHIELDING

N. F. Gronskaya and G. S. Strelin Feb. 1982 7 p refs Transl. into ENGLISH from Radiobiologiya (Leningrad), v. 20, no. 2, 1980 p 259-262 Transl. by Scientific Translation Service, Santa Barbara, Calif. Original doc. prep. by Central Sci. Res. X-ray Radiological Inst. of the USSR Ministry of Public Health (Contract NASw-3542)

(NASA-TM-76828; NAS 1.15:76828) Avail: NTIS HC A02/MF A01 CSCL 06C

Rats were exposed to X-radiation to study the influence of immobilization and shielding of part of bone marrow during exposure on survival. It is concluded that (1) the beneficial effect of the stress factor (created by the immobilization of rats during exposure) can aggregate with the effect of bone marrow shielding

and, under certain conditions, imitate the latter; and (2) the probability of the protective effect of immobilization should be taken into account when assessing the influence of bone marrow shielding. Author

N82-21867*# National Aeronautics and Space Administration, Washington, D. C. Inst. for Morphology.

MORPHOMETRICAL INVESTIGATIONS ON THE REPRODUCTIVE ACTIVITY OF THE OVARIES IN RATS SUBJECTED TO IMMOBILIZATION AND TO MOTION ACTIVITY

N. Konstantinov, L. Cheresharov, and S. Toshkova Mar. 1982 15 p refs Transl. into ENGLISH from Veterinarnomeditsinski Nauki (Sofia), v. 16, no. 6, 1979 p 66-74 Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prep. by Bulgarian Academy of Sci., Sofia (Contract NASw-3541)

(NASA-TM-76831; NAS 1.15:76831) Avail: NTIS HC A02/MF A01 CSCL 06C

Wistar-strain white female rats were divided into three groups, with the first group subjected to motion loading, the second used as control, and the third group was immobilized. A considerable reduction in numbers of corpora lutea was observed in the immobilized group, together with smaller numbers of embryos, high percent of embryo mortality, fetal growth retardation, and endometrium disorders. The control group showed no deviation from normal conditions, and there was slight improvement in reproductive activity of animals under motion loading. B.W.

N82-21868*# Alabama Univ. in Birmingham. Div. of Molecular Biology.

THE CHEMICAL BASIS FOR THE ORIGIN OF THE GENETIC CODE AND THE PROCESS OF PROTEIN SYNTHESIS Semiannual Report

22 Dec. 1981 19 p refs

(Grant NGR-01-010-001)

(NASA-CR-168748; NAS 1.26:168748) Avail: NTIS HC A02/MF A01 CSCL 06C

The principles upon which the process of protein synthesis and the genetic code were established are elucidated. Extensive work on nuclear magnetic resonance studies of both monomer- monomer and monoamino acid polynucleotide interactions is included. A new method of general utility for studying any amino acid interacting with any polynucleotide was developed. This system involves the use of methyl esters of amino acids interacting with polynucleotides. N.W.

N82-21869*# Oklahoma State Univ., Stillwater. Dept. of Microbiology.

MICROBIAL ECOLOGY OF EXTREME ENVIRONMENTS: ANTARCTIC DRY VALLEY YEASTS AND GROWTH IN SUBSTRATE LIMITED HABITATS Progress Report, 1 Dec. 1980 - 30 Nov. 1981

Helen S. Vishniac 30 Nov. 1981 27 p refs

(Grant NAGw-26)

(NASA-CR-168742; NAS 1.26:168742) Avail: NTIS HC A03/MF A01 CSCL 06C

The multiple stresses temperature, moisture, and for chemoheterotrophs, sources of carbon and energy of the Dry Valley Antarctica soils allow at best depauperate communities, low in species diversity and population density. The nature of community structure, the operation of biogeochemical cycles, the evolution and mechanisms of adaptation to this habitat are of interest in informing speculations upon life on other planets as well as in modeling the limits of gene life. Yeasts of the *Cryptococcus vishniacii* complex (Basidioblastomycetes) are investigated, as the only known indigenous of the most hostile, lichen free, parts of the Dry Valleys. Methods were developed for isolating these yeasts (methods which do not exclude the recovery of other microbiota). The definition of the complex was refined and the importance of nitrogen sources was established as well as substrate competition in fitness to the Dry Valley habitats. S.L.

N82-21870# Materials Research Labs., Melbourne (Australia). **SETTLEMENT OF FOULING ORGANISMS AT THE JITTRE NORTH BARNARD ISLAND RAFT SITE**

John A. Lewis Apr. 1981 13 p refs (MRL-TN-450) Avail: NTIS HC A02/MF A01

Data on the settlement of the major fouling organisms below the marine exposure raft at the North Barnard Islands, Queensland,

are presented for a twelve month period. Organisms settled throughout the year. The red algal species *Heteroderma* sp. and *Laurencia obtusa* were the dominant organisms when assessed as number of individuals per unit area. However, the most abundant organisms were the brown alga *Feldmannia indica*, the hydroid *Campanularia delicatula* and the stoloniferous bryozoan *Aetea truncata*. In all, seventy-one taxa from ten phyla settled during the study period. On the basis of fouling settlement, the raft is considered a suitable site to test the resistance of coatings to fouling growth under tropical conditions. R.J.F.

N82-21871# Materials Research Labs., Melbourne (Australia).
SETTLEMENT OF FOULING ORGANISMS AT THE HMAS STIRLING RAFT SITE

John A. Lewis Nov. 1980 13 p refs
(MRL-TN-441) Avail: NTIS HC A02/MF A01

The settlement of fouling organisms on non-toxic panels was studied over a twelve-month period on a marine exposure raft at HMAS STIRLING in Cockburn Sound, western Australia. Monthly settlement counts for the six major organisms and water temperature measurements indicated that the raft met the criteria of Australian Standard 1580, test method 481.5 in these respects, as required for registration by the National Association of Testing Authorities. Larval settlement occurred throughout the year and water temperatures are within the range prescribed by the standard. Species which settled on the panels represented each of the major groups of fouling organisms. Panels immersed for twelve months were initially dominated by algae but these were subsequently displaced by barnacles, ascidians and bivalve molluscs. R.J.F.

N82-21872# Materials Research Labs., Melbourne (Australia).
THE EFFECTS OF UNDERWATER EXPLOSIONS ON MARINE LIFE IN SHOALWATER BAY, QUEENSLAND

I. C. Dunstan and J. A. Lewis Sep. 1980 32 p refs
(MRL-R-795) Avail: NTIS HC A03/MF A01

Data on the effects of underwater explosions on marine life are presented. This was done in order to assess the ecological and biological impact on marine communities of underwater explosions in Shoalwater Bay, Queensland. A general assessment of the possible effects of the explosions is given on the basis of overseas data relevant to the biological effects of underwater explosions, and from the limited data published on the marine communities of the Queensland coast. R.J.F.

N82-21873# Georgia Inst. of Tech., Atlanta. Biomedical Research Branch.

INVESTIGATION OF RADIOFREQUENCY RADIATION EFFECTS ON EXCITABLE TISSUES Final Technical Report

R. L. Seaman, E. C. Burdette, and R. L. DeHaan (Emory Univ.)
31 Jul. 1981 100 p refs
(Contract F39620-79-C-0055; AF Proj. 2312)
(AD-A109813; AFOSR-82-0020TR) Avail: NTIS
HC A05/MF A01 CSCL 06/18

Spheroidal aggregates of cultured chick cardiac cells were used to study effects of 2450-MHz radiofrequency radiation (RFR) on excitable membranes. Rhythmically beating aggregates under normal culture conditions were exposed to known amounts of RFR energy in a specially developed open-ended coaxial device. Exposure level was given in terms of Specific Absorption Rate (SAR) in mW/g. Short-term recordings with intracellular electrodes suggested that increased variability in beat rate and in action potential maximum upstroke velocity occurred in the range of 10-40 mW/g for continuous wave (CW) RFR and RFR modulated as 10.9-microsecond pulses at 10,000 pps (PW). Long-term recordings with extracellular electrodes and video imaging were used to gather interbeat interval (IBI) data for computing mean IBI and coefficient of variation (CV). Three-minute exposures to CW and PW RFR and to RFR square-wave modulated at 1.6 or 16 Hz were made for SARs between 1.2 and 85.5 mW/g. Decreases in mean IBI during exposure for SARs greater than 30 mW/g closely matched those expected from induced temperature rises. However, IBI changes at smaller SARs, including an increase at 1.2 mW/g, were not fully explained by temperature changes. Small changes in CV occurred during exposure and were similar to those during sham exposures. GRA

N82-21874# Smithsonian Institution, Washington, D. C. Radiation Biology Lab.

PRIMARY LIGHT-HARVESTING SYSTEM: PHYCOBILISOMES AND ASSOCIATED MEMBRANES Progress Report,

1 Jan. - 31 Dec. 1981

E. Gantt 1981 5 p refs

(Contract DE-AS05-76ER-04310)

(DE81-028326; DOE/ER-04310/22)

Avail: NTIS

HC A02/MF A01

Phycobilisomes, serving as primary light harvesting complexes in cyanobacteria and red algae, were investigated. Allophycocyanin is in the center near the thylakoid. Stacked rods composed of phycocyanin, or phycocyanin phycoerythrin radiate peripherally from the allophycocyanin core. Phycobilisomes of *Nostoc* sp. and *Fremyella disposiphon*, after separation into separate allophycocyanin and phycoerythrin phycocyanin fractions were associated in vitro. Hybrid phycobilisomes, derived from mixtures of phycobiliprotein from these species were also obtained. Phycobilisomes were similar in their sedimentation, absorption, fluorescence excitation, fluorescence emission, and by electron microscopy. Many of the colorless polypeptides were also highly similar between *Nostoc* and *Fremyella*. The polypeptide composition of *Porphyridium cruentum* phycobilisomes is the most complex of any thus far examined. The phycobiliprotein containing polypeptides comprised 84% of the total stainable protein, while the remaining were colorless. Most of the colorless polypeptides occurred in a pelletable fraction, which was enriched in allophycocyanin and phycocyanin. DOE

N82-21875# Beth Israel Hospital, Boston, Mass. Div. of Nuclear Medicine.

MOLECULAR EVENTS BASIC TO CELLULAR RADIATION RESPONSE Progress Report, 1 Oct. 1980 - 31 Dec. 1981

G. M. Kolodny 1981 21 p refs

(Contract DE-AC02-80EV-10327)

(DE81-029813; DOE/EV-10327/T1)

Avail: NTIS

HC A02/MF A01

Research during the past year was directed at induction of specific protein synthesis in differentiated mammalian cells. The Primer Hypothesis for the regulation of eukaryotic gene expression suggests that RNA transcription is primed by small molecular weight RNA. It predicts that albumin mRNA transcription in a 3T3 fibroblast, which ordinarily does not produce albumin, can be initiated by RNA primer present in liver cells. During this past year experiments in which mouse fibroblasts were incubated with mouse liver RNA in the presence of polylysine were continued. Although these cells did indeed produce albumin which was detected by counterimmunoelectrophoresis the results were not consistent but depended on as yet unknown conditions of the extracted RNA. Conditions of phenol preparation extraction of RNA and incubation of RNA and cells were carefully monitored. None of these variations in technique were successful in reproducibly stimulating albumin synthesis on a repetitive basis although intermittently positive results were obtained. Because of these inconsistent results other methods of introducing RNA into cells were considered. DOE

N82-21877# Materials Research Labs., Melbourne (Australia).
A COMPARISON OF THE ANTIMUSCARINIC PROPERTIES OF APROPHEN WITH THOSE OF SOME OTHER ANTICHOLINERGIC DRUGS

R. M. Dawson, S. E. Freeman, and B. M. Paddle Sep. 1980
11 p refs

(MRL-R-794) Avail: NTIS HC A02/MF A01

Apparent dissociation constants $K_{sub i}$ for the interaction of benactyzine, aprophen, and atropine with the muscarinic cholinergic receptor were determined in the brain (striatum and pons-medulla) and ileum of the guinea pig by competition with (3H)-quinuclidinyl benzilate (QNB) in a direct binding assay. Corresponding dissociation constants in the atrium were determined by antagonism of antagonism of acetylcholine-induced contractions. In all regions studied, aprophen and benactyzine (which are closely related structurally) were approximately equi-effective, based on their $K_{sub i}$ values, and about 1/4 as effective as atropine. Hyoscine and the glycolate T3436 were also studied in the atrium and found to be more potent muscarinic antagonists than atropine. Values of $K_{sub i}$ were in the nanomolar range. For any one antagonist, significant differences were observed between $K_{sub i}$ values for different regions. Author

N82-21878# Materials Research Labs., Melbourne (Australia).
AN EXAMINATION OF THE FEASIBILITY OF ADMINISTERING PROPHYLACTIC PYRIDOSTIGMINE BY THE PERCUTANEOUS ROUTE

Hugh D. Crone and Michael P. Bladen 1981 16 p refs

(MRL-TN-449) Avail: NTIS HC A02/MF A01

The feasibility of administering pyridostigmine by the percutaneous route was examined by the use of guinea pigs in vivo and their skin in vitro. Pyridostigmine has a possible use as a prophylactic against inhibit blood cholinesterase, producing effects observable in 30 minutes. Evidence of the storage of pyridostigmine in skin was found. The compound when crossing skin in vitro takes 1,000 minutes to reach an equilibrium rate. A permeability constant was estimated. The main problem remaining is the practical on of making a dosage form suitable for presenting the pyridostigmine at constant concentration to the skin for a long period. Author

N82-21879# Air Force Systems Command, Wright-Patterson AFB, Ohio. Biodynamics and Bioengineering Div.
F/111 EJECTION EXPERIENCE (1967-1980). PART 1: EVALUATION AND RECOMMENDATIONS
 Bernard F. Hearon, James W. Brinkley, Ralph J. Luciani, and Henning E. VonGierke Nov. 1981 21 p refs
 (AF Proj. 7231)
 (AD-A110199; AFAMRL-TR-81-113) Avail: NTIS
 HC A02/MF A01 CSCL 06/19

A review of the accident investigation reports of all non-fatal F/111 ejections which occurred from 19 October 1967 to 26 March 1980 was conducted. The available spinal radiographs of the ejectees were also reviewed. The overall vertebral fracture rate among survived ejectees in a properly functioning module was found to be 29.5% (23 of 78). There was no correlation of these fractures with negative inertia reel strap angles. Five radiologic and orthopedic consultants did not agree on the specific mechanism of vertebral fracture in the involved crewmembers. A significant reduction in the vertebral fracture rate appears achievable only by decreasing the acceleration stresses imposed on the crewmembers during landing impact. GRA

N82-21880# Northwestern Univ., Evanston, Ill. Dept. of Psychology.

SOURCEBOOK OF TEMPORAL FACTORS AFFECTING INFORMATION TRANSFER FROM VISUAL DISPLAYS Final Report

R. Sekuler, P. D. Tynan, and R. S. Kennedy, ed. (Canyon Research Group) Alexandria, Va. Army Research Institute for the Behavioral and Social Sciences 1 Jun. 1981 191 p refs
 (Contract N61756-76-M-5961; DA Proj. 2Q1-62722-A-77)
 (AD-A109907; ARI-TR-540) Avail: NTIS HC A09/MF A01 CSCL 06/16

Temporal factors in vision are reported. A literature and information search is included. An integrative review of the literature is provided which deals with application of findings to display design. Perception of temporal events - specifically motion perception (real and apparent) and flicker/flash sensitivity is examined. Temporally based phenomena which distort or degrade perception are covered. Features of these phenomena are observed in visual displays. Equations are provided for the calculation of design criteria (e.g., peripheral motion threshold, contrast thresholds, contrast thresholds and age, etc.). General guidelines are offered for incorporating design criteria into perceptions due to temporal events. E.A.K.

N82-21881# Stanford Univ., Calif. Dept. of Computer Science.

SYMBOLIC REASONING AMONG 3-D MODELS AND 2-D IMAGES Ph.D. Thesis

Rodney Allen Brooks Jun. 1981 98 p refs
 (Contract MDA903-80-C-0102)
 (AD-A110316; STAN-CS-81-861; AIM-343) Avail: NTIS
 HC A05/MF A01 CSCL 09/2

An implemented and operational model-based vision system is described. Examples are given of its interpretation of images, including extraction of three dimensional parameters from monocular images. Advances are presented in representation for geometric modeling of objects and objects classes, in techniques for manipulating non-linear symbolic algebraic constraints, in geometric reasoning in incompletely specified situations, and in constructing algebraic constraints from image measurements. Both generic object classes and specific objects are represented by volume models which are independent of viewpoint. Complex real world object classes are modeled. Variations in size, structure and spatial relations within object classes can be modeled. New spatial reasoning techniques are described which are useful both for prediction within a vision system, and for planning within a manipulation system. New approaches to prediction and

interpretation are introduced, based on the propagation of symbolic constraints. Predictions are two-pronged. First, prediction graphs provide a coarse filter for hypothesizing matches of objects to image features. Second, prediction graphs contain instructions on how to use measurements of image features to deduce three dimensional information about tentative object interpretations. Interpretation proceeds by merging local hypothesized matches, subject to consistent derived implications about the size, structure and spatial configuration of the hypothesized objects. Prediction, description and interpretation proceed concurrently, from coarse object subpart and class interpretations of images, to fine distinctions among object subclasses, and more precise three dimensional quantification of objects. Author (GRA)

N82-21882# SRI International Corp., Menlo Park, Calif.
PERCEPTION OF SPATIAL FEATURES WITH STEREO-SCOPIC DISPLAYS Final Report, 1 Sep. 1979 - 30 Sep. 1981

Thomas P. Piantanida 30 Nov. 1981 60 p
 (Contract N00014-79-C-0742; SRI Proj. 8899; NR Proj. 196-162)
 (AD-A110191; N14-0742-81C-0002) Avail: NTIS
 HC A04/MF A01 CSCL 14/5

Two levels of measurement were used in this investigation: objective measures consisting of observer responses, and subjective measures consisting of observer eye movements. Two major experimental techniques were used. These were the selectively stabilized image technique, in which part of the stimulus image was stabilized on the observer's retina; and a motion-in-depth technique that allowed us to measure changes in an observer's perception of three dimensional stimuli. The major findings of this study are: (1) the human stereo mechanisms responsible for the perception of depth and of motion-in-depth are sensitive to different aspects of the retinal images produced by three-dimensional displays than is the form perception mechanism; (2) it is possible to drive the human stereo mechanism with retinal images that do not drive the form perception mechanism; (3) observer variables such as ocular dominance and familiarity with three-dimensional displays interact with the three-dimensional display parameters (image luminance, image contrast, and interocular contrast), but appear not to influence the perception of motion-in-depth in three-dimensional displays during binocular image misregistration. Author

N82-21883# Syracuse Univ., N. Y. Dept. of Mechanical and Aerospace Engineering.

POTENTIAL FOR INTERACTION OF LOW-LEVEL IMPULSE AND CONTINUOUS NOISE

Roger P. Hamernik, Donald Henderson, and Richard Salvii Wright-Patterson AFB, Ohio AMRL Mar. 1981 56 p refs
 (Contract F33615-78-C-0513; AF Proj. 2312)
 (AD-A109430 AFAMRL-TR-80-68) Avail: NTIS
 HC A04/MF A01 CSCL 06/19

The purpose of the experiments described in this report was to establish whether a synergistic interaction occurs between relatively low levels of continuous and impulse noise to produce an increased hearing loss and cochlear pathology. Twenty-three monaural chinchillas were used as experimental subjects. The animals were divided into six groups. Each group was exposed 8 hours per day for 8 weeks to various combinations of impulse and continuous noise presented at various levels. Using behavioral conditioning techniques, hearing thresholds were measured before, during, and after noise exposure. After a minimum of 30 days post-exposure the animals were killed and their cochleas were analyzed using the surface preparation technique. Histological results were qualified in the form of a cochleagram. In contrast to earlier findings the results of this study found no evidence of a synergistic interaction when the animals were exposed to a combination of continuous (between 75-85 dB SPL) and impulse (103 dB SPL peak exposure) noise. Author (GRA)

N82-21884# Royal Aircraft Establishment, Farnborough (England).

HUMAN REACTION TO LOW FREQUENCY MOTION: PRELIMINARY STUDIES

C. H. duRoss London HMSO 10 Nov. 1980 45 p refs
 (RAE-TM-FS-365; BR77320) Avail: NTIS HC A03/MF A01

A ship motion simulator was used to ascertain the effects of low frequency ship and sinusoidal motion on man and his

performance. Ship motion signals based on those recorded at 25 knots into a force 4 wind were employed. Heave, pitch and roll sinusoidal motion in the 0.1 to 0.4 Hz frequency range occurred. A tracing task involving unsupported arm movements was seriously affected by the motion; a tracing task showed a small decrement in performance and a digit keying task was unaffected. There was no evidence that adverse effects were caused by motion sickness. Accelerations measured at the head and hand of subjects resulted in transmissibilities showing that relatively large rotational motions could be induced.

Author (ESA)

N82-21885# Defence Research Information Centre, Orpington (England).

RECORDING BASIC CLIMATIC PARAMETERS AND THEIR PROCESSING INTO INTEGRATED HEAT STRESS INDICES

G. Kleinhanss, C. Piekarski, and E. Haug Mar. 1981 33 p refs Transl. into ENGLISH from Biomedizinische Tech. (Germany), v. 25, no. 1-2 1980 p 12-26

(DRIC-T-6292; BR78677) Avail: NTIS HC A03/MF A01

A method of estimating heat stress and climatic strain on man is described. Mathematical compound values based on simultaneously recorded meteorological factors related to physiological strain in exposed human beings are used. A procedure is presented which simplifies and improves the previous method used for field testing environmental strain of the workplace. With the aid of the mathematical model, it is possible using a simple electronic calculator to calculate the stress from a number of selected heat stress indices.

Author (ESA)

N82-21886# Defence Research Information Centre, Orpington (England).

ASPECTS OF THE BODY'S DEFENCE MECHANISMS AS PROTECTION AGAINST BIOLOGICAL AGENTS

Gunilla Eriksson and Thomas Olsson Aug. 1981 14 p refs Transl. into ENGLISH of 'Naagra aspekter paa infektionsfoersvaret som skydd mot biologiska stridsmedel' (Stockholm)

(DRIC-T-6433; FOA-C-40094-B 1; BR80179) Avail: NTIS HC A02/MF A01

Factors important in assessing the pathogenic powers of infectious microorganisms, and possible means of protection during biological warfare, were analyzed. Nonspecific defense mechanisms comprise: (1) mechanical protection, (skin, mucous membrane); (2) chemical factors, (antimicrobial substances); (3) inflammatory response, (increased circulation, etc); and (4) phagocytosis, (antimicrobial cell activity). The immune defenses, give specific, but not absolute, protection against infectious diseases. Effects of microorganisms against which there is no immune defense are restricted by antibiotics/chemotherapeutic drugs, and immunotherapy.

Author (ESA)

N82-21887# Green (Del) Associates, Inc., San Diego, Calif. **EFFECTS OF SHORT-TERM INTERMITTENT AIR POLLUTANTS ON INCIDENCE AND SEVERITY OF ACUTE RESPIRATORY DISEASE: DATA COLLECTION AND QUALITY ASSURANCE**

R. David Flesh, Margaret L. Riha, and Michelle F. Miller 1981 265 p

(Contract EPA-68-02-2749)

(PB82-129479; EPA-600/1-81-065)

Avail: NTIS

HC A12/MF A01 CSCL 06T

The purpose of this study was to measure the acute response of respiratory disease from peak hourly and daily average exposures to nitrogen dioxide alone and in combination with other pollutants. The study population was made up of families with children attending public elementary schools and living in four California South Coast Air Basin study areas: West Los Angeles/Santa Monica, Garden Grove/Westminster, Glendora/Covina, and Upland/Ontario. The role and responsibility of the contractor were to collect all background and health data, to process and assure the quality of the data and to prepare this report. Families were recruited for participation during the spring and summer months of 1978. Recruitment included face to face interviews for the purpose of collecting family background data.

GRA

N82-21888# Washington Univ., St. Louis, Mo. Materials Research Lab.

PHYSICAL TESTING OF POLYMERS FOR USE IN CIRCULATORY ASSIST DEVICES Annual Report, 31 Aug. 1980 - 30 Aug. 1981

J. L. Kardos, W. M. Swanson, R. E. Clark, and C. Migliaresi

31 Aug. 1981 79 p refs

(Contract N01-HV-02910)

(PB82-127069; NIH-N01-HV-02910-1)

Avail: NTIS

HC A05/MF A01 CSCL 06K

The distribution of fatigue lifetimes under biaxial stress for elastomers was developed. For crack growth under uniaxial fatigue an increase in frequency yielded an almost linear decrease in fatigue life. The predicted lifetimes are shorter than those experimentally measured. Comparison of the time-temperature superposed (TTS) master creep compliance curves with the realtime, longterm creep at 37C indicates the real-time creep to be slightly higher than the TTS predictions. A linear viscoelastic analysis is developed to predict creep under superimposed static and dynamic uniaxial loadings.

GRA

N82-21889# Professional Staff Association of the Rancho Los Amigos Hospital, Inc., Downey, Calif.

DEVELOPMENT AND PERSISTENCE OF ADAPTATION TO OZONE EXPOSURE IN OZONE-SENSITIVE SOUTHERN CALIFORNIA RESIDENTS Final Report

William S. Linn and Jack D. Hackney 20 Aug. 1981 33 p refs

(PB82-125899; CRC-APRAC-CAPM-31-79-1-80) Avail: NTIS HC A03/MF A01 CSCL 06E

Eleven healthy volunteer subjects believed to be atypically reactive to ozone were exposed to approximately 0.47 ppm ozone (ultraviolet calibration method) in purified air for four successive days to develop adaptation if possible. They were reexposed similarly once during each of the following five weeks to investigate the persistence of the adaptive response. Exposures lasted two hours and included stresses of heat and intermittent moderate exercise. Responses to ozone were assessed by forced expiratory lung function tests and by subjects' reports of symptoms. For the group as a whole, the time courses of lung function and symptom responses were very similar. For the typical subject in this group, adaptation was partially lost after four ozone-free days, and more or less completely lost after seven ozone-free days.

GRA

N82-21890# Decision Research Corp., Eugene, Oreg.

SUBJECTIVE CONFIDENCE IN FORECASTS

Baruch Fischhoff and Don Macgregor Dec. 1981 48 p refs (Contract N00014-80-C-0150)

(AD-A109730; PTR-1092-81-12)

Avail: NTIS

HC A03/MF A01 CSCL 05/10

To be useful, a forecast must not only predict the future, but also give some indication of how much confidence to place in that prediction. The appropriateness of people's confidence in their general knowledge has been studied extensively. After briefly reviewing that literature, the present article attempts to make it more directly relevant to forecasters by repeating previous studies in the context of confidence in forecasts. The most robust of previous results was strongly replicated: participants were greatly overconfident in their predictions when dealing with a fairly hard-to-predict set of events. A procedure that had previously proved effective in reducing overconfidence, forcing respondents to provide reasons why their answers might be wrong, was of minor value here. A new result was the discovery of a simple indicator of the quality of people's confidence assessments, whether they ever expressed certitude. Possible implications of these results for producing and using forecasts are discussed.

Author (GRA)

N82-21891# Decision Research Corp., Eugene, Oreg.

DIAGNOSTICITY AND THE BASE-RATE EFFECT

Baruch Fischhoff and Maya Bar-Hillel Nov. 1981 44 p refs (Contract N00014-80-C-0150)

(AD-A109731; PTR-1092-81-11)

Avail: NTIS

HC A03/MF A01 CSCL 05/1

A common judgmental task involves predicting the category membership of an individual on the basis of information specific to that individual and background information regarding the base rate of different categories. According to statistical theory, predictions may deviate from base rates only to the extent that the individuating information is diagnostic. Previous research has demonstrated that diagnosticity is often judged by 'representativeness', the degree to which the individuating information is differentially suggestive of the different possible categories. Thus, information with high differential representativeness, even if it is worthless (e.g., because its sources are unreliable), will swamp base-rate information. The present studies varied differential representativeness by manipulating the degree to which the

N82-21892

prediction categories are similar to one another vis a vis the individuating information, and hence similarly represented by that individuating information. It was found that the effect of the base rate increased systematically as differential representativeness decreased. Representativeness was measured independently by several converging techniques. These measures predicted the magnitude of the base rate over entire sets of descriptions.

Author (GRA)

N82-21892# National Physical Lab., Teddington (England). Acoustics Unit.

A STUDY OF THE EFFECTS OF FLUCTUATION FREQUENCY ON ADVERSE REACTIONS TO NOISE

H. C. Fuller and D. W. Robinson Oct. 1980 28 p refs
(NPL-Ac-97; ISSN-0143-7143) Avail: NTIS
HC A03/MF A01

The effects of the frequency of level fluctuations on the adverse reaction generated by a noise stimulus were investigated. As a result of theoretical considerations, it was suggested that the fluctuation term in the formula for noise pollution level should be weighted according to the frequency of the level fluctuations. Subjects completed a calculation task in a listening room, giving their response on a questionnaire. Test stimuli with levels varying by 10 dB and 20 dB with periods of between 6 and 600 sec were used and the adverse reaction generated after 10 min was measured. The results were examined in relation to the noise ratings L sub NP, L sub EG a measure of the rate of fluctuation of the level, and the proposed modification of L sub NP. None of the four measures fully explains the results, but there is some evidence to support the modification of L sub NP suggesting that only level fluctuations at frequencies between 0.1 Hz and 0.01 Hz contribute to the general adverse reaction.

Author (ESA)

N82-21893# Royal Naval Personnel Research Committee, London (England). Applied Psychology Unit.

COGNITIVE PERFORMANCE, SLEEP QUALITY AND MOOD DURING DEEP OXY-HELIUM DIVING

Vivien J. Lewis and Alan D. Baddeley Jan. 1981 32 p refs
(RPN-1/81) Avail: NTIS HC A03/MF A01

Five dives are reported, lasting between 18 and 26 days, and reaching maximum simulated depths of between 300 meters sea water (msw) and 540 msw. Tests of cognitive functioning, including associative and short term memory, arithmetic ability, perceptual speed, spatial manipulation, grammatical reasoning and semantic processing, were administered to well-practiced subjects prior to each dive, at maximum depth and again during decompression. Self-report measures of sleep and mood questionnaires were administered for a period extending from one week before each dive commenced until at least one week after the dive was completed. The results indicate significant impairments in all performance tasks at maximum depth, except for the tests of associative memory and grammatical reasoning. A significant reduction in sleep and decrease in the subjective level of alertness is found at maximum depth for all dives.

Author (ESA)

N82-21894*# Stanford Univ., Calif. Biomedical Technology Transfer Program.

MOBILITY AID FOR THE BLIND Final Report, 1 Dec. 1980 - 30 Nov. 1981

Jan. 1982 40 p refs
(Contract NCC2-113)
(NASA-CR-168731; NAS 1.26:168731) Avail: NTIS
HC A03/MF A01 CSCL 05H

A project to develop an effective mobility aid for blind pedestrians which acquires consecutive images of the scenes before a moving pedestrian, which locates and identifies the pedestrian's path and potential obstacles in the path, which presents path and obstacle information to the pedestrian, and which operates in real-time is discussed. The mobility aid has three principal components: an image acquisition system, an image interpretation system, and an information presentation system. The image acquisition system consists of a miniature, solid-state TV camera which transforms the scene before the blind pedestrian into an image which can be received by the image interpretation system. The image interpretation system is implemented on a microprocessor which has been programmed to execute real-time feature extraction and scene analysis algorithms for locating and identifying the pedestrian's path and potential obstacles. Identity and location information is presented

to the pedestrian by means of tactile coding and machine-generated speech.

R.J.F.

N82-21895*# Virginia Univ., Charlottesville. Dept. of Environmental Sciences.

SENSITIVITY ANALYSIS AS AN AID IN MODELLING AND CONTROL OF (POORLY-DEFINED) ECOLOGICAL SYSTEMS

G. M. Hornberger and E. B. Rastetter Mar. 1982 23 p refs
(NASA Order A-7747B)
(NASA-CR-166308; NAS 1.26:166308) Avail: NTIS
HC A02/MF A01 CSCL 13B

A literature review of the use of sensitivity analyses in modelling nonlinear, ill-defined systems, such as ecological interactions is presented. Discussions of previous work, and a proposed scheme for generalized sensitivity analysis applicable to ill-defined systems are included. This scheme considers classes of mathematical models, problem-defining behavior, analysis procedures (especially the use of Monte-Carlo methods), sensitivity ranking of parameters, and extension to control system design.

N.W.

N82-21896*# National Bureau of Standards, Washington, D.C. Industrial Systems Div.

AN OVERVIEW OF ARTIFICIAL INTELLIGENCE AND ROBOTICS. VOLUME 2: ROBOTICS

William B. Gevarter Mar. 1982 102 p refs
(NASA-CR-168727; NAS 1.26:168727; NBSIR-82-2479) Avail:
NTIS HC A06/MF A01 CSCL 05H

The field of robotics is reviewed. Primitive functions are discussed. Manipulator arms are considered. Actuators are examined. Mobility, end effectors, control, and sensor-controlled robots are covered. Robot vision is discussed, covering determination of pose, feature extraction, object recognition, and future techniques. Programming is addressed. Kinematics and dynamics are considered. Research requirements are taken up. Commercially available robots, vision systems, and other components are discussed. Information sources are provided.

N.W.

N82-21897*# Children's Hospital at Stanford, Palo Alto, Calif. Rehabilitation Engineering Center.

RESEARCH AND DEVELOPMENT OF A VERSATILE PORTABLE SPEECH PROSTHESIS Final Report

Nov. 1981 82 p refs
(NsG-2313)
(NASA-CR-168741; NAS 1.26:168741) Avail: NTIS
HC A05/MF A01 CSCL 05H

The Versatile Portable Speech Prosthesis (VPSP), a synthetic speech output communication aid for non-speaking people is described. It was intended initially for severely physically limited people with cerebral palsy who are in electric wheelchairs. Hence, it was designed to be placed on a wheelchair and powered from a wheelchair battery. It can easily be separated from the wheelchair. The VPSP is versatile because it is designed to accept any means of single switch, multiple switch, or keyboard control which physically limited people have the ability to use. It is portable because it is mounted on and can go with the electric wheelchair. It is a speech prosthesis, obviously, because it speaks with a synthetic voice for people unable to speak with their own voices. Both hardware and software are described.

R.J.F.

N82-21898# Oceanautics Inc., Annapolis, Md.
HUMAN ENGINEERING GUIDES TO DESIGN OF DISPLAYS FOR UNDERWATER APPLICATIONS

W. S. Vaughan, Jr. and J. A. S. Kinney (Naval Submarine Medical Research Lab.) Dec. 1981 40 p
(Contract N00014-79-C-0602; NR Proj. 196-157)
(AD-A110317) Avail: NTIS HC A03/MF A01 CSCL 05/5

This report contains recommendations for designers of displays for systems that operate underwater. The recommendations are based on a foundation of research and analyses contained in a companion document (Vaughan and Kinney, 1980). Both the current report and the database document are organized by designer decisions related to the legibility of panel displays and to the visibility of painted objects. Five decisions comprise the content organization of the report: eye-to-console distance, symbol size, display luminance, peripheral location, and use of color. Material presented within each section serves first, to provide a rationale for the significance of human factor considerations to the decision; second, to provide necessary translations of scientific concepts into engineering concepts; third, to state concise

recommendations for how to resolve the design issue from the viewpoint of human factors. GRA

N82-21899# Defence Research Information Centre, Orpington (England).

CONCEPTUAL ERGONOMICS: EARLY DETECTION OF FIELD OF VISION RESTRICTIONS BY MEANS OF ERGOSCOPY

H. J. Windberg London HMSO Nov. 1980 16 p refs Transl. into ENGLISH of ERGONOMICS, v. 23, no. 4, 1980 p 341-350

(DRIC-T-6253; BR76774) Avail: NTIS HC A02/MF A01

A photographic apparatus based on the endoscope for determining the field of vision from control positions using scale models is described. Called ergoscopy, the technique uses a pipe with an optical system and a flexible optical conductor cable fitted to a camera. The ergoscopy allows the designer to investigate sight angles of operators and recognize hindrances by simulating critical conditions with small scale models. Design mistakes may therefore be eliminated before the 1:1 scale prototype is built. Illustrations with 1:20 and 1:100 models are given. Author (ESA)

N82-21900# Royal Aircraft Establishment, Farnborough (England).

REPORT ON A VISIT TO CANADA OF THE 10-17 MAY 1980 SECOND INTERNATIONAL SYMPOSIUM ON PERSONAL HEARING PROTECTION IN INDUSTRY

J. A. Chillery London HMSO 29 Jan. 1981 24 p Conference held at Toronto, 14-16 May 1980

(RAE-TM-FS-377; BR78127) Copyright. Avail: NTIS HC A02/MF A01

Material presented at the symposium is summarized and evaluated. Several papers cover the testing of protectors, their design and performance, including the objective measurement of ear-plug attenuation, and the miniature microphone method of measuring ear-muff attenuation. Other papers describe an active noise reduction system, correlation between objective and subjective data, correlation between laboratory and field data, and the measurement of headband force. Author (ESA)

N82-21901# Royal Aircraft Establishment, Farnborough (England).

MEASUREMENT OF THE HEADBAND FORCE OF CIRCUM-AURAL HEARING PROTECTORS

J. A. Chillery London HMSO 5 Feb. 1981 25 p refs Presented at Inaugural Tech. Meeting of Can. Acoust. Soc., Toronto, 12 May 1980

(RAE-TM-FS-378; BR78249) Avail: NTIS HC A02/MF A01

Circumaural hearing protector design is summarized. Existing force meters for the measurement of the headband force of such protectors are assessed. The construction and preliminary testing of a reliable method for measuring the force with which the protector cups of an earmuff are pressed against the head of a wearer are described together with the necessary modifications, such as changes in dimensions, to enable the device to fit inside, and support, a flight helmet. Author (ESA)

N82-21902# Royal Aircraft Establishment, Farnborough (England).

A TEST FACILITY FOR THE OBJECTIVE MEASUREMENT OF CIRCUM-AURAL HEARING PROTECTOR ATTENUATION

J. A. Chillery London HMSO 5 Feb. 1981 33 p refs Presented at 2nd Intern. Symp. on Personal Hearing Protect. in Ind., Toronto, 14-16 May 1980

(RAE-TM-FS-379; BR78126) Avail: NTIS HC A03/MF A01

The development of a facility suitable for quality control work is developed. Published data were surveyed to identify the relative importance of parameters of a protector and the head of a wearer. The most important are the attenuation values of different ear geometries, reproducible leakage simulation and the effect on attenuation values of different types of skin and flesh. The construction of an artificial head and of testing equipment are described. Important factors are high acoustic isolation and simplicity of use. The performance of the device, using various test and sound fields and procedures, was examined. It is found that reliable data are generated. A pilot study on one example of protector is described. Author (ESA)

N82-21903# Royal Aircraft Establishment, Farnborough (England).

THE IMPORTANCE OF EAR-LIKE COUPLERS IN THE DESIGN OF AN OBJECTIVE TEST FACILITY FOR THE MEASUREMENT OF EARMUFF INSERTION LOSS

J. A. Chillery Jan. 1981 24 p refs Presented at 2nd Intern. Symp. on Personal Hearing Protection in Industry, Toronto, 14 May 1980

(RAE-TM-FS-380; BR78125) Avail: NTIS HC A02/MF A01

An objective method of earmuff attenuation measurement is outlined. Experiments were performed on an electronic manikin, a prototype artificial head, and two ear-like couplers. These show that the acoustic behavior of the ear canal and middle-ear is unaffected by a protector covering the outer ear. It is therefore unnecessary to include a simulation of an ear canal or an ear-like coupler in an objective test facility for measuring insertion loss. Data are presented which show that, for insertion loss measurements, the attenuation spectra produced by an objective method are practically independent of the method of acoustically coupling the measuring microphone to the volume contained by the earmuff. This simplifies the design of the objective method. Author (ESA)

N82-21904# Motor Industry Research Association, Lindley (England).

ANTHROPOMETRIC PROFILE OF THE BRITISH CAR OCCUPANT

C. M. Haslegrave and R. N. Hardy 1979 76 p refs Sponsored in part by MEMTRB

(MIRA-1979/2) Avail: NTIS HC A05/MF A01

British car drivers and front seat passengers were anthropometrically surveyed. Seventeen dimensions required in the design of cars were measured. The dimension distributions of the male and female driving populations show variations with age, stature and weight. No significant difference is found between female occupants of either front seat, but male drivers are found to be significantly older and heavier than male passengers, although there was little difference in stature. Comparison with the dimensions of the US civilian population show that where male dimensions are based on American statistics they are adequate for the present British driving population, however, British female drivers are significantly taller than US women. A factor analysis is used to explore the relationships between dimensions relevant to vehicle design. Three factors are used to construct a set of body indices which are suggested as shape parameters in the definition of a range of anthropometric dummies and models. Author (ESA)

N82-21905# Prins Maurits Lab. TNO, Rijswijk (Netherlands). Inst. for Chemical and Technological Research.

EVALUATION OF THE NBC OVERGARMENTS MANUFACTURED BY SEYNTEX BELG

J. Medema May 1980 19 p ref

(Contracts A78/KL/106; A77/KL/061)

(PML-1980-33; TDCK-73841) Avail: NTIS HC A02/MF A01

A protective clothing system against chemical warfare agents (liquid and vapor) was evaluated. The suit was exposed to a simulated spray attack of mustard gas droplets. The suit was used in combination with ordinary combat clothing in penetration cells. Protection time is defined as the time in which four micrograms/cu cm cloud penetrate. Protection was measured after: (1) outdoor exposure, including rain; (2) 12 hr cycling sweat poisoning tests; (3) 5 years storage; (4) accelerated aging; (5) and 120 passes over an obstacle course. No serious degradation of protection is reported. Author (ESA)

N82-21906# Technical Research Centre of Finland, Espoo. Electrical Engineering Lab.

GUIDELINES FOR MAN-MACHINE INTERFACE DESIGN

Jukka Ranta, Bjoern Wahlstroem, and Rolf Westesson Aug. 1981 135 p refs

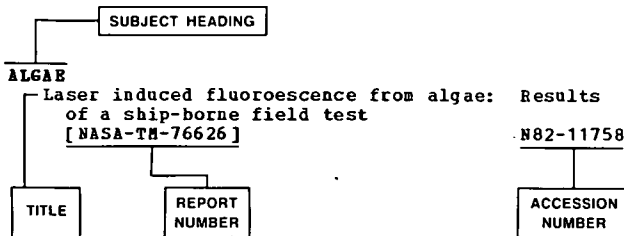
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Avail: NTIS HC A07/MF A01

Guidelines applicable to the design stage of complex process automation systems were designed. Three decision making levels are discerned: (1) decisions are made concerning the launching of the project; general outlines and criteria for later phases are created; (2) the degree of automation, basic interface design, coding system, instrumentation, and procedures are decided; (3) the practical implementation of specified subareas, control system parameter design, or instrumentation scale design. The guidelines ensure that factors affecting decision making are taken into account at each level. Author (ESA)

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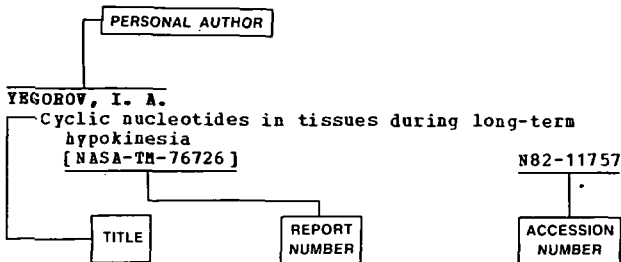
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