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# AEROSPACE MEDICINE AND BIOLOGY

**A CONTINUING BIBLIOGRAPHY**

**WITH INDEXES**

**(Supplement. 144)**

**AUGUST 1975**

**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION**

## ACCESSION NUMBER RANGES

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

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# AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY  
WITH INDEXES

**(Supplement 144)**

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 July 1975 in:

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



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# INTRODUCTION

This Supplement to *Aerospace Medicine and Biology* (NASA SP-7011) lists 257 reports, articles and other documents announced during July 1975 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA)*. The first issue of the bibliography was published in July 1964; since that time, monthly supplements have been issued.

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.

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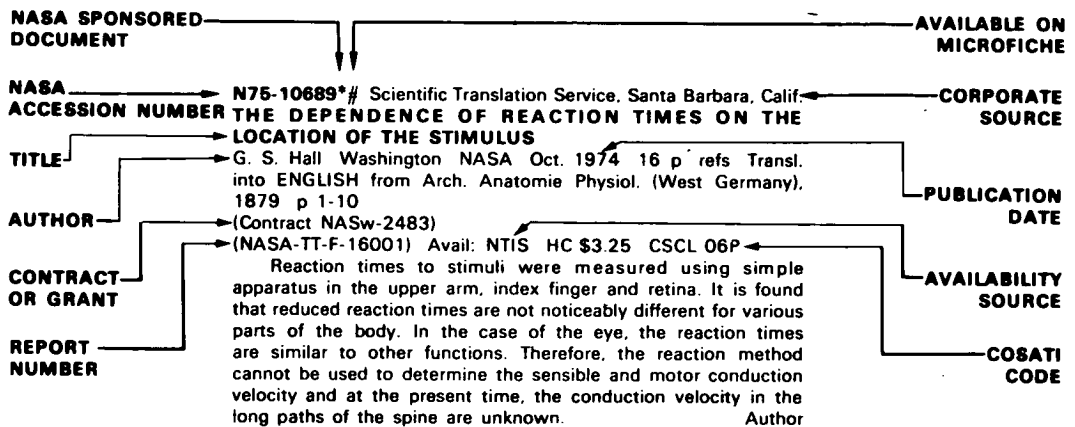
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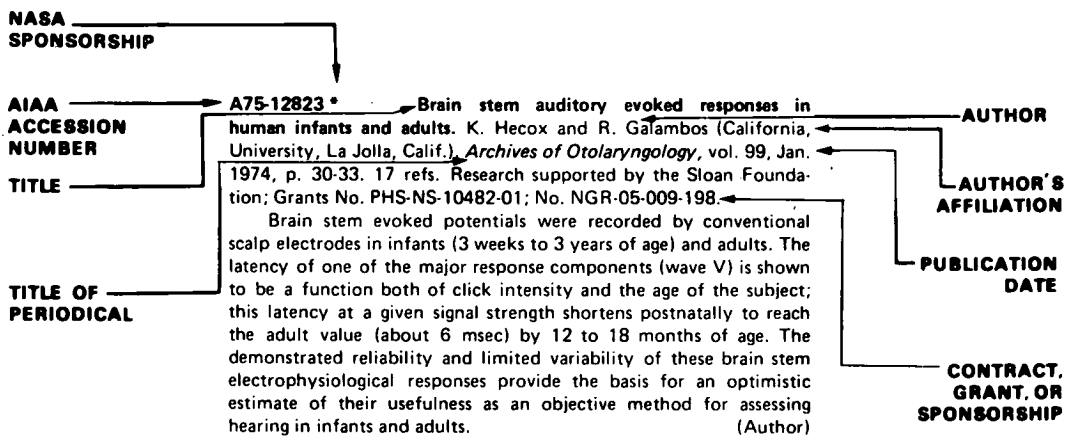
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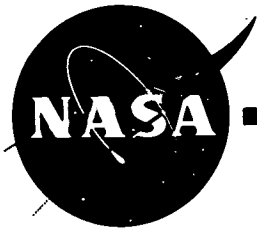
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# AEROSPACE MEDICINE AND BIOLOGY

*A Continuing Bibliography (Suppl. 144)*

AUGUST 1975

## IAA ENTRIES

**A75-29232** Ultrasonic blood flowmeter yielding instantaneous velocity profile by real-time phase detection. M. Brandestini (Zürich, Universität; Eidgenössische Technische Hochschule, Zurich, Switzerland). *Electronics Letters*, vol. 11, Apr. 17, 1975, p. 183, 184. 7 refs.

**A75-29250** The healthy pilot. J. M. Ramsden. *Flight International*, vol. 107, Apr. 17, 1975, p. 647-649.

Dangers to flight safety presented by pilots with heart problems are considered, taking into account diagnostic approaches which are used to recognize critical cases. Medical research and investigations designed to explore the significance of human factors in flight safety are discussed, giving attention to requirements for flight-time limitations, the effect of hypnotics and drugs, automatic-landing studies, the medical problems of supersonic flight, and cosmic-radiation effects. G.R.

**A75-29264** The influence of age on variations in superior mediastinal electrical impedance (Influence de l'âge sur les variations d'impédance électrique médiastinale haute). J. Colin, J. Langlois, and J. Demange (Ministère des Armées /Air/, Service de Santé, Paris, France). *Revue de Médecine Aéronautique et Spatiale*, vol. 13, 4th Quarter, 1974, p. 241-245. 10 refs. In French.

An experimental study of variations in superior mediastinal impedance was undertaken to determine the distensibility of the ascending aorta and the effect of age on that property. The magnitude of variation in impedance was found to be directly related to the magnitude of variation in aortic volume, and the derivatives of both variations were similarly connected. Aortic volume was in turn linked to the pressure variation and volume distensibility of the aorta. Impedance was lowered about 1 percent per year of age, and since pressure variation does not change significantly with age, this lowering is due to a proportional decrease in aortic distensibility. S.J.M.

**A75-29265** Inhibitors of ovulation and variation in the tonus and pressure of the ophthalmic artery in airline stewardesses (Inhibiteurs de l'ovulation et variation du tonus et de la pression de l'artère ophtalmique chez les hôteses de l'air). J. P. Chevaleraud, G. Gougoud, J. Nathalie (Centre Principal d'Expertise Médicale du Personnel Navigant de l'Aéronautique, Paris, France), and G. Perdriel (Hôpital d'Instruction des Armées, Val-de-Grâce, France). *Revue de Médecine Aéronautique et Spatiale*, vol. 13, 4th Quarter, 1974, p. 246-251. 13 refs. In French.

Ninety-one airline stewardesses were tested for ocular tonus (OT) and ophthalmic arterial pressure (OAP) in order to determine the effect of contraceptives on these parameters. It was found that (1) age had no effect on variations in OAP or OT; (2) OT was slightly higher in those stewardesses taking contraceptives; and (3) OAP was not influenced by oral or general contraceptives. S.J.M.

**A75-29266** Considerations on the WPW syndrome in airplane personnel (Considérations sur le syndrome W.P.W. chez le personnel aéronavigant). T. Costin Popescu, I. Pintille, and V. Filcescu (Centre Médical Aéronautique, Bucharest, Rumania). *Revue de Médecine Aéronautique et Spatiale*, vol. 13, 4th Quarter, 1974, p. 252, 253. In French.

The WPW and pre-WPW symptoms of six air personnel are reported as observed over a 9-year period. The question of making evaluations of flight ability in cases involving WPW is examined. The aim of the study was to identify clinical features that would predict the occurrence of WPW, and thus to avoid enrolling those who augur it in aviation schools. S.J.M.

**A75-29267** Drepanocytemia and evaluation of flight personnel (Drépanocytose et expertise du personnel navigant). A. Didier, R. Carre, J. Charrieau, P. Fourn, and J. Bastien (Centre Principal d'Expertise Médicale du Personnel Navigant de l'Aéronautique; Union de Transports Aériens; Air Afrique, Paris, France). *Revue de Médecine Aéronautique et Spatiale*, vol. 13, 4th Quarter, 1974, p. 254-256. 22 refs. In French.

The dangers posed by sickle-cell anemia to its victims who work at high altitudes are considered. Particularly damaging is the tendency to hypoxemia and its consequences that are associated with the condition. It is proposed, however, that drepanocytic subjects should not be summarily denied participation in civil aviation, since (1) only 35 incidents involving such patients have been reported in the past 25 years; (2) the electrophoretic technique used to identify abnormal hemoglobin has located 7 drepanocytic personnel in the past year, who were performing normally; and (3) sickle-cell anemia is very widespread in some areas of Africa, so prohibiting its victims from working in the air would hinder aviation progress. S.J.M.

**A75-29268** Certain effects of supersonic airplane flight on renal function in aviators (Certains effets du vol sur avions supersoniques sur la fonction rénale chez les aviateurs). M. Anton and I. Nastoiu (Centre Médical Aéronautique, Bucharest, Rumania). *Revue de Médecine Aéronautique et Spatiale*, vol. 13, 4th Quarter, 1974, p. 257-262. In French.

Urinary physicochemical constants were studied in aviators during six hours of supersonic flight. The experiment showed an increase in urinary output during flight as compared to activity on the ground. It was also found that during flight urinary density was lowered, pH was raised, dry residue was increased, calcium content was higher, potassium content was less, sodium was more concentrated, chlorine and phosphorus concentrations were higher after 4 hr, creatine was lower, urea was less after 2 hr, oxalate increased with flight time, lower age groups had higher output than older groups, and output was higher during cool seasons than in warm ones. S.J.M.

**A75-29269** Human aspects of the use of the Concorde (Aspects humains de l'exploitation de Concorde). C. Dousset (Société Nationale Industrielle Aérospatiale, Paris, France). *Revue de Médecine Aéronautique et Spatiale*, vol. 13, 4th Quarter, 1974, p. 263-272. In French.

Several facets of the medical problem attending supersonic flight are reviewed: depressurization, cabin ozone, radiation, ground noise, sonic boom, and stratospheric pollution. It is concluded that the use of the Concorde fleet poses only small difficulties in these areas, and that the difficulties have already been overcome in many cases. S.J.M.

**A75-29270** Statistical data on the medical causes of definitive flight inability in the TFP of an airline company (Données statistiques sur les causes médicales d'inaptitude définitive au vol du P.N.T. d'une compagnie aérienne). E. Lafontaine and J. Lavernhe (Compagnie Nationale Air France, Paris, France). *Revue de Médecine Aéronautique et Spatiale*, vol. 13, 4th Quarter, 1974, p. 273-275. In French.

A statistical study is reported which shows that (1) the frequency of definitive inaptitude in technical flight personnel (TFP) increases significantly with age; (2) cardiovascular maladies are the leading cause of this inaptitude, especially coronary insufficiencies with or without infarctions; (3) next to these diseases, neurotic states are the prime contributor, sometimes with an associated somatic factor; and (4) nontraumatic osteoarticular affections and traumatic lesions take the third and fourth places respectively. (Author)

**A75-29271** Biological studies of cosmic rays (Etudes biologiques des rayonnements cosmiques). R. P. Delahaye (Hôpital Bégin, Saint-Mandé, Val-de-Marne, France) and A. Pfister (Hôpital Necker, Paris, France). *Revue de Médecine Aéronautique et Spatiale*, vol. 13, 4th Quarter, 1974, p. 276-283. 25 refs. In French.

Numerous studies conducted up to the present time on the biological role of cosmic radiation are surveyed. They provide evidence for a beneficial activation effect on organic mechanisms. The influences of heavy particles are however difficult to evaluate, and they do not follow classical laws. Lesions which occur depend on the size and speed of the particle and on the amount and type of tissue traversed by it. Moreover, the magnitude of the effect of this nonhomogeneous radiation far exceeds that expected from classical measurements of its dosage strength - i.e., much larger doses are required to experimentally recreate the damage done by this radiation than its doses as measured by conventional equipment.

S.J.M.

**A75-29576** Effects of D-amphetamine and of secobarbital on optokinetic and rotation-induced nystagmus. W. E. Collins, D. J. Schroeder, and G. W. Elam (FAA, Civil Aeromedical Institute, Oklahoma City, Okla.). *Aviation, Space, and Environmental Medicine*, vol. 46, Apr. 1975, Section 1, p. 357-364. 20 refs. Grant No. NIH-T01-NB-05418-09.

**A75-29577** Effects of a glucose meal on human pulmonary function at 1600-m and 4300-m altitudes. J. G. Dramise, C. M. Inouye, B. M. Christensen, R. D. Fults, J. E. Canham, and C. F. Consolazio (Letterman Army Institute of Research, Presidio of San Francisco, Calif.). *Aviation, Space, and Environmental Medicine*, vol. 46, Apr. 1975, Section 1, p. 365-368. 24 refs.

**A75-29578** Reactions to sonic booms - A report of two studies and a general evaluation of startle effects. R. I. Thackray, R. M. Touchstone, and J. P. Bailey (FAA, Civil Aeromedical Institute, Oklahoma City, Okla.). *Aviation, Space, and Environmental Medicine*, vol. 46, Apr. 1975, Section 1, p. 369-376. 9 refs.

The first study reported was conducted primarily to determine an exposure level below which arm-hand startle responses to simulated sonic booms would not occur. The second study was concerned with an investigation of habituation effects. The results of the two experiments reported make it possible to conduct an evaluation of startle effects over a reasonably wide range of exposure levels. A summary of the behavioral, physiological, and subjective data obtained is presented in a table. G.R.

**A75-29579** Arm-reach capability of USAF pilots as affected by personal protective equipment. L. L. Laubach (Webb Associates, Yellow Springs, Ohio) and M. Alexander (USAF, Aerospace Medical Research Laboratory, Wright-Patterson AFB, Ohio). *Aviation, Space, and Environmental Medicine*, vol. 46, Apr. 1975, Section 1, p. 377-386. 12 refs. Contract No. F33615-75-C-5003.

Thirty-two USAF pilots participated in a study to determine the

effects of personal protective equipment upon arm-reach capability. The reach envelope of each pilot was measured under two experimental conditions: (1) shirt-sleeved with the inertial reel unlocked; and (2) wearing complete winter flying assembly with the inertial reel locked. Selected descriptive statistics are presented for each of five angular positions. Arm-reach envelopes for various percentile values obtained for the two experimental conditions at 10 knob distances from the deck are shown. The results indicate that there are significant practical differences in arm-reach capability between the shirt-sleeved and the complete winter flying assembly conditions.

(Author)

**A75-29580** Disorientation phenomena in naval helicopter pilots. F. R. Tormes and F. E. Guedry, Jr. (U.S. Naval Aerospace Medical Research Laboratory, Pensacola, Fla.). *Aviation, Space, and Environmental Medicine*, vol. 46, Apr. 1975, Section 1, p. 387-393. 13 refs.

A study is conducted of the flight conditions in which disorientation is most likely to occur during shipboard helicopter operations. It is found that a high percentage of naval aviators experience disorientation while in low-altitude hovers at sea in IFR conditions, and at night. Factors which contribute to disorientation include relative motion illusions and somatic sensations while in the hover configuration. Disorientation problems occur also frequently during approaches and takeoffs from aviation ships at night. G.R.

**A75-29581 \*** Instrumented personal exercise during long-duration space flights. C. F. Sawin, J. A. Rummel, and E. L. Michel (NASA, Johnson Space Center, Biomedical Research Div., Houston, Tex.). *Aviation, Space, and Environmental Medicine*, vol. 46, Apr. 1975, Section 1, p. 394-400. 9 refs.

The present work reports the results of instrumented personal exercise performed in flight by Skylab 3 and 4 crewmen. Inflight cycle ergometer data provide conclusive evidence that man can perform earthbound equivalent maximum levels of physical work while in the zero-G environment. Moreover, SL4 crewmen were able to improve their physical condition during 84 days of space flight relative to launch condition, due to rigorous personal exercise regimens. Biological data measured included oxygen consumption, CO<sub>2</sub> production, minute volume, and heart rate. S.J.M.

**A75-29582** Characteristics of the sleep of men in simulated space flights. V. I. Miasnikov (Ministerstvo Zdravookhraneniia SSSR, Moscow, USSR). *Aviation, Space, and Environmental Medicine*, vol. 46, Apr. 1975, Section 1, p. 401-408. 23 refs.

Dyssomnia was studied in human subjects under simulated space flight conditions. Monotony and time of exposure were the principal culprits responsible for the sleep disturbances. The simulation conditions included hypokinesia, noise, and rotation. The action of somnogenic mechanisms developed against the background of the action of analyzers (vestibular, acoustic, and proprioceptive) that were under load and whose excitation during the simulation led to cumulation and was expressed in the phenomenon of spontaneous awakening. Dyssomniac etiology also included hemodynamic disturbances induced by blood redistribution due to the recumbent position and monotonous motor activity. S.J.M.

**A75-29583** Electrolyte changes at 3500 m in males with and without high-altitude pulmonary edema. M. S. Malhotra, H. D. Brahmachari, K. Sridharan, T. Purshottam, K. Ramachandran, and U. Radhakrishnan (Defence Institute of Physiology and Allied Sciences, Delhi, India). *Aviation, Space, and Environmental Medicine*, vol. 46, Apr. 1975, Section 1, p. 409-412. 16 refs.

**A75-29584** Coronary hemodynamics during positive  $+G$  sub  $z$  acceleration. S. J. Shubrooks, Jr., J. W. Burns, and H. H. Erickson (USAF, School of Aerospace Medicine, Brooks AFB, Tex.). *Aviation, Space, and Environmental Medicine*, vol. 46, Apr. 1975, Section 1, p. 413-418. 26 refs.

Left circumflex (LC) and left anterior descending (LAD) coronary flows, coronary perfusion pressure (P sub ca), and arterial O<sub>2</sub> content (Ca-O<sub>2</sub>) were determined in five lightly anesthetized dogs exposed to high-G stress. At 2G sub  $z$ , LC and LAD flows increased relative to control by 15 sec and then returned to normal, while coronary resistances were significantly below control level at 15 and 30 sec. At 3G sub  $z$ , LC and LAD flows were above control from 30 to 60 sec; resistances were again lower than control. At 3.5 G sub  $z$ , LC flow was maintained above control by a much-reduced resistance, with P sub ca below control, and LAD flow varied. Ca-O<sub>2</sub> did not change significantly at any G sub  $z$  level, while myocardial O<sub>2</sub> transport paralleled the changes in coronary flow. S.J.M.

**A75-29585** Cardiopulmonary changes following 24-36 hours of hyperoxia. A. V. Beran, D. R. Sperling, and R. F. Huxtable (California, University, Irvine, Calif.). *Aviation, Space, and Environmental Medicine*, vol. 46, Apr. 1975, Section 1, p. 419-422. 25 refs.

Cardiopulmonary variables were studied in rabbits breathing room air following 24-36 h of 100% O<sub>2</sub> exposure. Initially, arterial pH and CO<sub>2</sub> partial pressure remained within normal limits while arterial O<sub>2</sub> partial pressure decreased significantly. Cardiac output and oxygen consumption increased significantly. Static lung compliance was decreased, and histologic examination showed pulmonary hemorrhage, atelectasis, and edema. Myocardial function under these conditions was restored, and the myocardium was able to produce a compensatory increase in cardiac output. Therefore, changes in myocardial function, as related to oxygen toxicity, are reversible phenomena. (Author)

**A75-29587** # Human whole-body exposure to infrasound. R. N. Starve and D. L. Johnson (USAF, Aerospace Medical Research Laboratory, Wright-Patterson AFB, Ohio). *Aviation, Space, and Environmental Medicine*, vol. 46, Apr. 1975, Section 1, p. 428-431.

Four male subjects were exposed to infrasound ranging from 1 through 20 Hz for a period of 8 min up to levels of 144 dB re 20 micropascal. There was no objective evidence (including audiograms) of any detrimental effect due to infrasound; however all subjects experienced painless 'pressure build-up' in the middle ear that was relieved by valsalva maneuver or by cessation of infrasound, and voice modulation and body vibration consistently occurred. It is concluded that infrasound exposures as high as 144 dB are safe for healthy subjects, at least for periods of 8 min, and it is predicted that longer exposures will also be safe. (Author)

**A75-29588** Antihypertensive drug therapy in USAF flying personnel. W. H. King, M. C. Lancaster, and D. E. Cloyd (USAF, School of Aerospace Medicine, Brooks AFB, Tex.). (*International Congress of Aviation and Space Medicine, Beirut, Lebanon, Oct. 7, 1974.*) *Aviation, Space, and Environmental Medicine*, vol. 46, Apr. 1975, Section 1, p. 436-440. 7 refs.

Statistics regarding ranks, age groups, and aeronautical ratings of hypertensive-diagnosed USAF aircrew members are presented. Drug therapy had been instituted in about half of the patients. Associated medical conditions such as abnormal EKG findings, carbohydrate intolerance, and hyperuricemia are reported. There was a higher incidence of both abnormal glucose tolerance test results and hyperuricemia in the subgroup of hypertensive patients receiving drug therapy as compared to those not receiving drugs. S.J.M.

**A75-29589** Instrument for the on-line measurement of the slow phase of nystagmus. E. Trinder (National Hospital, London, England). *Aviation, Space, and Environmental Medicine*, vol. 46, Apr. 1975, Section 1, p. 441-444.

The on-line measurement of the slow-phase velocity of vestibular nystagmus, induced or spontaneous, has considerable practical advantages. An instrument for this purpose, developed around simple operational amplifiers, is described. Typical applications of the system are given in respect of nystagmus induced by optokinetic, rotational, and caloric stimuli. (Author)

**A75-29590** \* Project BIOCORE /M212/, a biological cosmic ray experiment - Procedures, summary, and conclusions. W. Haymaker, B. C. Look, D. L. Winter, E. V. Benton, and M. R. Cruty (NASA, Ames Research Center, Moffett Field; San Francisco, University, San Francisco, Calif.). *Aviation, Space, and Environmental Medicine*, vol. 46, Apr. 1975, Section 2, p. 467-481.

The primary objective of the experiment was to determine whether a specific portion of the high Z-high energy (HZE) galactic cosmic ray particle spectrum, especially particles with Z no less than 6, can produce microscopically visible injury of brain and eye tissues. Pocket mice (*Perognathus longimembris*), obtained from the California desert, were selected as the biological target. Five of these mice were flown on Apollo XVII. Not only the brain and eyes but also many other tissues of these animals were studied for evidence of cosmic ray particle damage. The lack of prior experimental evidence as to the character of the potential injury induced by HZE particles required reliance on the physical characteristics of particle radiation in ascertaining the probable nature of the injury. These characteristics and the key aspects of the experiment are summarized in this paper. Subsequent articles in this special supplement give details of the biological, engineering, and dosimetric aspects of BIOCORE together with the results. (Author)

**A75-29591** \* Characteristics and tolerances of the pocket mouse and incidence of disease. R. G. Lindberg, L. M. Kraft, R. C. Simmonds, O. T. Bailey, W. A. Dunlap, and W. Haymaker (Northrop Research and Technology Center, Hawthorne; NASA, Ames Research Center, Moffett Field, Calif.; NASA, Johnson Space Center, Houston, Tex.; Illinois, University, Chicago, Ill.). *Aviation, Space, and Environmental Medicine*, vol. 46, Apr. 1975, Section 2, p. 482-493. 32 refs.

Studies carried out on the pocket mouse colony on Apollo XVII are reported. They revealed no serological evidence of viral disease, no pathogenic enterobacteria or respiratory Mycoplasma on culture, a 25% incidence of sarcosporidiosis, and a 2% incidence of chronic meningitis or meningoencephalitis. It is concluded that the pocket mouse is a highly adaptive animal and very well-suited to space flight. S.J.M.

**A75-29592** \* Dosimeter design, construction, and implantation. D. L. Winter, K. Suri, J. A. D'Urso, F. L. Cota, W. W. Ashley, R. M. Binnard, W. Haymaker, E. V. Benton, M. R. Cruty, and W. Zeman (NASA, Ames Research Center, Moffett Field; San Francisco, University, San Francisco, Calif.; Indiana University, Indianapolis, Ind.). *Aviation, Space, and Environmental Medicine*, vol. 46, Apr. 1975, Section 2, p. 494-499.

To detect the passage of cosmic ray particles through the heads of the pocket mice during the Apollo XVII flight, a 'monitor' (dosimeter) composed of plastics was prepared and implanted under the scalp. The monitor was mounted on a platform, the undersurface of which fitted the contour of the skull. Numerous tests were run to assure that the presence of the monitor assembly beneath the scalp would be compatible with the well-being of the mice and that the capacity of the monitor to detect the traversal of cosmic ray particles would be preserved over the several weeks during which it would remain under the scalp. (Author)

**A75-29593 \*** **Engineering aspects of the experiment and results of animal tests.** B. C. Look, J. W. Tremor, W. F. Barrows, H. R. Zabower, K. Suri, E. G. Park, Jr., J. A. D'Urso, H. A. Leon, W. Haymaker, and R. G. Lindberg (NASA, Ames Research Center, Moffett Field; Northrop Research and Technology Center, Hawthorne, Calif.). *Aviation, Space, and Environmental Medicine*, vol. 46, Apr. 1975, Section 2, p. 500-513. 13 refs.

A closed passive system independent of support from the spacecraft or its crew was developed to house five pocket mice for their flight on Apollo XVII. The reaction of potassium superoxide with carbon dioxide and water vapor to produce oxygen provided a habitable atmosphere within the experiment package. The performance of the system and the ability of the mice to survive the key preflight tests gave reasonable assurance that the mice would also withstand the Apollo flight. (Author)

**A75-29594 \*** **Preflight studies on tolerance of pocket mice to oxygen and heat. I - Physiological studies.** H. A. Leon, K. Suri, M. McTigue, J. Smith, W. Cooper, J. Miquel, W. W. Ashley, A. R. Behnke, Jr., and J. F. Saunders (NASA, Ames Research Center, Moffett Field, Calif.; NASA, Washington, D.C.). *Aviation, Space, and Environmental Medicine*, vol. 46, Apr. 1975, Section 2, p. 514-520. 12 refs.

Tests were carried out on pocket mice to ascertain their tolerance to elevated oxygen pressures alone and to a combination of hyperoxia and heat in excess of that expected during the flight of the mice on Apollo XVII. The mice withstood oxygen partial pressures up to 12 psi at normal room temperature (24 C, 75 F) over a period of 7 days. A few mice previously exposed to increased PO<sub>2</sub> died in the course of exposure to an oxygen pressure of 10 psi or 12 psi (517 mm or 620 mm Hg) for 13 d in ambient heat of 32 C (90 F). Supplemental vitamin E and physiological saline loading given prior to exposure had no apparent protective effect. The overall conclusion was that the pocket mice which were to go on Apollo XVII could readily survive the ambient atmosphere to which they would be exposed. (Author)

**A75-29595 \*** **Preflight studies on tolerance of pocket mice to oxygen and heat. II - Effects on lungs.** G. A. Harrison, R. L. Corbett, and G. Klein (NASA, Ames Research Center, Moffett Field, Calif.). *Aviation, Space, and Environmental Medicine*, vol. 46, Apr. 1975, Section 2, p. 520-524. 16 refs.

An electron microscope examination was carried out on the lungs of 11 pocket mice (*Perognathus longimembris*) that breathed oxygen at 10 psi or 12 psi partial pressure over a period of 7 d, at the end of which time they were decompressed to sea-level O<sub>2</sub> pressure, either suddenly or in 30, 60, or 90 min. Vesiculation was noted in the endothelium of the alveolar-capillary wall in most of the animals and, occasionally, blebbing. Some mitochondria were swollen in a few of the animals. Alveolar exudate was, in general, sparse. Compared with the lungs of other rodents, the lungs of pocket mice appeared relatively resistant to the toxic effects of oxygen. This conclusion needs, however, to be tempered by the fact that 5% N<sub>2</sub> was used in the tests reported here. Nonetheless, the results suggest that the oxygen pressures anticipated on the flight of Apollo XVII should be well tolerated by the pocket mice. (Author)

**A75-29596 \*** **Preflight studies on tolerance of pocket mice to oxygen and heat. III - Effects on eyes.** D. E. Philpott, R. L. Corbett, S. Black, A. Takahashi, and D. Leaffer (NASA, Ames Research Center, Moffett Field, Calif.; Hawaii, University, Honolulu, Hawaii). *Aviation, Space, and Environmental Medicine*, vol. 46, Apr. 1975, Section 2, p. 524-527. 13 refs.

A study was made of the eyes of eight pocket mice exposed to oxygen at partial pressures of 8, 10, or 12 psi over a period of 7 d. At the termination of the exposure, the animals were decompressed to sea-level O<sub>2</sub>, either immediately or over a period of 30, 60, or 90 min. No pathological changes were found in any of the eyes, except in the retina of one of the animals exposed to 12 psi O<sub>2</sub>. Here, only a single rod photoreceptor was found damaged, an observation not

regarded as significant. Hence, an oxygen partial pressure as high as 12 psi in the canister in which pocket mice were expected to fly on Apollo XVII would probably have no deleterious effect on the eyes of the animals. (Author)

**A75-29597 \*** **Preflight studies on tolerance of pocket mice to oxygen and heat. IV - Observations on the brain.** O. T. Bailey, J. M. Ord, and W. Haymaker (Illinois, University, Chicago, Ill.; Tulane University, Covington, La.; NASA, Ames Research Center, Moffett Field, Calif.). *Aviation, Space, and Environmental Medicine*, vol. 46, Apr. 1975, Section 2, p. 527, 528. 6 refs.

Experiments designed to ascertain the effects of oxygen at 8, 10, and 12 psi partial pressure on the brains of pocket mice (*Perognathus longimembris*) were carried out at room temperature (24 C, 75 F) and at 32 C (90 F). The animals exposed to 8-12 psi at 32 C had been in earlier KO<sub>2</sub> oxygen tests. Five animals exposed either to 10 or 12 psi (517 mm or 620 mm Hg) O<sub>2</sub> partial pressure at 32 C died during the course of the tests, possibly as a consequence of injury sustained by the earlier O<sub>2</sub> partial pressure testing. Autopsy was not carried out. In the other 36 exposed animals, no pathological changes were observed in the brain. It is thus highly probable that oxygen pressures at the hyperbaric levels to which the pocket mice would be exposed during the Apollo XVII mission would not result in any lesions in the brain. (Author)

**A75-29598 \*** **Launch, flight, and recovery.** B. C. Look, J. W. Tremor, W. F. Barrows, H. R. Zabower, D. L. Winter, G. H. Shillinger, G. A. Harrison, D. E. Philpott, K. Suri, and W. T. Platt (NASA, Ames Research Center, Moffett Field; Northrop Research and Technology Center, Hawthorne, Calif.; NASA, Johnson Space Center, Houston, Tex.; Indiana University, Indianapolis, Ind.; Cleveland Psychiatric Institute, Cleveland, Ohio). *Aviation, Space, and Environmental Medicine*, vol. 46, Apr. 1975, Section 2, p. 529-536.

The final phase to fly five pocket mice in the Apollo XVII command module was carried out at the NASA Kennedy Space Center. Upon completion of the 13-d space flight, the package was removed from the spacecraft and, after having been purged with an oxygen-helium gas mixture, was flown to American Samoa. Four of the five mice were recovered alive from the package. Analysis of the mouse that died during the flight revealed several factors that could have contributed to its death, the chief of which was massive hemorrhage in its middle ear cavities. (Author)

**A75-29599 \*** **Cosmic ray particle dosimetry and trajectory tracing.** M. R. Cruty, E. V. Benton, C. E. Turnbull, and D. E. Philpott (San Francisco, University, San Francisco; NASA, Ames Research Center, Moffett Field, Calif.). *Aviation, Space, and Environmental Medicine*, vol. 46, Apr. 1975, Section 2, p. 537-552. 10 refs.

Five pocket mice (*Perognathus longimembris*) were flown on Apollo XVII, each with a solid-state (plastic) nuclear track detector implanted beneath its scalp. The subscalp detectors were sensitive to HZE cosmic ray particles with a LET greater than or approximately equal to 0.15 million electron volts per micrometer (MeV/micron). A critical aspect of the dosimetry of the experiment involved tracing individual particle trajectories through each mouse head from particle tracks registered in the individual subscalp detectors, thereby establishing a one-to-one correspondence between a trajectory location in the tissue and the presence or absence of a lesion. The other major aspect was the identification of each registered particle. An average of 16 particles with Z greater than or equal to 6 and 2.2 particles with Z greater than or equal to 20 were found per detector. The track density, 29 tracks/sq cm, when adjusted for detection volume, was in agreement with the photographic emulsion data from an area dosimeter located next to the flight package. (Author)

**A75-29600** Results of scalp examination. F. S. Vogel, B. Lloyd, M. R. Cruty, and E. V. Benton (Duke University, Durham, N.C.; San Francisco, University, San Francisco, Calif.). *Aviation, Space, and Environmental Medicine*, vol. 46, Apr. 1975, Section 2, p. 553-560. 5 refs.

The scalps of the four pocket mice that were recovered alive from the Apollo XVII flight contained acute focal lesions in the epidermis and an inflammatory reaction in the subjacent dermis and subcutaneous tissue. Hair follicles were focally damaged in three of the four mice. There were 13 scalp lesions singled out in the four flight mice because of histological features that distinguished them from changes observed in the scalps of the control mice. There was only one possible coincidence between a lesion and the trajectory of a cosmic ray particle registered in a subscalp dosimeter. There is, however, a possibility that at least some lesions were produced by unregistered particles. (Author)

**A75-29601 \*** Results of examination of the nasal mucosa. L. M. Kraft, F. S. Vogel, B. Lloyd, E. V. Benton, M. R. Cruty, W. Haymaker, H. A. Leon, J. Billingham, C. E. Turnbull, and V. Teas (Duke University, Durham, N.C.; San Francisco, University, San Francisco; NASA, Ames Research Center, Moffett Field, Calif.; Cleveland Psychiatric Institute, Cleveland, Ohio; Chicago, University, Chicago, Ill.; Indiana, University, Indianapolis, Ind.). *Aviation, Space, and Environmental Medicine*, vol. 46, Apr. 1975, Section 2, p. 561-581. 35 refs.

The olfactory epithelium, but not the nasal respiratory epithelium, of the four pocket mice (*Perognathus longimembris*) that survived their flight on Apollo XVII showed both diffuse alterations and numerous disseminated focal lesions. The olfactory mucosa of the mouse that died during flight was also affected, but to a minor degree insofar as could be determined. All this was in contrast to the normal appearance of the olfactory mucosa of the numerous control animals. A number of possible causes were considered: systemic or regional infection; inhaled particulate material (seed dust); by-products from the KO<sub>2</sub> bed in aerosol or particulate form; gas contaminants originating in the flight package; volatile substances from the dead mouse; weightlessness; and cosmic ray particle radiation. Where feasible, studies were conducted in an effort to rule in or rule out some of these potentially causative factors. No definitive conclusions were reached as to the cause of the lesions in the flight mice. (Author)

**A75-29602 \*** Results of ear examination. W. Haymaker, H. A. Leon, W. F. Barrows, K. Suri, L. M. Kraft, C. E. Turnbull, D. B. Webster, W. W. Ashley, B. C. Look, and R. C. Simmonds (NASA, Ames Research Center, Moffett Field; San Francisco, University, San Francisco, Calif.; Louisiana State University, New Orleans, La.; Cincinnati, University, Cincinnati, Ohio; New York Hospital, New York, N.Y.; Illinois, University, Chicago, Ill.). *Aviation, Space, and Environmental Medicine*, vol. 46, Apr. 1975, Section 2, p. 582-606. 19 refs.

In the five pocket mice flown on Apollo XVII, no evidence was found that the inner ear had been damaged, though poor fixation precluded detailed study. On the other hand, the middle ear cavity was involved in all the mice, hemorrhage having occurred in response to excursions in pressure within the canister that housed the mice during their flight. The same occurred in flight control mice which had been subjected to pressure excursions of much the same magnitude. A greater degree of exudation into air cells and greater leukotaxis were noted in the flight animals than in the control animals. There was no increase in leukocyte population along the paths of the 23 cosmic-ray particles registered in the subscalp dosimeters that traversed the middle ear cavities of the flight mice. The increased exudation and the greater response by leukocytes in the flight mice may have been causally related to the lesions found in their olfactory mucosa but there were no data in support of this possibility. (Author)

**A75-29603 \*** Results of eye examination. D. E. Philpott, R. L. Corbett, A. Takahashi, E. V. Benton, and M. R. Cruty (NASA,

Ames Research Center, Moffett Field; San Francisco, University, San Francisco, Calif.). *Aviation, Space, and Environmental Medicine*, vol. 46, Apr. 1975, Section 2, p. 607-612. 18 refs.

Five pocket mice (*Perognathus longimembris*) were flown on Apollo XVII, and four survived. All the eyes, except one eye from the dead flight mouse, were examined histologically. In the four surviving mice, a total of five cosmic-ray particles which had registered in the subscalp particle detectors had trajectories that intersected the eyes. Four of them ( $Z = 6.9$  for three of the particles and  $Z$  greater than or equal to 10 for the fourth) most likely went through the head before reaching the particle detector, while the thindown direction of the fifth ( $Z$  greater than or equal to 10) was not determinable. The retinas of the flight animals were found free from histological alterations such as might have been expected from encounters with cosmic-ray particles. (Author)

**A75-29604 \*** Results of examination of the calvarium, brain, and meninges. W. Haymaker, W. Zeman, C. E. Turnbull, R. K. Clayton, O. T. Bailey, T. Samorajski, F. S. Vogel, B. Lloyd, M. R. Cruty, and E. V. Benton (NASA, Ames Research Center, Moffett Field; San Francisco, University, San Francisco, Calif.; Illinois, University, Chicago, Ill.; Cleveland Psychiatric Institute, Cleveland, Ohio; Duke University, Durham, N.C.). *Aviation, Space, and Environmental Medicine*, vol. 46, Apr. 1975, Section 2, p. 613-625.

Tissue reactions were found around the monitor (dosimeter) assemblies that had been implanted beneath the scalp of the five pocket mice that flew on Apollo XVII. Mitosis in the dentate gyrus of the hippocampal formation was considerably reduced in comparison with that in control animals. Otherwise the brain tissue as well as the meninges in the flight animals appeared unaltered. Since the animals were exposed primarily to high  $Z$ -high energy (HZE) cosmic-ray particles at the lower end of the high LET spectrum, the lack of changes in the brain cannot be taken as evidence that the brain will suffer no damage from the heavier HZE particles on prolonged manned missions. (Author)

**A75-29605** Condition of flight animals on recovery; food intake; observations on hypothalamus, pituitary, and adrenal glands. J. M. Ordy, K. R. Brizze, and T. Samorajski (Tulane University, Covington, La.; Cleveland Psychiatric Institute, Cleveland, Ohio). *Aviation, Space, and Environmental Medicine*, vol. 46, Apr. 1975, Section 2, p. 627-633. 14 refs.

Results of studies on certain hypothalamic nuclei and on the pituitary and adrenal glands of pocket mice on Apollo XVII are reported. Decrease in body weight and variability of food intake were significant compared to ground controls, as was the increase in mean nuclear diameter of neurons in the supraoptic nucleus. The mean nuclear diameter of neurons in the arcuate and ventromedial hypothalamic nuclei, the adeno- and neurohypophysis, and the adrenals were similar in flight and control groups. S.J.M.

**A75-29606** Evaluation of oral, dental, and skeletal tissues. P. Person, L. R. Eversole, G. Shklar, L. C. Johnson, and M. L. Moss (U.S. Veterans Administration Hospital, Brooklyn; Columbia University, New York, N.Y.; University of the Pacific, San Francisco, Calif.; Harvard University, Boston, Mass.; U.S. Armed Forces Institute of Technology, Washington, D.C.). *Aviation, Space, and Environmental Medicine*, vol. 46, Apr. 1975, Section 2, p. 634-638. 5 refs.

A sparse neutrophilic leukocytic infiltrate was found in the gingival sulcus, both in the flight and the control animals, while no changes were observed in the palate. Mitoses in gingival and palatal tissues were in approximately equal numbers in all animal groups. The tongues of flight mice and controls contained areas characterized by vascular dilatation, separation of muscle bundles, and regressive and degenerative changes in muscle fibers. Mucous glands in the posterior part of the tongue of flight and control animals exhibited acinar distension. Also examined were the vertebral column; femur, knee joint, tibia and fibula of the right hindlimb; and the tracheal cartilages. No evidence of cosmic-ray particle effects was found in any of these tissues. (Author)

**A75-29607 \*** Evaluation of viscera and other tissues. J. T. Ellis, L. M. Kraft, C. C. Lushbaugh, G. L. Humason, W. S. Hartroft, E. A. Porta, O. T. Bailey, R. O. Greep, C. S. Leach, and T. Laird (New York Hospital, New York, N.Y.; Oak Ridge Associated Universities, Oak Ridge, Tenn.; Hawaii, University, Honolulu, Hawaii; Illinois, University, Chicago, Ill.; NASA, Johnson Space Center, Houston, Tex.; NASA, Ames Research Center, Moffett Field, Calif.). *Aviation, Space, and Environmental Medicine*, vol. 46, Apr. 1975, Section 2, p. 639-654. 20 refs.

Histopathological findings in the lungs, livers, bone marrows, small intestines, gonads, kidneys, and other tissues of the four pocket mice (*Perognathus longimembris*) that survived the Apollo XVII flight were evaluated in the light of their immediate environment and as targets of HZE cosmic ray particles. Results of this study failed to disclose changes that could be ascribed to the HZE particle radiation. Decreased numbers of erythropoietic cells in the bone marrow of the flight mice were probably related to the increased oxygen pressure. The small intestine showed no changes. Ovaries and testes appeared normal. Two of the three surviving male flight mice displayed early stages of spermatogenesis, just as ground-based controls did at the same season. Abnormalities were also not found in the thyroid, parathyroids, adrenals, or kidneys. The status of the juxtaglomerular apparatus could not be evaluated. The lungs exhibited nonspecific slight reactions. A variety of incidental lesions were noted in the livers of both the flight mice and their controls. The heart muscle showed nothing that could be regarded as pathological. Sections of skeletal muscle examined were free from significant change.

(Author)

**A75-29612 #** The airport and the people associated with it (Port lotniczy i ludzie z nim zwiazani). J. Smolenski. *Technika Lotnicza i Astronautyczna*, vol. 29, Mar. 1975, p. 29-32. In Polish.

The problems associated with providing adequate passenger service in the design and operational stages of an airport are examined, including prompt delivery of luggage after landing, prompt customs and passport inspections, etc. The principal aspects of training airport employees for efficient and reliable performance of the various individual duties are examined, including provision of guides for groups of tourists visiting the airport. The complex relationship between the airport and the surrounding communities is discussed.

V.P.

**A75-29789 #** Dynamics of change in the peripheral blood of dogs under high-mountain conditions /Eastern Pamir/ (Dinamika izmeneniia perifericheskoi krovi u sobak v usloviakh vysokogor'ia /Vostochnyi Pamir/). I. Iu. Iuldashev and F. Kh. Sharipov (Tadzhikskii Gosudarstvennyi Meditsinskii Institut, Dyushambe, Tadzhik SSR). *Akademiia Nauk Tadzhikskoi SSR, Doklady*, vol. 17, no. 12, 1974, p. 57-60. 8 refs. In Russian.

**A75-29869 #** Distribution of oxidized molecules among various hemoglobin fractions (Pro rozpodil okislenikh molekul mizh okremimi fraktsiiami gemoglobinu). M. F. Starodub and I. A. Kriklii (Akademiia Nauk Ukrain'skoi RSR, Institut Molekuliarnoi Biologii i Genetiki, Ukrainian SSR). *Akademiia Nauk Ukrain'skoi RSR, Dopovidi, Seriya B - Geologiya, Geofizika, Khimiia i Biologiya*, Feb. 1975, p. 163-165. 18 refs. In Ukrainian.

The concentration of oxidized molecules in hemoglobin fractions was determined through the degree of solution enrichment with methemoglobin. Methemoglobin was present in four fractions isolated by column chromatography with aluminum oxide and in all fractions obtained by the method of preparation electrophoresis in polyacrylamide gel. Methemoglobin distribution was not uniform. Data on the methemoglobin content in individual fractions are compared with those on the structural characteristics of hemoglobin in these fractions.

P.T.H.

**A75-29898** Inhibition and disinhibition of direction-specific mechanisms in human vision. E. Levinson and R. Sekuler (Northwestern University, Evanston, Ill.). *Nature*, vol. 254, Apr. 24, 1975, p. 692-694. 24 refs. NIH-supported research.

The results of the investigation considered show that direction-specific mechanisms can inhibit one another. A demonstration of disinhibition shows that the inhibition effect is not an artefact of nonlinear signal summation, either in the apparatus or in early stages of the visual system. The reported psychophysical demonstration of inhibition between human direction-specific mechanisms is compatible with the hypothesis that human direction-specificity is mediated by directionally selective neurones in the human visual cortex.

G.R.

**A75-30076 \*** Hazard analysis of *Clostridium perfringens* in the Skylab Food System. C. T. Bourland, C. S. Huber, P. R. Kiser (Technology, Inc., Houston, Tex.), N. D. Heidelbaugh (NASA, Johnson Space Center, Biomedical Research Div., Houston, Tex.), and D. B. Rowley (U.S. Army, Natick Laboratories, Natick, Mass.). *Journal of Milk and Food Technology*, vol. 37, Dec. 1974, p. 624-628. 12 refs.

The Skylab Food System presented unique microbiological problems because food was warmed in null-gravity and because the heat source was limited to 69.4 C (to prevent boiling in null-gravity). For these reasons, the foods were manufactured using critical control point techniques of quality control coupled with appropriate hazard analyses. One of these hazard analyses evaluated the threat from *Clostridium perfringens*. Samples of food were inoculated with *C. perfringens* and incubated for 2 h at temperatures ranging from 25 to 55 C. Generation times were determined for the foods at various temperatures. Results of these tests were evaluated taking into consideration: food-borne disease epidemiology, the Skylab food manufacturing procedures, and the performance requirements of the Skylab Food System. Based on this hazard analysis, a limit for *C. perfringens* of 100/g was established for Skylab foods.

(Author)

**A75-30252 #** Molecular mechanism of contraction of cross-striated muscles (Molekuliarnii mekhanizm skorochennia pope-rechno-smugastikh m'iaziv). O. S. Davidov (Akademiia Nauk Ukrain'skoi RSR, Institut Teoretichnoi Fiziki, Kiev, Ukrainian SSR). *Ukrains'kii Fizichnii Zhurnal*, vol. 20, Feb. 1975, p. 179-184. 16 refs. In Ukrainian.

The paper suggests at the molecular level an explanation for the mechanisms of cross-striated muscle contraction. It is shown that the hydrolysis energy of ATP molecules attached to the heads of myosin molecules causes the oscillations of amide I in the peptide groups. The excited part of the molecule together with local deformation of the alpha-helical part of a myosin molecule travels from the head to its tail. The moving local deformations through the heads of myosin molecules projecting from thick threads translate the motion to thin threads evoking their slipping relative to the thick threads of a sarcomere.

(Author)

**A75-30337 #** Changes in central hemodynamics and peripheral vessels tone during hemorrhage (Pro zmini tsentral'noi gemodinamiki ta tonusu periferichnikh sudin pri gemoragii). V. V. Bratus' (Akademiia Nauk Ukrain'skoi RSR, Institut Fiziologii, Kiev, Ukrainian SSR). *Fiziologichnii Zhurnal*, vol. 21, Mar.-Apr. 1975, p. 161-169. 17 refs. In Ukrainian.

The aim of the investigations was to elucidate whether the hemodynamic shifts and changes in peripheral vessels tone during hemorrhage are due to influences from carotid sinuses. The obtained data furnish evidence for the presence of considerable differences in the reactions of peripheral vessels to the investigated influences. The development of the cardiovascular reflex to the pressure drop in carotid sinuses was followed by much more considerable changes in tone of the resistance vessels than in that of capacitance. Changes in the venous vessels tone prevailed during hemorrhage. The selective reflex influences on arterial and venous parts of the vascular system are supposed to be the reason for these effects.

(Author)



**A75-30338 #** On hemodynamic reactions to hypoxic hypoxia in dogs with acute arterial hypertension (Pro gemodinamichni reaktsii na gipoksichnu gipoksiu u sobak z gastroiu arterial'noiu gipertenzieiu). S. A. Bershtein (Akademiia Nauk Ukrain-s'koi RSR, Institut Fiziologii, Kiev, Ukrainian SSR) and T. Mansurov (Tashkents'kii Oblasnii Pedagogichnii Institut, Tashkent, Uzbek SSR). *Fiziologichnii Zhurnal*, vol. 21, Mar.-Apr. 1975, p. 170-175. 8 refs. In Ukrainian.

Comparison of hemodynamic reactions to acute hypoxic hypoxia in control animals and in dogs with experimental arterial hypertension shows that with different direction of the changes in the systemic arterial pressure the shifts in most parameters of hemodynamics are the same and differ only in the quantitative respect. This is supposed to be connected with an essential weakening in the effect of noradrenalin infusion which increases the peripheral vascular tone under conditions of arterial hypoxemia.

(Author)

**A75-30339 #** Structure of hemodynamic shifts under conditions of acute and chronic hypoxia in people with prevalent pathological processes in the lungs (Struktura gemodinamichnikh zrushen' pri gostrii i khronichnii gipoksii u liudei z poshirenimi patologichnimi protsesami v legeniakh). M. I. Gurevich, G. G. Gorovenko, B. M. Brusilov's'kii, and V. A. Tsiurul'nikov (Akademiia Nauk Ukrain's'koi RSR, Institut Fiziologii; Kiiv's'kii Institut Tuberkul'ozu i Grudnoi Khirurgii, Kiev, Ukrainian SSR). *Fiziologichnii Zhurnal*, vol. 21, Mar.-Apr. 1975, p. 176-182. 29 refs. In Ukrainian.

**A75-30340 #** On certain parameters of hemodynamics and blood oxygen transport function in teen-agers under static loading (Pro deiakhi pokazniki gemodinamiki i kisen'transportnoi funktsii krovi pidlitkiv pri statichnikh zussiliakh). Iu. V. Stepanov (Kiiv's'kii Institut Fizichnoi Kul'turi; Akademiia Nauk Ukrain's'koi RSR, Laboratoriia Fiziologii Dikhannia Liudini, Kiev, Ukrainian SSR). *Fiziologichnii Zhurnal*, vol. 21, Mar.-Apr. 1975, p. 222-228. 18 refs. In Ukrainian.

Changes in the minute and stroke blood volume are studied, and the characteristics of oxygen transport by arterial and venous blood are investigated. Quantitative comparisons between the oxygen transport by blood and its uptake by the tissues are performed for teen-agers under the near-limit static loading and in the next restoration period after it. The studies conducted showed that under the near-limit loading (0.7 kg/kg), blood-flow in teen-agers increases more intensively than in persons of middle age. However, the efficiency of blood circulation as to the tissue supply with oxygen in the teen-agers drops both under static loading and in the first minute of the restoration period.

(Author)

**A75-30341 #** Oxygen regimes of organism in teen-agers and men under muscular activity of dynamic character (Kisnevi rezhimi organizmu pidlitkov i cholovikiv pri m'iazovii diial'nosti dinamichnogo kharakteru). M. M. Filipov (Akademiia Nauk Ukrain's'koi RSR, Laboratoriia Fiziologii Dikhannia Liudini, Kiev, Ukrainian SSR). *Fiziologichnii Zhurnal*, vol. 21, Mar.-Apr. 1975, p. 229-237. 48 refs. In Ukrainian.

It is shown that maximal specific capacity in untrained teen-agers is considerably less than in men. The oxygen expenditure of mechanical work in untrained teen-agers is higher than in men. The oxygen regime of an organism (ORO) of untrained teen-agers when fulfilling the muscular work of dynamic character with the maximal oxygen consumption is characterized by a smaller value and less rate of oxygen supply by stages than in untrained men and by low economy and efficiency. Under loading with equal oxygen uptake in young cyclists, the activity in the respiratory and cardiovascular systems is more economical and effective, the work oxygen expense being lower than in untrained teen-agers. The process of training causes not only an increase in the oxygen supply system capacity, but also development of mechanisms providing a more complete utilization of oxygen by tissues.

(Author)

**A75-30342 #** Study of cardiac output under physical loading by the rebreathing method of CO<sub>2</sub> (Vivchennia sertsevoogo vishtovkhu pri fizichnomu navantazheni metodom zvorotnogo dikhannia CO<sub>2</sub>). V. S. Mishchenko, V. D. Monogarov, and R. Ia. Levin (Kiiv's'kii Institut Fizichnoi Kul'turi; Kiiv's'kii Derzhavnii Universitet, Kiev, Ukrainian SSR). *Fiziologichnii Zhurnal*, vol. 21, Mar.-Apr. 1975, p. 238-248. 50 refs. In Ukrainian.

On the basis of studying some variants of the procedure for determining the cardiac output by the rebreathing method of CO<sub>2</sub>, a variant of the procedure is suggested which, in the authors opinion, is the most suitable to cardiac output studies under different intensities of physical loading. On the basis of studying 65 men at the age of 18-28 and 32 boys at the age of 9-15 under step-like (every 5 min) growing veloergometric loading, essential differences are found in the blood CO<sub>2</sub> parameters, systolic volume, and cardiac output in dependence on the level of O<sub>2</sub> uptake in sportsmen of different categories, children, and teen-agers.

(Author)

**A75-30343 #** Electrophoresis of soluble proteins in the blood serum, the heart, and skeletal muscles under prolonged morbid stimulations involving the use of hexonium for blocking ganglion (Elektroforez rozchinnikh bilkov sirovatki krovi, sertsia ta skeletnikh m'iaziv pri trivalikh bol'ovikh podraznenniakh iz zastosuванняm ganglioblokatora geksoniiu). S. M. Dionesov (Voroshilovgrad's'kii Pedagogichnii Institut, Voroshilovgrad, Ukrainian SSR) and I. O. Ivaniura (Melitopol's'kii Pedagogichnii Institut, Melitopol, Ukrainian SSR). *Fiziologichnii Zhurnal*, vol. 21, Mar.-Apr. 1975, p. 256-260. 18 refs. In Ukrainian.

**A75-30344 #** Influence of B12 and B15 vitamins on the indices of coagulograms and thromboelastograms of dogs and rabbits under conditions of acute hypoxia (Vpliv vitaminiv B12 ta B15 na pokazniki koagulogramu i tromboelastogramu sobak ta krolivik pri gostrii gipoksii). V. V. Bakans'ka, T. V. Gal'tseva, and T. M. Draigal (Grodnen's'kii Medichnii Institut, Grodno, Belorussian SSR). *Fiziologichnii Zhurnal*, vol. 21, Mar.-Apr. 1975, p. 269-271. 21 refs. In Ukrainian.

**A75-30345 #** Evolutionary aspects of the relationship between hypoxic and circulatory hypoxia (Do vzaemovidnoshennia gipoksichnoi i tsirkulatornoi gipoksii v evoliutsiinomu aspekti). M. M. Sirotnin (Akademiia Nauk Ukrain's'koi RSR, Institut Fiziologii, Kiev, Ukrainian SSR). *Fiziologichnii Zhurnal*, vol. 21, Mar.-Apr. 1975, p. 276-279. 12 refs. In Ukrainian.

The present work discusses the anaerobic or near-anaerobic conditions under which life originated on earth and examines the evolutionary aspects of breathing control and circulation. Some clinical results on adaptation to hypoxia are discussed, and their relation to paleontological studies is pointed out.

P.T.H.

**A75-30574** Interaction of electromagnetic transient radiation with biological materials. J. C. Lin (Wayne State University, Detroit, Mich.). *IEEE Transactions on Electromagnetic Compatibility*, vol. EMC-17, May 1975, p. 93-97. 15 refs. Contract No. F41609-73-C-0002.

The transmission characteristics of transient electromagnetic pulses in biological material are studied using a plane wave pulse incident normally on a semi-infinite layer model. With the dispersion properties of complex tissue dielectric constants taken into account, the steady state transfer function was examined as a function of frequency. Integral solutions for the transmitted field of a Gaussian pulse were obtained through Fourier transformation. The transmitted waveforms inside muscle were determined numerically for various depths pertinent to biological situations. The results suggest that incident pulse experiences severe reflection at the air-tissue interface and, shorter pulses are transmitted more readily than longer ones. For an incident pulse of 50 kV/m and 1 microsec in pulsewidth, the transmitted amplitude is 221 V/m.

(Author)

**A75-30646 #** The influence of adaptation to high-altitude hypoxia on the development and indices of higher nervous activity in the progeny of adapted animals (Vliianie adaptatsii k vysoknoi gipoksii na razvitie i pokazateli vysshei nervnoi deiatel'nosti potomstva adaptirovannykh zhivotnykh). F. Z. Meerson, S. A. Radzievskii, and O. L. Drozhdin (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Akademiia Nauk SSSR, Doklady*, vol. 221, Mar. 1, 1975, p. 247-250. 8 refs. In Russian.

**A75-30647 #** Concerning the role of nonlinear optical effects in the process of photoreception of laser radiation (K voprosu o roli nelineinykh opticheskikh effektov v protsesse fotoretseptsii izlucheniia OKG). B. M. Savin, R. I. Kovach, and E. E. Kolchin. *Akademiia Nauk SSSR, Doklady*, vol. 221, Mar. 1, 1975, p. 255, 256. In Russian.

Experiments demonstrated that human subjects visually perceived IR (1.06-micron wavelength) pulsed laser radiation as bright green flashes at about half the wavelength. Measurements were made of the electrical responses in frog retinas produced by stimulation at 0.69 and 1.06 microns. The data indicate that the observed phenomenon involves the photoreceptors and is due to nonlinear optical effects occurring in the retina structures. Two basic processes are suggested: (1) two-photon absorption and (2) generation of the second harmonic of the incident radiation, followed by its direct perception. A.T.S.

**A75-30684 \*** The effects of light on man and other mammals. R. J. Wurtman (MIT, Cambridge, Mass.). *Annual Review of Physiology*, vol. 37, 1975, p. 467-483. 62 refs. Grants No. PHS-AM-11709; No. PHS-ES-00616; No. NGR-22-009-627.

The present article describes the best-studied extravital effects of visible and ultraviolet light on humans and other mammals. It also considers the possible biological consequences to man of living in artificially lighted environments that differ significantly from the milieu in which he evolved. Cumulative evidence favors the beneficial influences of sunlight: vitamin D activation, plasma bilirubin elimination, inhibition of pineal melatonin synthesis, etc. S.J.M.

**A75-30695 #** Relation between the fluctuations of a slow electric potential and the changes in oxygen tension in the human brain (O sviazi kolebaniit medlennogo elektricheskogo potentsiala s kolebaniiami napriazheniia kisloroda v golovnom mozge cheloveka). Iu. D. Kropotov and V. B. Grechin (Akademiia Meditsinskikh Nauk SSSR, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 61, Mar. 1975, p. 331-338. 22 refs. In Russian.

**A75-30696 #** 'Spontaneous' cutaneous galvanic responses during night sleep in normal man ('Spontannnye' kozhno-gal'vanicheskie reaktsii v nochnom sne zdorovogo cheloveka). V. P. Danilin and L. P. Latash (Akademiia Nauk SSSR, Institut Evoliutsionnoi Morfologii i Ekologii Zhivotnykh, Moscow, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 61, Mar. 1975, p. 362-367. 25 refs. In Russian.

**A75-30697 #** A mathematical model of cardiac rhythm: disturbances under rapid electrical activity of atria (Matematicheskaiia model' narusheniia serdchnogo ritma pri chastoii elektricheskoi aktivnosti predserdii). L. V. Mezentseva and L. S. Ul'ianinskii (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 61, Mar. 1975, p. 400-406. 12 refs. In Russian.

**A75-30698 #** The effect of cooling in an altered gaseous medium on the systems of ammonia formation and binding in the brain (Vliianie okhlazhdeniia v usloviakh izmenennoi gazovoi sredy na sistemy obrazovaniia i svyazyvaniia ammiaka v golovnom mozge). N. V. Korostovtseva, G. A. Valeeva, and V. I. Baev (Leningradskii Pediatricheskii Meditsinskii Institut, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 61, Mar. 1975, p. 449-453. 23 refs. In Russian.

The ammonia-glutamic system of brain tissue is studied in rats which are adapted to an acute hypoxia caused by single and repeated cooling under conditions of increasing hypoxia and hypercapnia. It is shown that ammonia metabolites are involved in the adaptive readjustment of the organism. In the case of single cooling, ammonia is found to accumulate in the brain due to the predominance of catabolic processes, whereas in repeated cooling, ammonia content is normalized as a result of anabolic processes superceding the catabolic ones. Among ammonia producers are the free amino acids, in particular the glutamic and aspartic acids, as well as glutamine. Ammonia acceptors are the proteins of the brain, in which amidation proceeds intensely. S.D.

**A75-30819** Masking, aftereffect, and illusion in visual perception of curvature. B. Crassini and R. Over (Queensland, University, St. Lucia, Australia). *Perception and Psychophysics*, vol. 17, Apr. 1975, p. 411-416. 32 refs. Research supported by the Australian Research Grants Committee.

Masking, aftereffect, and illusion paradigms were used to establish the spatial selectivity of curvature detectors in human vision. Arcs with the same chord orientation mask each other maximally when they are identical in radius and direction of curvature. There is gradual reduction in masking over an extensive spatial range as arcs diverge in curvature. The transition from convexity to concavity does not produce discontinuity in the masking function. The extent to which a straight line appears curved also depends on the curvature of arcs shown previously (aftereffect) or at the same time (illusion). It is suggested that these effects could occur through selective adaptation of detectors responsive to either global curvature or the orientation of local straight-line approximations within an arc. Evidence is reviewed in support of the latter interpretation. (Author)

**A75-31013 #** Changes in the activity of anterior hypothalamic neurons due to stimulation of thermoreceptors of subcutaneous veins (Izmenenie aktivnosti neuronov perednego gipotalamusa v sviazi s razdrzheniem termoretseptorov podkozhnykh ven). N. F. Glebova (Petrozavodskii Gosudarstvennyi Universitet, Petrozavodsk, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 61, Feb. 1975, p. 187-192. 16 refs. In Russian.

**A75-31014 #** A neurophysiological analysis of the effect of adrenal cortex steroid hormones on the bioelectric activity of the structures in the reticulolimbic system (Neirofiziologicheskii analiz vliianiia steroidnykh gormonov kory nadpochechnikov na bioelektricheskuiu aktivnost' struktur retikulo-limbicheskoi sistemy). N. M. Malysenko (Chernovitskii Meditsinskii Institut, Chernovtsy, Ukrainian SSR). *Fiziologicheskii Zhurnal SSSR*, vol. 61, Feb. 1975, p. 203-212. 21 refs. In Russian.

**A75-31015 #** Reactions of frog's midbrain auditory centers to labyrinth stimulation by focused ultrasound (Reaktsii slukhovykh tsentrov srednego mozga liagushki pri razdrzhenii labirinta fokusirovannym ul'trazvukom). L. P. Gavrilov, E. M. Tsiur'nikov, and E. E. Shchekhanov (Akademiia Nauk SSSR, Laboratoriia Sravnitel'noi Fiziologii Organov Chuvstv, Leningrad; Akademiia Nauk SSSR, Laboratoriia Fiziki Ul'trazvuka, Moscow, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 61, Feb. 1975, p. 213-221. 13 refs. In Russian.

**A75-31016 #** Study of the model of smooth muscle contractions at the automatic analog of Vinner's medium (Issledovanie sokrashchenii modeli gladkoi myshtsy na avtomatnom analoge sredy Vintera). L. V. Reshod'ko, A. A. Letichevskii, and P. G. Bogach (Akademiia Nauk Ukrainsoi SSR, Institut Kibernetiki; Kievskii Gosudarstvennyi Universitet, Kiev, Ukrainian SSR). *Fiziologicheskii Zhurnal SSSR*, vol. 61, Feb. 1975, p. 222-231. 17 refs. In Russian.

The simplest structure and the main moments of smooth muscle contractile activity are presented in terms of theory of the automata

and logarithmic language ALGOL-60, the separate smooth muscle cell thus corresponding to the Moor automaton, and the muscle tissue - to the combination of automata forming the cell automatic analog of excitable Winner's medium. Functioning of the automatic smooth muscle model was studied on 'Mir-2' and 'M 220-M' computers. The smooth muscle cells are dissimilar by the duration of refractory period, period of stimulation, ability of spontaneous activity, or excitability. The data obtained aid to understanding of nature of myogenic automation in the smooth muscles and of spreading of excitation along the smooth muscle fibers. (Author)

**A75-31017 #** Correlations between some hematological and biochemical characteristics in monkeys (Korrelatsionnye zavisimosti mezhdu nekotorymi gematologicheskimi i biokhimičeskimi pokazateliami u obez'ian). L. A. Tiunov, V. A. Voronin, V. A. Ivanova, and V. I. Kasatkin. *Fiziologicheskii Zhurnal SSSR*, vol. 61, Feb. 1975, p. 235-238. 15 refs. In Russian.

Macaca mulatta monkeys are investigated experimentally to determine correlations between individual fluctuations in the level of blood cells and individual changes in the activity of some enzymes in the erythrocytes, leucocytes, and blood serum. Mechanisms which may underlie the derived correlations are discussed. It is shown that (1) desoxyribonuclease-I decreases with increasing values of the erythrocyte level and its catalase activity in the blood; (2) blood peroxidase activity increases with growing values of erythrocytes and hemoglobin; and (3) individual fluctuations in the number of leucocytes in the peripheral blood is directly correlated to the activity of peroxidase in them. S.D.

**A75-31018 #** Thrombocytopenic activity of blood serum in animals under short-term adaptation to high altitude conditions (Trombotsitopeničeskaja aktivnost' syvorotki krovi u zhivotnykh pri kratkovremennoi adaptatsii k usloviyam vysokogor'ia). T. A. Ponomareva (Akademii Nauk Kirgizskoi SSR, Laboratoriia Eksperimental'noi Fiziologii, Frunze, Kirgiz SSR). *Fiziologicheskii Zhurnal SSSR*, vol. 61, Feb. 1975, p. 239-243. 24 refs. In Russian.

**A75-31019 #** Significance of ACTH in the formation of complex heparin compounds in the blood under immobilization stress (Znachenie AKTG dlia protessa obrazovaniia kompleksnykh soedinenii geparina v krovi pri immobilizatsionnom stresse). B. A. Kudriashov, F. B. Shapiro, E. G. Lomovskaia, and L. A. Liapina (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 61, Feb. 1975, p. 244-250. 13 refs. In Russian.

**A75-31020 #** On the optimal heart-rate in warm-blooded animals (Ob 'optimal'noi chastote' bienii serdtsa teplokrovnoego). V. D. Kiselev and Z. V. Urazaeva (Altaiskii Gosudarstvennyi Meditsinskii Institut, Barnaul, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 61, Feb. 1975, p. 257-261. 30 refs. In Russian.

The optimal heart-rate was studied in natural conditions of hemodynamics and on stabilizing the left ventricle load and volume with a balloon. The coronary blood-flow was traced with the aid of electromagnetic fluorometer. Post-occlusion reactive hyperemia estimated reserves of the coronary blood-flow. On stabilizing the left ventricle load and volume, its contractility was higher with faster heart-rate. With the fastest heart-rate, a considerable reserve of the coronary blood-flow was still preserved. Apparently under conditions of natural hemodynamics, the optimal heart-rate (100-180/min) and the decline of contractility with fast heart-rate are due to decrease in filling of the heart cavities with the blood per 1 systole at a constant 1 min volume of the blood-flow. (Author)

**A75-31021 #** Does afferentation from respiratory muscles take part in the regulation of eupnea in man (Prinimaet li uchastie afferentatsiia s dykhatel'nykh myshts v reguliatsii eipnicheskogo dykhaniiia u cheloveka). S. I. Frankshtein, L. N. Sergeeva, Z. N. Sergeeva, and E. S. Ivanova (Akademii Meditsinskikh Nauk SSSR, Moscow, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 61, Feb. 1975, p. 284-286. 9 refs. In Russian.

**A75-31022 #** Optical illusion of diverging waves (Zritel'naia illiuziia raskhodiashchikhsia voln). N. F. Podvigin, A. M. Kuperman, R. D. Khabibullin, and I. V. Chueva (Akademii Nauk SSSR, Laboratoriia Fiziologii Zreniia, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 61, Feb. 1975, p. 292, 293. 5 refs. In Russian.

The experiments described were aimed at detecting a possible psychophysiological phenomenon predicted on the basis of electrophysiological data. The subjects were made to observe bright circular spots on a white screen, the diameter of the spots being varied at rates between 0.1 and 20 angular degrees per second. At rates greater than roughly 5 angular degrees per second, the subjects appeared to see dark and light concentric rings (concentric waves) moving outward from the center of the screen. This optical illusion is attributed to previously observed wave processes in the receptive fields of the external geniculate body. V.P.

**A75-31023 #** On the origin of trace depolarization of nerve fibers (K voprosu o proiskhozhdenii sledovoi depolarizatsii nervnykh volokon). L. L. Katalymov (Ul'ianovskii Pedagogicheskii Institut, Ulyanovsk, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 61, Feb. 1975, p. 294-298. 17 refs. In Russian.

**A75-31024 #** Technique for the measurement and dynamic recording of microvessel diameter by television microscopy (Metod izmereniia i registratsii v dinamike diametra mikrosudov s pomosh'iu sistemy televizionnoi mikroskopii). I. P. Morozov (Akademii Meditsinskikh Nauk SSSR, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 61, Feb. 1975, p. 301-304. 9 refs. In Russian.

A system of television microscopy for measuring the diameter of microvessels is described which consists of a television unit and a microscope whose light source is represented by a high-pressure mercury lamp. Use is made of a simple measurement technique to determine the mean component of video pulses under laboratory conditions. The proposed technique is verified through experimental studies on the vasomotor responses of the small intestine. S.D.

**A75-31025 #** A device for in vivo microspectrophotometric investigations and instructions for its use (Ustanovka dlia prizhiznennykh mikrospektrofotometricheskikh issledovaniia i metodika ee ispol'zovaniia). Iu. I. Levkovich, V. A. Levtoev, and A. P. Golubev (Akademii Nauk SSSR, Laboratoriia Nauchno-Issledovatel'skoi Kinematografii i Laboratoriia Fiziologii Krovoobrashcheniia, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 61, Feb. 1975, p. 307-309. 6 refs. In Russian.

The design and principles of operation of an in vivo microspectrophotometer are outlined for the spectral study of blood vessels, striated muscle fibers, connective tissue sections, peripheral neurons, and other microstructures. It is found that at high absolute values, the light transmission factors of the analyzed microstructures differ greatly from each other in some regions of the spectrum. The selection of the required light-sensitive film and contrast filter is discussed. S.D.

**A75-31035** Visual detection analysed in terms of luminance and chromatic signals. P. E. King-Smith (University of Manchester Institute of Science and Technology, Manchester, England). *Nature*, vol. 255, May 1, 1975, p. 69, 70. 26 refs. Research supported by the Royal Society and Science Research Council.

Experimental evidence is reviewed which implies that a test flash is detected either by its luminance or by its color. Results indicate that there may be some probability summation between the luminance and color detection systems when they have nearly equal sensitivity. It is likely that the major part of light adaptation occurs within the cones; thus some adaptation in the photopic system may occur at a point where the signals from receptors have been 'pooled.' S.J.M.

**A75-31036** Spatial frequency selectivity in the retina. D. H. Kelly (Stanford Research Institute, Menlo Park, Calif.). *Vision Research*, vol. 15, June 1975, p. 665-672. 26 refs. Grant No. NIH-EY-01128.

Retinal sensitivity to spatial patterns depends on the spatial distribution of receptive fields. Their natural distribution is neither perfectly random nor perfectly regular; its effects vary with the visual task involved. A model of the sustained ganglion cell in man is used to make quantitative predictions of the sine-wave contrast sensitivity for various hypothetical receptive-field distributions. In the spatial frequency domain, partial coherence among ganglion-cell responses can produce narrow bands of sensitivity to sinusoidal gratings. Thus receptive-field coherence may account for various spatial frequency effects previously thought to require a cortical mechanism. (Author)

**A75-31037** Apparent fineness of briefly presented gratings - Balance between movement and pattern channels. J. J. Kulikowski (University of Manchester Institute of Science and Technology, Manchester, England). *Vision Research*, vol. 15, June 1975, p. 673-680. 25 refs. Science Research Council Grant No. B/RG/1511.

Certain causes of increased perceived grating fineness are investigated. These causes comprise mainly (1) presentation of the grating for only 20-60 msec and (2) contrast reversal of the grating at a rate above 8 Hz. The detection of motion (or flicker) is found to be a necessary condition for both the phenomena to occur. The increase in apparent spatial frequency may reach a factor of two only when the recognition threshold for a grating of doubled spatial frequency is substantially lower than for the fundamental pattern. It is concluded that the phenomena depend on some integration of signals from motion and pattern detectors. S.J.M.

**A75-31038** Luminance-duration relationships in the photopic ERG and the apparent brightness of flashes. T. W. Butler (Brown University, Providence, R.I.). *Vision Research*, vol. 15, June 1975, p. 693-698. 18 refs. Grant No. PHS-EY-00744.

With conditions that isolate the photopic response, electroretinograms (ERGs) and brightness judgments were obtained over a range of flash durations and luminance levels to test for the presence of an electrophysiological correlate of the Broca-Sulzer brightness enhancement effect. The averaged responses to single flashes of light indicated that while the amplitude overshoot typically present in the ERG at a particular duration of flash was present, no close correlation of it with a psychophysical peak in apparent brightness was evident. Peaking of the electrical responses occurred in the 10-20 msec duration range with the luminances used, while increases in subjective brightness were reported out to 50 msec flash durations. (Author)

**A75-31039** Parameters of tachistoscopic stereopsis. W. R. Uttal, J. Fitzgerald, and T. E. Eskin (Michigan, University, Ann Arbor, Mich.). *Vision Research*, vol. 15, June 1975, p. 705-712. 18 refs. Research supported by the University of Michigan; NSF Grant No. GB-25431; Grant No. NIH-1-R01-MH-24016-01.

This study examines the effects of disparity, dot numerosity, exposure duration, and the allowed processing time on briefly exposed Julesz-type random dot stereogram perception. Dot numerosity produces only minimal effects for the lower values used; reductions in exposure duration systematically reduce the performance level; and the changes in performance are found to be symmetrical for either convergent or divergent disparity and to continuously improve with disparity varying from approx 30 sec to over 5 min of visual angle. The findings from this experiment indicate that there is only minimal summatory interaction among stereoscopic mechanisms for adjacent areas and confirm earlier estimates of the time required (approx 50 msec) for processing stereoscopic stimuli. (Author)

**A75-31040** The doll reflex - Ocular counterrolling with head-body tilt in the median plane. S. M. Ebenholtz and W. Shebilske (Wisconsin, University, Madison, Wis.). *Vision Research*, vol. 15, June 1975, p. 713-717. 17 refs. Grants No. NIH-MH-13006-08; No. NIH-MH-13006-09.

Two groups of 10 Ss each were tilted backward in the median plane in 10 deg increments. For Group P, photographs were taken of the eyes when Ss signalled they were fixating a target that appeared straight ahead. In Group M, ocular position was inferred from the location of a visual target that appeared straight ahead. Both groups exhibited a significant decrement in ocular position when tilted in comparison with Ss' judgments when upright. It was suggested that reflexive ocular counterrolling is best described as a sine function of body tilt, and that the reflexive innervation of the extra-ocular muscles does not contribute directly to the sense of visual direction. (Author)

**A75-31041** Failure to detect displacement of the visual world during saccadic eye movements. B. Bridgeman (California, University, Santa Cruz, Calif.), D. Hendry, and L. Stark (California, University, Berkeley, Calif.). *Vision Research*, vol. 15, June 1975, p. 719-722. 25 refs.

Perception of the rapid displacement of a target is suppressed during saccadic eye movements. Suppression is complete if eye movement is more than about three times larger than target displacement, and some suppression occurs even for target displacements of 4 deg. These results can be interpreted with the addition of a threshold element to the algebraic sum of the corollary discharge and the visual signal. (Author)

**A75-31042** Accuracy of echocardiography for assessing aortic root diameter. G. S. Francis, A. D. Hagan, J. Oury, and R. A. O'Rourke (U.S. Navy, Naval Regional Medical Center; California, University, San Diego, Calif.). *British Heart Journal*, vol. 37, Apr. 1975, p. 376-378. 5 refs. Navy-PHS-supported research.

The normal range for aortic root diameters employing the echocardiographic continuous recording technique was determined in 159 adult subjects without aortic valve disease or hypertension. In order to evaluate the accuracy of this noninvasive technique, the aortic root diameters as measured by ultrasound before operation in 31 patients with aortic valve disease were compared with their respective aortic annulus diameters as determined at the time of valve replacement. A significant difference in aortic root diameters existed between men and women which could not be explained by differences in body surface area. The aortic root diameter which was measured preoperatively by ultrasound in the 31 patients with aortic valve disease averaged about 25.1 mm and did not differ significantly from the actual aortic annulus diameter of about 25.5 mm measured at the time of surgery. The aortic root measurements by echo were within 2mm of the corresponding annulus diameter in 25 of the 31 operated patients. (Author)

**A75-31043** Comparison of scalar and vector electrocardiographic diagnosis and localization of myocardial infarction. G. McNeill, D. Emslie-Smith, and K. G. Lowe (Dundee, University, Dundee, Scotland). *British Heart Journal*, vol. 37, Apr. 1975, p. 379-385. 43 refs. Research supported by the British Heart Foundation.

A prospective study was made of 80 patients during typical clinical episodes of acute myocardial infarction with biochemical and scalar electrocardiographic confirmation. Nine patients had bundle-branch block and 12 had had previous episodes of myocardial infarction. Serial electrocardiograms and vectorcardiograms were recorded during the first week in hospital. The most striking finding

was that in more than half the cases there was disagreement between the electrocardiogram and vectorcardiogram in the localization of infarction. The earliest evidence of infarction in the electrocardiogram is often restricted to ST and T changes though in the corresponding vectorcardiograms evidence of infarction may be present in the QRS loop. In those cases in which both electrocardiogram and vectorcardiogram show QRS abnormalities, these are frequently detected earlier in the vectorcardiogram, but the converse is rare. (Author)

**A75-31047 #** Difference in the functional organization of the visual center in frogs and cats (Razlichie funktsional'noi organizatsii zritel'nogo tsentra liagushki i koshki). L. I. Mkrtycheva and V. G. Samsonova (Akademiia Nauk SSSR, Institut Vyshei Nervnoi Deiatel'nosti i Neurofiziologii, Moscow, USSR). (*Simpozium po Fiziologii Sensornykh Sistem - Fiziologiya Zreniia, 2nd, Leningrad, USSR, Fall 1973.*) *Neurofiziologiya*, vol. 7, no. 1, 1975, p. 5-11. 8 refs. In Russian.

A comparative study of the functional characteristics of the responses of the neurons of frog's tectum and cat's primary visual cortex. The responses are recorded under identical experimental conditions, with brightness and duration of light flashes varying within 6 log units. The distribution of neurons in the visual center of frogs and cats is discussed along with the simultaneous response of two adjacent neurons. It is shown that frogs possess fixed mechanisms of temporal and spatial interactions accounting for the detection of stimulus brightness, whereas cats show no interaction between separate neuron populations and no mutual inhibition between adjacent neuron units in the visual cortex. S.D.

**A75-31048 #** Cholinergic mechanisms of interneural transmission in the retina (Kholinergicheskie mekhanizmy mezhneironnoi peredachi v setchatke). P. Dettmar (Leipzig, Universität, Leipzig, East Germany). (*Simpozium po Fiziologii Sensornykh Sistem - Fiziologiya Zreniia, 2nd, Leningrad, USSR, Fall 1973.*) *Neurofiziologiya*, vol. 7, no. 1, 1975, p. 48-54. 25 refs. In Russian.

Acetylcholine (ACh) applied to the perfused isolated retina in man and frog results in a slow corneapositive fluctuation of potential. This potential-evoking effect of ACh corroborates the hypothesis of cholinergic synaptic transmission in the retina. The magnitude and time-behavior of ACh-evoked potential depends both on ACh concentration and on the adaptive state of the retina. Light stimulation is shown to decrease the potential-evoking action of ACh, while a flickering light is more effective than a steady one. Retinal response to light is found to be reduced during perfusion with ACh to the extent that the b-wave is suppressed, leaving only the negative PIII wave. It is shown that ACh acts upon the synapses between the first and second retinal neurons. The observed changes in the ACh-evoked retinal potential may be interpreted in terms of desensitization of cholinergic receptors under the action of ACh. S.D.

**A75-31049 #** Investigation of responses to light of retinal rods in frogs (Issledovanie reaktzii palocheh setchatki liagushki na svet). V. I. Gusel'nikov, A. S. Sidorov, and V. L. Suponitskii (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR). (*Simpozium po Fiziologii Sensornykh Sistem - Fiziologiya Zreniia, 2nd, Leningrad, USSR, Fall 1973.*) *Neurofiziologiya*, vol. 7, no. 1, 1975, p. 84-92. 21 refs. In Russian.

The amplitude and shape of rod photoresponses in frogs (*Rana ridibunda*) are investigated for different values of light stimulation intensity, duration, wavelength, and diameter of light spots on the retina, using intracellular recording of the evoked potentials. It is shown that an increase in light intensity results in an increase in the amplitude and a decrease in the rise time of photoresponses. An intensive light flash is seen to suppress temporarily the rod sensitivity to subsequent test flashes. For light spots of large diameter (1000-1500 microns), a delayed depolarization is observed due to the illumination of the remote surroundings of rods with possible activation of horizontal cells. The functional significance of this depolarization effect is discussed. S.D.

**A75-31050 #** Dependence of the amplitude of the components of the response evoked in the somato-sensory zone of man's cortex on the stimulus intensity (Zavisimost' amplitudy komponentov vyzvannogo otveta somato-sensornoii zony kory cheloveka ot sily razdrazheniia). M. S. Zalkind, A. V. Naidel', and E. I. Koz'mian (Akademiia Nauk SSSR, Institut Problem Peredachi Informatsii, Moscow, USSR). (*Simpozium po Fiziologii Sensornykh Sistem - Fiziologiya Zreniia, 2nd, Leningrad, USSR, Fall 1973.*) *Neurofiziologiya*, vol. 7, no. 1, 1975, p. 93-96. 8 refs. In Russian.

**A75-31094** Responses of medial reticular neurons to stimulation of the vestibular nerve. B. W. Peterson (Rockefeller University, New York, N.Y.), M. Filion (Université Laval, Quebec, Canada), L. P. Fempel (Texas, University, San Antonio, Tex.), and C. Abzug (Maryland, University, Baltimore, Md.). *Experimental Brain Research*, vol. 22, Apr. 24, 1975, p. 335-350. 27 refs. Grant No. NIH-NS-02619.

Vestibular nerve stimulation evoked firing of about one-third of the reticular neurons studied and produced EPSPs or IPSPs in approximately three-fourths of the same group. The shortest-latency PSPs thus evoked had properties suggesting a disynaptic production pathway. Reticular neurons often received convergent input from vestibular nerves, pericruciate cortex and several cutaneous points. S.J.M.

**A75-31095** Spatial and temporal properties of 'sustained' and 'transient' neurones in area 17 of the cat's visual cortex. H. Ikeda and M. J. Wright (St. Thomas' Hospital, London, England). *Experimental Brain Research*, vol. 22, Apr. 24, 1975, p. 363-383. 42 refs. Medical Research Council Grant No. G-973/617/B.

**A75-31096** Retinotopic distribution, visual latency and orientation tuning of 'sustained' and 'transient' cortical neurones in area 17 of the cat. H. Ikeda and M. J. Wright (St. Thomas' Hospital, London, England). *Experimental Brain Research*, vol. 22, Apr. 24, 1975, p. 385-398. 24 refs. Medical Research Council Grant No. G-973/618/13.

**A75-31097** Brightness and darkness enhancement during flicker - Perceptual correlates of neuronal B- and D-systems in human vision. S. Magnussen and A. Glad (Oslo, Universitetet, Oslo, Norway). *Experimental Brain Research*, vol. 22, Apr. 24, 1975, p. 399-413. 38 refs. Research supported by the Norwegian Research Council for Science and the Humanities.

**A75-31098** Differential responses of cat visual cortical cells to textured stimuli. P. Hammond and D. M. MacKay (Keele, University, Keele, Staffs., England). *Experimental Brain Research*, vol. 22, Apr. 24, 1975, p. 427-430. 7 refs.

**A75-31115 \*** Precambrian paleobiology - Problems and perspectives. J. W. Schopf (California, University, Los Angeles, Calif.). In: Annual review of earth and planetary sciences. Volume 3. Palo Alto, Calif., Annual Reviews, Inc., 1975, p. 213-249. 129 refs. NSF Grant No. GB-37257; Grant No. NGR-05-007-407.

The limitations of the early fossil record are examined, taking into account the youth of the field, the form of Precambrian microfossils preservation, and the status of organic geochemistry in Precambrian research. The Precambrian fossil record is considered, giving attention to the Proterozoic I, the Proterozoic II, and the Proterozoic III. A description of the Archean record is presented. Bacterium-like microstructures are discussed along with filamentous 'microfossils', spheroidal 'microfossils', and questions regarding the evidence of Archean life. G.R.

**A75-31151** Predictive validities of several clinical color vision tests for aviation signal light gun performance. K. N. Jones, J. A. Steen, and W. E. Collins (Oklahoma, University, Norman; FAA, Civil Aeromedical Institute, Oklahoma City, Okla.). *Aviation, Space, and Environmental Medicine*, vol. 46, May 1975, p. 660-667. 10 refs.

**A75-31152** Effect of aerosolized dipalmitoyl lecithin on oxygen-toxic rat lungs. J. B. Brodsky (Harvard University; Beth Israel Hospital, Boston, Mass.). *Aviation, Space, and Environmental Medicine*, vol. 46, May 1975, p. 668-670. 12 refs. Grants No. NIH-GM-15904; No. NIH-HL-05422.

The present study finds that administration of aerosolized dipalmitoyl lecithin (DPL), a pulmonary surfactant, has no effect on resistance to oxygen toxicity in rats. This result implies that the initial pathological response of oxygen at atmospheric pressure (OAP) is capillary endothelial damage leading to transudation of fluid into alveoli, with ensuing inactivation of surfactant already present. The finding runs counter to previous non-in vivo or non-OAP studies, which indicate that a deficiency of active surfactant is due to a decrease in production of surface-active material.

S.J.M.

**A75-31153 \*** +Gz tolerance in man after 14-day bedrest periods with isometric and isotonic exercise conditioning. J. E. Greenleaf, R. F. Haines, H. Sandler (NASA, Ames Research Center, Biomedical Research Div., Moffett Field, Calif.), E. M. Bernauer (NASA, Ames Research Center, Biomedical Research Div., Moffett Field; California, University, Davis, Calif.), J. T. Morse (NASA, Ames Research Center, Biomedical Research Div., Moffett Field; California State University, Sacramento, Calif.), R. Armbruster, L. Sagan (NASA, Ames Research Center, Biomedical Research Div., Moffett Field; Palo Alto Medical Clinic, Palo Alto, Calif.), and W. van Beaumont (NASA, Ames Research Center, Biomedical Research Div., Moffett Field, Calif.; St. Louis University, St. Louis, Mo.). *Aviation, Space, and Environmental Medicine*, vol. 46, May 1975, p. 671-678. 31 refs.

The effects of isometric and isotonic exercise training on post-bedrest +Gz tolerance were determined. In general, 14-day bedrest resulted in a significant loss of Gz tolerance, as previously discovered. At 2.1 Gz, neither the isometric nor the isotonic exercises regimens resulted in a significant increase in post-bedrest Gz tolerance. However, following isometric exercise, restoration of about half the tolerance decrement occurred at 3.2 Gz and 3.8 Gz. Possible reasons for this partial restoration of tolerance are put forward.

S.J.M.

**A75-31154 \*** Physiological response to exercise after space flight - Apollo 14 through Apollo 17. J. A. Rummel, C. F. Sawin, M. C. Buderer, D. G. Mauldin, and E. L. Michel (NASA, Johnson Space Center, Biomedical Research Div., Houston, Tex.). *Aviation, Space, and Environmental Medicine*, vol. 46, May 1975, p. 679-683. 10 refs.

Submaximal exercise stress tests were conducted preflight and postflight on the Apollo 14-17 crewmen. A bicycle ergometer was utilized to evoke target heart rates up to 160 beats/min while respiratory gas exchange, blood pressure, and cardiac output were measured. Three preflight tests were conducted during the month prior to flight to establish baseline values for postflight comparisons. Tachycardia was evidenced at rest and during exercise immediately postflight. This transitory tachycardia compensated for reduced stroke volume. Systolic blood pressure was reduced during exercise stress, but no consistent changes were observed in diastolic blood pressure. With the exception of the Apollo 15 crewmen, all crewmen had returned to preflight response levels by the day following recovery. No changes were observed in mechanical or respiratory efficiency immediately postflight.

(Author)

**A75-31155** Collagen metabolism in rat lungs during chronic intermittent exposure to oxygen. M. Valimaki, K. Juva, J. Rantanen, T. Ekfors, and J. Niinikoski (Turku, University, Turku, Finland). *Aviation, Space, and Environmental Medicine*, vol. 46, May 1975, p. 684-690. 24 refs. Research supported by the Emil Aaltonen Foundation of Finland; Grant No. DA-ERO-124-74-G0011.

**A75-31156** Control of health hazards from airborne lasers. D. H. Sliney (U.S. Army, Environmental Hygiene Agency, Aberdeen Proving Ground, Md.) and R. Yacovissi (U.S. Navy, Industrial Environment Health Center, Cincinnati, Ohio). *Aviation, Space, and Environmental Medicine*, vol. 46, May 1975, p. 691-696. 11 refs.

The use of lasers in tactical military aircraft present eye hazards to personnel in aircraft and on the ground. Biomedical scientists and engineers are often asked for advice for controlling these hazards. Methods are given for applying ocular exposure criteria to the solution of practical field safety problems. Laser pointing accuracy and the extent of hazardous specular reflections from flat glass and from standing areas of water are the principal determinations required to develop safe laser operations. Special considerations may be required for scanning lasers and laser arrays.

(Author)

**A75-31157 \*** Response of local vascular volumes to lower body negative pressure stress. R. A. Wolthuis, A. LeBlanc, W. A. Carpentier, and S. A. Bergman, Jr. (NASA, Johnson Space Center, Cardiovascular Research Laboratory; Baylor College of Medicine, Houston, Tex.). *Aviation, Space, and Environmental Medicine*, vol. 46, May 1975, p. 697-702. 15 refs. Contracts No. NAS9-11785; No. NAS9-13291.

The present study involved an intravenous injection of radio-active iodinated serum albumin, equilibration of this isotope within the vascular space, and the continuous measurement of isotope activity over selected anatomical areas before, during and following multiple human LBNP tests. Both rate and magnitude of vascular pooling were distinctly different within each of five selected lower body anatomical areas. In the upper body, all areas except the abdomen showed depletions from their resting vascular volumes during LBNP. The presence of uniquely different pooling patterns in the lower body, the apparent stability of abdominal vascular volumes, and a possible decrease in cerebral blood volume during LBNP represent the major findings of this study.

(Author)

**A75-31158** Tolerance of small animals to acceleration. E. U. Chae (Kyungpook National University, Taegu, South Korea). *Aviation, Space, and Environmental Medicine*, vol. 46, May 1975, p. 703-708.

Tolerance to +Gz, -Gz, and -Gx inertial forces due to acceleration was investigated in mice, rats, rabbits, finches, pigeons, and roosters. The average tolerance ratio of -Gz to +Gz was 0.58, while the tolerance ratio of -Gx to +Gz was 2.12. Body weight was inversely related to the threshold G value that was tolerated with prolonged acceleration (up to 20 min).

S.J.M.

**A75-31159** Flight behaviour of pigeons in the weightless phase of parabolic flight. W. J. Oosterveld and A. J. Greven (Amsterdam, Universiteit, Amsterdam, Netherlands). *Aviation, Space, and Environmental Medicine*, vol. 46, May 1975, p. 713-716. 22 refs.

Pigeons were subjected to changes in G-loading during parabolic flight with special attention to their flight behavior in the weightless periods. Experiments were performed (1) with the eyes covered, (2) with the legs tied to the body, (3) with eyes covered and legs tied, and (4) with none of these handicaps. In all these situations the flight behavior of the birds was observed. Special attention was paid to the tumble-phenomenon, which appeared in birds with covered eyes. The results are discussed and comparisons are made with the behavior of man and fish under similar conditions.

(Author)

**A75-31160** Effect of noise exposure during primary flight training on the conventional and high-frequency hearing of student pilots. R. M. Robertson and C. E. Williams (U.S. Naval Aerospace Medical Center, Aerospace Medical Research Laboratory, Pensacola, Fla.). *Aviation, Space, and Environmental Medicine*, vol. 46, May 1975, p. 717-724. 7 refs. Contract No. N00014-71-C-0354.

**A75-31161** Reduced carbohydrate intake in the preparatory diet and the reliability of the oral glucose tolerance test. R. O. Hughes (USAF, School of Aerospace Medicine, Brooks AFB, Tex.). *Aviation, Space, and Environmental Medicine*, vol. 46, May 1975, p. 725-728. 16 refs.

Two USAF flying populations of 622 subjects each were subjected to the oral glucose tolerance test. One of these populations was prepared for the test by the ingestion of at least 300 grams per day (g/d) of dietary carbohydrate for the 3 d preceding the test; the other by 150 g/d of dietary carbohydrate. Statistical analysis of the data obtained from these populations revealed no change in the reliability of the oral glucose tolerance test as a diagnostic tool. The preparatory diet containing the lesser amount of carbohydrate is now being used by the USAF School of Aerospace Medicine Consultation Service on all patients undergoing oral glucose tolerance tests.

(Author)

**A75-31162** Interpretation of an abnormal oral glucose tolerance test encountered during multiphasic laboratory screening. R. G. Troxler, J. F. Trabal, and M. C. Lancaster (USAF, School of Aerospace Medicine, Brooks AFB, Tex.). *Aviation, Space, and Environmental Medicine*, vol. 46, May 1975, p. 729-735. 40 refs.

A study of oral glucose tolerance test (OGTT) results is reported which shows that the reproducibility of this test is limited to 50%, becoming even lower with certain diagnostic criteria. It was also found that a fasting plasma glucose of 130 mg/dl or greater was as accurate an indicator of persistent carbohydrate intolerance as a 2-h GTT. It is concluded that the diagnosis of chemical diabetes in adults should never be made on the basis of a single GTT, and that it should be confirmed by demonstrating hyposecretion of insulin according to the method of Genuth.

S.J.M.

**A75-31163** Proposal for improving ejection seats with respect to sitting comfort and ejection posture. A. Beck (Bundesministerium der Verteidigung, Luftwaffe, Flugmedizinisches Institut, Fürstenfeldbruck, West Germany). *Aviation, Space, and Environmental Medicine*, vol. 46, May 1975, p. 736-739. 11 refs.

**A75-31164** Hearing in para-airport children. W. S. Andrus, M. E. Kerrigan, and K. T. Bird (Massachusetts General Hospital, Boston, Mass.). *Aviation, Space, and Environmental Medicine*, vol. 46, May 1975, p. 740-742.

Audiometric screening was carried out on 3,322 elementary and high school students living in the vicinity of Logan International Airport, Boston, in an effort to determine whether noise from aircraft had any measurable effect on their hearing. Follow-up examinations and additional data on children failing the screening examination made it possible to classify the hearing losses as conductive, sensorineural, or mixed. The incidence of bilateral sensorineural or mixed hearing loss in the group living directly under flight paths or immediately adjacent to runways was not significantly different from the overall average. In normal subjects, the average sensorineural gap, a newly defined measure of high-tone loss, was not found to be significantly affected by the degree or duration of exposure to aircraft noise.

(Author)

**A75-31194** Clinical application of a second generation electrocardiographic computer program. H. V. Pipberger, D. McCaughan, D. Littmann, H. A. Pipberger, J. Cornfield, R. A. Dunn, C. D. Batchlor, and A. S. Berson (U.S. Veterans Administration

Hospital; George Washington University, Washington, D.C.; U.S. Veterans Administration Hospital, West Roxbury; Harvard University, Boston, Mass.). *American Journal of Cardiology*, vol. 35, May 1975, p. 597-608. 37 refs. Grants No. NIH-HL-15047; No. NIH-HL-15191.

An electrocardiographic computer program based on multivariate analysis of orthogonal leads was applied to records transmitted between two hospitals. A Bayesian classification procedure was used to compute probabilities for all diagnostic categories that might be encountered in a given record. Computer results were compared with interpretations of conventional 12-lead tracings. It was found that 86% were classified correctly by computer, as compared with 68% by the conventional method. The most marked improvement in diagnostic accuracy occurred in cases of hypertensive cardiovascular disease or chronic obstructive lung disease.

S.J.M.

**A75-31256 #** On certain mechanisms of the appearance of the trace-type muscular bioelectric activity. E. V. Kisselkova and V. I. Georgiev (Vissh Institut za Fizkultura, Sofia, Bulgaria). *Bolgarskaia Akademiia Nauk, Doklady*, vol. 28, no. 3, 1975, p. 403-406. 5 refs.

The mechanism for the emergence of trace-type muscular bioelectric activity was investigated by studying its appearance and the nature of its changes not only after physical loading, but under conditions of hypoxia as well. Evidence was found for the existence, under hypoxic conditions, of bioelectric activity synchronous with respiration - activity recorded from the muscles of the extremities, although they had not been involved in the performance of any physical work.

P.T.H.

**A75-31257 #** A determination of maximum anaerobic muscular power, and its meaning as a functional evaluation test (Determinazione della massima potenza muscolare anaerobica e suo significato come prova di valutazione funzionale). P. Rota. *Rivista di Medicina Aeronautica e Spaziale*, vol. 37, Jan.-June 1974, p. 21-31. In Italian.

Thirty military aviators, trained in different specialties of light athletics, were subjected to a test of maximum anaerobic muscular power after the method of Margaria et al. Values obtained concerning total maximum power and maximum power per unit body weight are compared with athletic results; in addition, a behavioral correlation is attempted. The test is shown to be useful as a means of selecting subjects assigned to work or to athletic activities when exceptional muscular expenditure is required in a short time.

S.J.M.

**A75-31258 #** Some considerations on errors in flight (Considerazioni sugli errori in volo). P. Sparvieri. *Rivista di Medicina Aeronautica e Spaziale*, vol. 37, Jan.-June 1974, p. 32-59. 50 refs. In Italian.

After having defined flight error as a disorganization of higher mental activity, the present work describes the main types of error found in flight. A large part of them can be explained by a confabulatory and contaminatory mechanism which gives an intuitive, childish aspect to the thought. It is observed that thoughts of this kind appear either under stress conditions or in persons especially prone to produce them. Therefore a method of flight error prevention based on the selection of nonprone individuals by perceptual analytic methods is proposed.

S.J.M.

**A75-31259 #** Perceptual analysis under tachistoscopic conditions (Analisi percettiva in condizioni tachistoscopiche). F. Sparvieri. *Rivista di Medicina Aeronautica e Spaziale*, vol. 37, Jan.-June 1974, p. 60-70. 7 refs. In Italian.

A group of fifty student pilots was subjected to Zulliger's test

under tachistoscopic and normal conditions. Tachistoscopic results were compared with a group of findings on fifty first-grade children under normal conditions. It was found that thought was less rationalized in the pilots under tachistoscopic than under normal conditions, and that the former type of thought was as unrationalized as that observed in the group of children. S.J.M.

**A75-31260 #** Vertebral lesions caused by ejection with ejection seats - Mechanism, diagnosis, results and means of prevention. I (Lesioni vertebrali da eiezione con seggiolino catapultabile - Meccanismo, diagnosi, esiti e mezzi di prevenzione. I). G. Rotondo (Aeronautica Militare, Istituto Medico Legale, Milan, Italy). *Rivista di Medicina Aeronautica e Spaziale*, vol. 37, Jan.-June 1974, p. 71-88. In Italian.

**A75-31261 #** Otorhinolaryngological syndromes in aeronautics. I (Sindromi otorinolaringoiatriche in aeronautica. I). C. Koch (Aeronautica Militare, Servizio di Sanità, Italy). *Rivista di Medicina Aeronautica e Spaziale*, vol. 37, Jan.-June 1974, p. 89-98. In Italian.

**A75-31294 #** Emotional stress of helicopter crewmembers in flights of diverse complexity (Emotsional'noe napriazhenie u chlenov ekipazhei vertoletov v poletakh razlichnoi slozhnosti). E. V. Bondarev, V. A. Egorev, V. A. Kolosov, and V. G. Ovchinnikov. *Voenna-Meditsinskii Zhurnal*, Feb. 1975, p. 54-56. In Russian.

Cardiovascular reactions of flight commanders, navigators, and engineers are investigated for various tasks under different levels of emotional stress. It is shown that the emotional stress level of each crewmember is determined both by the nature of the task to be performed and by the individual responsibility of each performer for the execution of his task. Emotional stress is found to be more pronounced in flight commanders during take-off and landing, and in flight engineers during loading and unloading of the helicopter under hovering conditions. S.D.

**A75-31295 #** Experimental application of nomograms to the evaluation of the functional capacity of the blood circulation system (Opyt primeneniia nomogramm dlia otsenki funktsional'noi sposobnosti apparata krovoobrashcheniia). A. P. Smirnov. *Voenna-Meditsinskii Zhurnal*, Feb. 1975, p. 60-63. In Russian.

Time-saving accurate nomograms for calculating systolic discharge of the heart and cardiac output are developed on the basis of Starr's formulas. The application of the systolic volume nomogram to the study of patients suffering from neurasthenia and neurocirculatory dystonia shows that the systolic discharge of the heart is directly proportional to systolic pressure and inversely proportional to patient's age and diastolic pressure. A combination of arterial blood pressure and systolic volume is expected to yield enough data to ensure a better evaluation of the functional capacity of the myocardium. The minute volume diagram for cardiac output is found to yield data within 3% error as compared to data obtained from calculations of oxygen consumption. S.D.

**A75-31296 #** Post-traumatic condition of the spine in middle-age pilots (Posttravmaticheskoe sostoianie pozvonochnika u letchikov starshikh vozrastov). N. V. Tangaev, E. B. Rubin, B. S. Khinskaia, and S. I. Tangaeva. *Voenna-Meditsinskii Zhurnal*, Feb. 1975, p. 67, 68. In Russian.

Flying personnel aged 35 to 40 were submitted to clinical and X-ray examinations of the spine. Only X-ray investigation made it possible to reveal, in 75% of the cases studied, pathological changes in the spine, including spinal fractures which had occurred in the past. Most of the changes were localized in the lumbar and thoracic regions of the spine, in isolation or in combination with other regions. Spinal fractures were found to be associated with deformed spondylosis. Traumatic factors involved in spinal injury are indicated.

It is concluded that X-ray examination of flying personnel and trainees is a prophylactic tool for the diagnosis of spinal injuries. S.D.

**A75-31575** A mathematical model of the ventilatory control system to carbon dioxide with special reference to athletes and nonathletes. J. Stegemann, P. Seez, W. Kremer, and D. Böning (Deutsche Sporthochschule, Cologne, West Germany). *Pflügers Archiv*, vol. 356, no. 3, 1975, p. 223-236. 21 refs. Deutsche Forschungsgemeinschaft Grant No. Ste-93/7.

**A75-31650** The oxygen pressure histogram in the left ventricular myocardium of the dog. B. Lössle, S. Schuchhardt, and N. Niederle (Max-Planck-Institut für Systemphysiologie, Dortmund, West Germany). *Pflügers Archiv*, vol. 356, no. 2, 1975, p. 121-132. 32 refs.

The relation of myocardial P-O<sub>2</sub> to arterial and coronary venous P-O<sub>2</sub> was investigated in dogs by open-chest polarography. There is a wide range of P-O<sub>2</sub> in the myocardium, averaging at 19.3 torr. Neither the shape of the histogram nor the mean coronary venous P-O<sub>2</sub> are significantly changed under moderate arterial hypoxemia; increases in arterial P-O<sub>2</sub> to more than 300 torr cause no distinct change in coronary venous P-O<sub>2</sub>, whereas myocardial P-O<sub>2</sub> shows heterogeneous reactions; and myocardial as well as coronary venous P-O<sub>2</sub> are well-regulated over a broad spectrum of arterial P-O<sub>2</sub>. S.J.M.

**A75-31748 #** A rapid technique for visualizing the structure of a microwave field (Ekspress-metod vizualizatsii struktury SVCh polia). V. V. Sevast'ianov. *Voenna-Meditsinskii Zhurnal*, Dec. 1974, p. 53-57. 8 refs. In Russian.

A rapid visual technique is developed for interpreting the near-field microwave energy distribution in areas where radio engineers are compelled to work. The technique makes use of a thermoreactive paper containing cobalt chloride to convert the electromagnetic energy into a corresponding temperature field owing to thermoelectric losses in the thermoreactive substance exposed to radiation. It is shown that the proposed technique is a simple and reliable tool for evaluating, from a hygienic standpoint, the characteristics of microwave action on a human organism located in the vicinity of a radiator. The technique is also well suited for studying diffraction at holes in metallic screens of microwave devices and at the edges of metallic test-wafers that simulate metal inclusions in the organism exposed to radiation. S.D.

**A75-31749 #** Central regulation of vascular tonus in pilots (O tsentral'noi reguliatsii sosudistogo tonusa u letchikov). B. I. Parmenov-Trifilov and L. I. Starikov. *Voenna-Meditsinskii Zhurnal*, Dec. 1974, p. 58-60. In Russian.

Cardiovascular and biochemical investigation of middle-age pilots (aged 30 to 40) suffering from hypertonic-type neurocirculatory dystonia. It is shown that disorders in vascular tonus regulation are due to changes in the functional state of the formations in the brain stem. Repeated emotional stresses imparted to the autonomic nervous system bring about a state of systemic stimulation which is accompanied by changes in the neuromediator metabolism of the organism, predominance of subcortical adrenergic and cholinergic structures, functional disorder of the vasomotor center, and increase in the excitability and bioelectric activity of the cardiovascular system. S.D.

**A75-31750 #** Objective determination of light sensitivity of the eye (Ob'ektivnoe opredelenie svetovoi chuvstvitel'nosti glaz). N. N. Guseinov. *Voenna-Meditsinskii Zhurnal*, Dec. 1974, p. 70-73. In Russian.

A technique is proposed for the exact evaluation of eye dark adaptation by recording the initiation of optokinetic nystagmus at



threshold illumination of a moving tape. The design and principles of operation of the proposed adaptometer are described. The behavior of eye sensitivity under different conditions of dark adaptation is examined. It is shown that the technique presented yields reliable results for the examination of eye sensitivity to light both in normal and pathological subjects. S.D.

**A75-31838 #** Formation of image memory in puppies through vestibular and vestibular-kinesthetic perceptions (O razvitií obraznoi pamiati u shchenkov na vestibularnyye i vestibularno-kinesteticheskie vospriiatiia). T. D. Dzhevishvili and I. M. Aivazashvili (Akademiia Nauk Gruzinskoi SSR, Institut Fiziologii, Tiflis, Georgian SSR). *Akademiia Nauk SSSR, Doklady*, vol. 221, Mar. 11, 1975, p. 502-504. 8 refs. In Russian.

**A75-31847 #** Health-protection measures in agricultural aviation (Gesundheitsschutz bei aviochemischen Arbeiten). H. Hohenwald (Ministerium für Verkehrswesen, Berlin, East Germany). *Technisch-ökonomische Information der zivilen Luftfahrt*, vol. 11, no. 1, 1975, p. 52-55. 15 refs. In German.

Operations related to the application of pesticides to agricultural crops by aircraft present certain dangers in connection with a possible exposure of the personnel to the effects of toxic substances contained in the pesticides. The persons who have to be protected include the pilot and employees who are concerned with the loading and the preparation of the aircraft. Protective measures are related to a close medical supervision of the persons involved and to the reduction and elimination of exposure hazards by various approaches. G.R.

**A75-32099 #** Application of facility location techniques to the optimization of visual display designs. T. P. Cullinane (Notre Dame, University, Notre Dame, Ind.) and C. C. Wagner, Jr. (Alabama, University, Huntsville, Ala.). *Operations Research Society of America and Institute of Management Sciences, National Meeting, Chicago, Ill., Apr. 30-May 2, 1975, Paper*. 16 p. 13 refs.

The problem of optimally locating  $N$  dials to  $N$  fixed locations in a visual display is in many ways similar to the problem of assigning a finite number of facilities to a finite number of candidate locations. It is the purpose of this paper to apply models and techniques developed specifically for solving facilities layout and location problems to the problem of optimally locating dials in a visual display. The assumption of a one to one match between dials and candidate locations is made and conditions under which these models can be feasibly applied are specified. (Author)

**A75-32371** Changing effect of lung volume on respiratory drive in man. N. N. Stanley, M. D. Altose, S. G. Kelsen, C. F. Ward, and N. S. Cherniack (Pennsylvania, University, Philadelphia, Pa.). *Journal of Applied Physiology*, vol. 38, May 1975, p. 768-773. 18 refs. Grant No. NIH-HL-08805.

Experiments were conducted on human subjects to study the effect of lung inflation during breath holding on respiratory drive. Two series of experiments were performed: the first to examine respiratory drive during a single breath hold, the second designed to examine the sustained effect of lung inflation on subsequent breath holds. The experiments involved breath holding begun either at the end of a normal expiration or after a maximum inspiration. When breath holding was repeated at 10-min intervals, the increase in BHT produced by lung inflation was greater in short breath holds (after CO<sub>2</sub> rebreathing) than in long breath holds (after hyperventilation). If breath holds were made in rapid succession, the first breath hold was much longer when made at total lung capacity than at functional residual capacity, but this effect of lung inflation diminished in subsequent breath holds. It is concluded that the inhibitory effect of lung inflation decays during breath holding and is regained remarkably slowly during the period of breathing immediately after breath holding. (Author)

**A75-32372 \*** Constant-load versus heart rate-targeted exercise - Responses of systolic intervals. V. Q. Lance (Lemuel Shattuck Hospital, Boston, Mass.) and D. H. Spodick (Tufts University, Boston, Mass.). *Journal of Applied Physiology*, vol. 38, May 1975, p. 794-800. 31 refs. Grant No. NGR-22-012-026.

Various systolic intervals were measured prior to and during heart rate-targeted bicycle ergometer exercise. There were striking similarities within each matched exercise set for Q-Tm, isovolumetric contraction time, prejection period (PEP), and PEP/left ventricular ejection time (LVET). LVET was significantly shorter for rate-targeted exercise. It is concluded that either constant-load or rate-targeted bicycle ergometry may be used with the choice of method determined by the purpose of the protocol, and that systolic intervals (except LVET) should not be much altered owing to the method chosen. S.J.M.

**A75-32373** Cardiac performance during graded exercise in acute hypoxia. S. C. Manchanda, J. T. Maher, and A. Cymerman (U.S. Army, Research Institute of Environmental Medicine, Natick, Mass.). *Journal of Applied Physiology*, vol. 38, May 1975, p. 858-862. 30 refs.

Exposure to simulated high altitude (HA) produced only a small increase in various cardiocirculatory performance parameters when compared to sea level (SL) during moderately heavy exercise. Plasma catecholamines (CATS) were also determined from venous blood during the tests; there was a twofold increase in CATS during moderately heavy exercise at HA relative to SL. It is postulated that the depressant effect of increased hypoxemia and acidosis during moderately heavy exercise at HA may override the cardiostimulatory influence of circulating CATS. S.J.M.

**A75-32374** Effect of chronic hypercapnia on body temperature regulation. K. E. Schaefer, A. A. Messier, C. Morgan, and G. T. Baker, III (U.S. Navy, Naval Submarine Medical Research Laboratory, Groton, Conn.). *Journal of Applied Physiology*, vol. 38, May 1975, p. 900-906. 35 refs.

Guinea pigs and rats exposed to 15% CO<sub>2</sub> for 7 days showed a parallel time course of changes in pH, body temperature (T<sub>b</sub>), and oxygen consumption (VO<sub>2</sub>). Skin blood content (heat loss) also exhibited a pH-dependent time course. The behavior of T<sub>b</sub> was found to be a good indicator of the acid-base status and adaptive potential of the animals to hypercapnia. A decrease in norepinephrin content of the hypothalamus occurred during 24 hr exposure to 15% CO<sub>2</sub>; serotonin content also increased slightly in this period. With prolonged exposure to 3% CO<sub>2</sub> for 7 days, T<sub>b</sub> showed a transient rise and VO<sub>2</sub> was slightly elevated. S.J.M.

**A75-32377 #** The multiplicity of potential living systems based on C.H.O.N. P. M. Molton (Maryland, University, College Park, Md.). *British Interplanetary Society, Journal*, vol. 28, June 1975, p. 392-398. 15 refs.

Chemical evolution on the primitive earth occurred in the continuous presence of water. Hence, a Strecker synthesis route for alpha-amino acid formation is most likely to have occurred. On some planets, such as Jupiter, the initial formation of nitriles occurs in the atmosphere in the absence of water. Water is present for the subsequent step of nitrile hydrolysis, and so any form of life on Jupiter seems likely to be based on beta-amino acids. If water is permanently frozen out (as for instance on the Jovian satellites), chemical evolution should lead to unsaturated nitrile polymer formation. Where water is frozen out and ammonia is in excess, several further possibilities exist for life based on amino acid amides, alpha-aminoamides, and related compounds. None of these life forms are theoretically impossible, although only one - our own - is definitely known to exist. (Author)

## STAR ENTRIES

**N75-21920\*#** National Aeronautics and Space Administration, Goddard Space Flight Center, Greenbelt, Md.  
**GODDARD EARTH MODELS (5 AND 6)**  
 Francis J. Lerch, Carl A. Wagner, James A. Richardson (Computer Science Corp., Silver Spring, Md.), and Joseph E. Brown (Computer Science Corp., Silver Spring, Md.) Dec. 1974 238 p refs Submitted for publication (NASA-TM-X-70868; X-921-74-145) Avail: NTIS HC \$7.50 CSCL 08E

A comprehensive earth model has been developed that consists of two complementary gravitational fields and center-of-mass locations for 134 tracking stations on the earth's surface. One gravitational field is derived solely from satellite tracking data. This data on 27 satellite orbits is the most extensive used for such a solution. A second solution uses this data with 13,400 simultaneous events from satellite camera observations and surface gravimetric anomalies. The satellite-only solution as a whole is accurate to about 4.5 milligals as judged by the surface gravity data. The majority of the station coordinates are accurate to better than 10 meters as judged by independent results from geodetic surveys and by Doppler tracking of both distant space probes and near earth orbits. Author

**N75-21921\*#** National Aeronautics and Space Administration, Goddard Space Flight Center, Greenbelt, Md.  
**IMPROVED METHOD OF DETECTING AND COUNTING BACTERIA Patent Application**  
 Grace L. Picciolo and Emmett W. Chappelle, inventors (to NASA) Filed 5 Mar. 1975 21 p (NASA-Case-GSC-11917-2; US-Patent-Appl-SN-555641) Avail: NTIS HC \$3.25 CSCL 06M

An improved method is provided for determining bacterial levels, especially in samples of aqueous physiological fluids. The method depends on the quantitative determination of bacterial adenosine triphosphate (ATP) in the presence of nonbacterial ATP. Bacterial ATP is released by cell rupture and is measured by an enzymatic bioluminescent assay. A concentration technique is included to make the method more sensitive. It is particularly useful where the fluid to be measured contains an unknown or low bacteria count. NASA

**N75-21922#** Texas A&M Univ., College Station. Dept. of Biology.

### **SUBLETHAL EFFECTS OF OIL, HEAVY METALS AND PCBs ON MARINE ORGANISMS**

J. W. Anderson, J. M. Neff, and S. R. Petrocelli 1974 48 p refs Presented at The Mechanisms of Survival in Toxic Environments Symp., Dec. 1974 (Grants NSF GX-37344; NSF GX-37347) (PB-238514/4) Avail: NTIS HC \$3.75 CSCL 08A

The sublethal effects of three major classes of pollutants commonly found in the estuarine environment are studied. Heavy metals and chlorinated hydrocarbons are in general accumulated

to a greater extent and bound to organisms much more firmly than petroleum hydrocarbons. Retention of petroleum derived hydrocarbons by animals in clean water may vary from several days to approximately two months, and is species dependent. The class of petroleum hydrocarbons accumulated to the greatest extent and retained the longest is the naphthalenes. Inorganic mercury, Aroclor 1254 and petroleum hydrocarbons have been shown to affect the respiratory rate and chloride ion regulation of selected marine animals. GRA

**N75-21923#** School of Aerospace Medicine, Brooks AFB, Tex.  
**CIRCULATING RED CELLS IN RATS WITH SIMILAR TISSUE PO2 BUT DIFFERING PCO2 Final Report, Jan. 1971 - Dec. 1972**

William E. Pepelko Sep. 1974 12 p refs (AF Proj. 7164)

(AD-A003432; SAM-TR-74-31) Avail: NTIS CSCL 06/19

To investigate the effect of CO2 upon erythropoiesis, adult female rats were exposed to 1 of 3 gaseous environments designed to produce similar tissue PO2, but widely differing PCO2. Tissue PCO2 was varied from 38 to 69 torr, while PO2 averaged near 22 torr. Inspired PO2 of the nonhypercapnic rats approximated that found at 11,000-ft. altitude. Tissue PO2 and PCO2 were estimated from measurements of subcutaneous-gas-pocket contents. Hematocrit and circulating red cell volume were significantly (P .001) greater in two hypercapnic groups as compared with those inspiring no CO2 after 40 days of continuous exposure. Reticulocyte counts were greater in two hypercapnic groups after four days of exposure (P .001), but not after 40 days. The conclusion is that when tissue PO2 was held constant, additional CO2 increased the circulating red cells. GRA

**N75-21924** Washington Univ., Seattle.

### **A DYNAMIC VISCOELASTIC ANALYSIS OF THE HUMAN HEAD Ph.D. Thesis**

Krishan Kishore Wahi 1974 210 p

Avail: Univ. Microfilms Order No. 75-4061

Indications of trauma manifested by stress levels which could generate neuron darkening and higher level tensile waves are investigated through the use of digital computer solutions. The head is modeled as a body of revolution and as a body with translational symmetry. The models are analyzed using a two dimensional Lagrangian finite difference digital computer solution. The skull is modeled with two layers of hard bone and a central layer of soft bone. The brain material is modeled both as a perfect fluid and as a viscoelastic material. The viscoelastic model gives results that show significantly lower (about 35%) compression and rarefaction levels in the brain for both high and low level loading. Locations of possible brain trauma are identified. Comparisons are made between the experimental results and the computer solutions. Dissert. Abstr.

**N75-21925** Pennsylvania Univ., Philadelphia.

### **STUDIES ON THE MULTIPLICITY AND ENTRAINMENT OF CIRCADIAN OSCILLATORS Ph.D. Thesis**

Susan Craig Edmonds 1974 82 p

Avail: Univ. Microfilms Order No. 75-2724

A system of multiple oscillators underlies the circadian system in mammals. In an animal entrained to a 24 hour light-dark (LD) cycle, many different physiological and behavioral variables maintain the same 24 hour periodicity, but differ in phase. The current studies were designed to investigate what kinds of internal coupling among oscillators, and external couplings with environmental events might produce such an outcome. In both studies, rats were used as subjects, and running wheel activity was the dependent variable. The first experiment demonstrated that periodic food access can be a powerful entrainer of circadian activity rhythms in the rat. In the second experiment, rats were housed in constant light, and the only regular environmental events were two periodic feedings. The activity patterns which resulted indicated that circadian activity rhythms in the rat are controlled by at least two separate oscillators. Dissert. Abstr.

**N75-21926** Florida Univ., Gainesville.  
**SEMI-AUTOMATIC DETECTION AND ANALYSIS OF RAPID EYE MOVEMENT PATTERNS IN HUMAN SLEEP** Ph.D. Thesis

Periklis Yiannis Ktonas 1974 396 p  
 Avail: Univ. Microfilms Order No. 75-3502

The recording, detection and analysis of rapid eye movement (REM) patterns in human sleep is reported. Emphasis is placed on the detailed description and evaluation of a modified version of an existing special electronic system for the automatic detection of REMs, as well as on the detailed description and evaluation of a software, man-machine interactive package interfacing this automatic detection system to a small, general purpose digital minicomputer for the further processing of the REM detection times in search of an effective modeling and quantification of REM patterns. Dissert. Abstr.

**N75-21927** Florida Univ., Gainesville.  
**ASPECTS OF ULTRADIAN RHYTHMS IN MAN** Ph.D. Thesis

Peretz Lavie 1974 197 p  
 Avail: Univ. Microfilms Order No. 75-3503

Three related experiments were conducted in order: (1) to explore the relationship between the REM-NONREM cycle and the waking cycle in the perception of the spiral after-effect (SAE); (2) to assess the influence of interruptions of REM and NONREM sleep on the perception of the beta movement; and (3) to compare the possible cyclicity in perception of the beta M during waking with the cyclicity in the perception of the SAE. Subjects awakened from REM sleep revealed perceptual cycles out of phase with respect to the perceptual cycles of Ss awakened from NONREM sleep. The results were interpreted to support the accumulated data for the existence of a waking ultradian biorhythm which is synchronized with that of the REM-NONREM cycle. Dissert. Abstr.

**N75-21928\*** Texas Univ. Health Science Center, Dallas. Pauline and Adolph Weinberger Lab. for Cardiopulmonary Research.

**CARDIOVASCULAR EFFECTS OF VARIATIONS IN HABITUAL LEVELS OF PHYSICAL ACTIVITY** Final Technical Report

C. Gunnar Blomqvist and Jere H. Mitchell 22 Apr. 1975 9 p refs  
 (Grant NGR-44-012-151)

(NASA-CR-142616) Avail: NTIS HC \$3.25 CSCL 06S  
 Mechanisms involved in human cardiovascular adaption to stress, particularly adaption to different levels of physical activity are determined along with quantitative noninvasive methods for evaluation of cardiovascular function during stress in normal subjects and in individuals with latent or manifest cardiovascular disease. Results are summarized. Author

**N75-21929\*** Scientific Translation Service, Santa Barbara, Calif.  
**VARIATIONS IN INTERNAL TEMPERATURE AND HEART RATE AS A FUNCTION OF METABOLISM AND ENVIRONMENT DURING POSITIVE AND NEGATIVE WORK**

F.-A. Missenard Washington NASA Apr. 1975 10 p refs  
 Transl. into ENGLISH from Arch. Sci. Physiol. (Paris), 1973 p A263-269  
 (Contract NASw-2483)

(NASA-TT-F-16260) Avail: NTIS HC \$3.25 CSCL 06S  
 Equations are formulated for the relationships between rectal temperature, metabolism, ambient temperature and heart rate for both positive and negative physical work. When performing negative work, the cyclometer is powered by a motor and the subject brakes it with his legs. The equations were confirmed by measurements. Author

**N75-21930\*** Defence and Civil Inst. of Environmental Medicine, Downsview (Ontario). Biosciences Div.  
**CHANGES IN BODY COMPOSITION DURING AN ARCTIC WINTER EXERCISE**

W. J. OHara and C. L. Allen Nov. 1974 32 p refs  
 (DCIEM-74-R-1061) Avail: NTIS HC \$3.75

The effects of long range Arctic winter patrols on body and

urine composition were examined during a two week exercise. Each man carried 30kg of clothing and equipment, and for one third of the patrol time would assist in pulling a 180 kg cargo tobogan. During the first week of the exercise the men traversed 25,000 meter in 12 hours at a speed of 2,000 m/hour. Daily temperatures ranged from -38 F to +7 F with a mean of -20 deg F. Mean wind speed and maximum daily windchill were 16.5 mph and 2,032 Kcal/M squared/hr respectively. During the second week they covered 44,000 meter in 16 hours at a speed of 2,750 m/hour. Energy expenditure studies indicated an approximate caloric balance. The mean decrease in body weight was 1.0 kg. Skinfold thickness decreased by 38%, equivalent to a 21.9% loss of body fat. Urinalysis showed an unusually high incidence of proteinuria and ketonuria. Author

**N75-21931\*** Kanner (Leo) Associates, Redwood City, Calif.  
**THE THERMOREGULATORY SYSTEM: REGULATED SYSTEM OR SERVO SYSTEM?**

Y. Houdas and J. D. Guieu Washington NASA 29 Apr. 1975 37 p refs Transl. into ENGLISH from Arch. Sci. Physiol. (France), v. 27, 1973 p A311-A338  
 (Contract NASw-2481)

(NASA-TT-F-16256) Avail: NTIS HC \$3.75 CSCL 06P  
 Control theory is used to construct a model of the human thermoregulatory system to determine the nature of the mechanism which keeps the body at a relatively constant temperature. Findings seem to negate the set-point theory, indicating that, rather than returning its central temperature to a set point, the body instead seeks to return its instantaneous heat storage rate to zero. The system is therefore a servo system. Author

**N75-21932\*** Kanner (Leo) Associates, Redwood City, Calif.  
**THERMAL CONDUCTIVITY OF THE HUMAN BODY DURING IMMERSION AT THERMAL NEUTRALITY AND IN A COLD ENVIRONMENT**

C. Boutelier, J. Timbal, and J. Colin Washington NASA Mar. 1975 25 p refs Transl. into ENGLISH from Arch. Sci. Physiol. (Paris), v. 27, 1973 p 189-205  
 (NASA-TT-F-16258) Avail: NTIS HC \$3.25 CSCL 06S

The thermal conductivity of the body immersed in water at thermal neutrality is found to be close to that observed in air, with only slight variations between individuals and no apparent effect due to the quantity of adipose tissue. In cold water, however, conductivity does depend on the fatness or thinness of the subject, since cutaneous vasoconstriction occurs, making use of the layer of subcutaneous fat to insulate the body center from the cold. The effect of cutaneous vasoconstriction is limited, however, and the muscular region is found to contribute to peripheral insulation, a phenomenon which has been considered a characteristic of adaptation to cold. Author

**N75-21933\*** Scientific Translation Service, Santa Barbara, Calif.  
**CHANGES IN RECTAL AND CUTANEOUS TEMPERATURE DURING MUSCULAR EXERCISE PERFORMED IN AIR TEMPERATURE BETWEEN 10 DEGREES AND 30 DEGREES C**

V. Candas, J. J. Vogt, and J. P. Libert Washington NASA Apr. 1975 11 p refs Transl. into ENGLISH from Arch. Sci. Physiol. (France), v. 27, 1973 p A239-A246  
 (Contract NASw-2483)

(NASA-TT-F-16259) Avail: NTIS HC \$3.25 CSCL 06/5  
 Students were subjected to large variations in ambient temperature while performing muscular exercise (pedalling machine). Rectal and cutaneous temperatures were measured. Slight effects were found for air temperatures below 5 C and above 30 C. Author

**N75-21934\*** Scientific Translation Service, Santa Barbara, Calif.  
**CUTANEOUS CIRCULATION AND THERMAL EXCHANGE AT ALTITUDE (3800 m)**

J. Raynaud, P. Varene, H. Vieillefond, and J. Durand Washington  
 NASA Apr. 1975 11 p refs Transl. into ENGLISH from  
 Arch. Sci. Physiol. (Paris), v. 27, 1973 p A247-A254  
 (Contract NASw-2483)  
 (NASA-TT-F-16311) Avail: NTIS HC \$3.25 CSCL 06S

The effect of high altitudes upon cutaneous circulation and thermal exchange is studied. It is concluded that at high altitudes the effects of hypoxia and hypocapnia can be dissociated.

Author

**N75-21935\*** Texas Univ. Health Science Center, Dallas. Dental Branch.  
**CHEMICO-THERAPEUTIC APPROACH TO PREVENTION OF DENTAL CARIES Final Report, period ending 28 Feb. 1975**

Ira L. Shannon 5 Mar. 1975 17 p  
 (Contract NAS9-10566)

(NASA-CR-141762) Avail: NTIS HC \$3.25

The program of chemical preventive dentistry is based primarily upon the development of a procedure for stabilizing stannous fluoride in solution by forcing it into glycerin. New topical fluoride treatment concentrates, fluoride containing gels and prophylaxis pastes, as well as a completely stable stannous fluoride dentifrice are made possible by the development of a rather complicated heat application method to force stannous fluoride into solution in glycerin. That the stannous fluoride is clinically effective in such a preparation is demonstrated briefly on orthodontic patients.

Author

**N75-21936#** Oak Ridge National Lab., Tenn.  
**ESTIMATED RADIATION DOSES FROM INGESTION OF TRITIUM-CONTAINING CONSUMER PRODUCTS MADE WITH HYDROCARBONS FROM NUCLEARLY STIMULATED NATURAL GAS WELLS**

C. J. Barton and S. A. Reynolds Dec. 1974 30 p refs  
 (Contract W-7405-eng-26)

(ORNL-TM-4730) Avail: NTIS HC \$3.75

Commercial scale use of nuclear explosives to increase production of natural gas could result in the introduction of hydrocarbons containing tritium into petrochemical feedstocks. This report considers radiation doses that could be received from ingestion of several products hypothetically produced from natural gas containing 1 pCi of tritium/cu cm of gas. One of the highest estimated whole body doses was from ingestion of sufficient ethyl alcohol to maintain a concentration of 0.15%, the intoxication level, in the body water throughout the year. A slightly higher dose was estimated for ingestion of a synthetic protein supplement. Estimated wholebody doses from ingestion of other products ranged from 0.5 millirem/year for an individual eating one lb/day of a hydrogenated fat or oil product to 0.005 millirem/year for a person taking eight aspirin tablets per day.

Author (NSA)

**N75-21937#** Texas Univ., Austin. Center for Cybernetic Studies.

**POWER SPECTRUM OF THE RESPIRATORY SYSTEM**

Edward L. Frome, Evan L. Frederickson, and C. C. Lushbaugh  
 Nov. 1974 20 p refs

(Contracts N00014-67-A-0126-0008;  
 N00014-67-A-0126-0009; NR Proj. 047-021)

(AD-A002958; CCS-188) Avail: NTIS CSCL 06/16

Spectrum analysis is proposed as a method for analyzing biologic time series data that arises in the study of respiration. A mechanical model of the respiratory system is used to provide a theoretical basis for the interpretation of the air flow spectrum in terms of a physically defined energy concept. The authors show that under certain conditions the flow variance is proportional to the mechanical work of breathing, and indicate how this new parameter is related to conventional measures of respiratory function. An example is presented to describe the computational procedure and to illustrate the graphical aspects of cross-spectrum analysis.

GRA

**N75-21938#** Naval Aerospace Medical Research Lab., Pensacola, Fla.

**HYPERBARIC-HYPOBARIC INTERACTIONS AS THEY RELATE TO COMPRESSED AIR DIVING AND AVIATION: CANINE EXPERIMENT Special Report**

James L. Kupper, Walter P. Trevethan, and Richard J. Brown  
 Nov. 1974 14 p refs

(AD-A003073; NAMRL-SR-74-1) Avail: NTIS CSCL 06/19

To confirm or refute the existing regulation requiring a 24 hour interval between diving and flying, dogs were exposed to increased ambient pressures equivalent to water depths encountered in normal professional and recreational diving. The animals were subsequently exposed to reduced pressures comparable to those experienced by naval aircrew members. Various times between hyperbaric and hypobaric episodes were evaluated. The experimental animals were examined using the following methods: clinical signs; clinico-pathologic determinations; pulmonary interstitial fluid volume; gross pathology; and light microscopy. Evidence of decompression sickness was found. Insofar as the findings may apply to man, a period greater than 12 hours should elapse between diving and flying. An experimental animal species more closely related to man is being examined in larger numbers to precisely define the safe interval.

GRA

**N75-21939#** Naval Air Development Center, Warminster, Pa. Crew Systems Dept.

**MEASUREMENT OF HUMAN HEAD RESULTANT ACCELERATION IMPACT**

Joseph O'Rourke 12 Nov. 1974 21 p refs

(AD-A002971; NADC-74210-40) Avail: NTIS CSCL 06/19

The report describes a method for measuring the resultant acceleration at the center of mass of a human subject's head during a simulated crash. An equation is derived giving the resultant acceleration as a simple function of four accelerations measured at points outside the head. Two experiments are described which show that the equation is valid and yields accurate results under test conditions. It is also shown that the calculation of resultant acceleration is not unduly sensitive to small errors in the center of mass location.

GRA

**N75-21940#** Southwest Research Inst., San Antonio, Tex.  
**A LITERATURE SEARCH AND ANALYSIS OF INFORMATION REGARDING SOURCES, USES, PRODUCTION, CONSUMPTION, REPORTED MEDICAL CASES, AND TOXICOLOGY OF PLATINUM AND PALLADIUM Final Report, 15 Feb. - 15 Apr. 1974**

Richard A. Mayer, W. Laurence Prehn, Jr., and Donald E. Johnson  
 Apr. 1974 49 p

(Contract EPA-68-02-1274)

(PB-238546/6; EPA-650/1-74-008) Avail: NTIS HC \$3.75 CSCL 07B

An intensive search of the literature provides the basis for the following conclusions concerning platinum and palladium. An average of 3.7 million troy ounces of platinum and palladium were produced in the world in the four-year 1969-1972 period. The United States consumed about a third of this. The proved world reserves amount to some 394 million troy ounces; half of the proved reserves are in the Republic of South Africa and 45% in the Soviet Union. Investigations show that only the salts of platinum present human health hazards. Industrial exposure to these is limited to the mining and refining of platinum ores and the preparation of catalysts for chemical and petroleum refining industries.

GRA

**N75-21941#** Human Factors Research, Inc., Goleta, Calif.  
**A STUDY OF HEAT, NOISE, AND VIBRATION IN RELATION TO DRIVER PERFORMANCE AND PHYSIOLOGICAL STATUS Final Report, Jun. 1972 - Jun. 1974**

Robert R. Mackie, James F. O'Hanlon, and Michael McCauley  
 Dec. 1974 263 p refs

(Contract DOT-HS-241-2-420)

(PB-238829/6; DOT-HS-801-313) Avail: NTIS HC \$8.50 CSCL 06S

Experimental studies were conducted on the highway to determine the effects of heat, noise, and vibration on the driving

performance, subjective feelings of alertness and fatigue, and physiological signs of stress among drivers of passenger cars and trucks. Heat stress was shown to significantly affect both driver performance and various indices of central nervous system arousal felt to be important to driving safety. It was shown that the noise stress was sufficient to induce permanent hearing loss in some drivers and that the amount of vibration stress, unless compensated for by properly designed seats, was borderline with respect to current standards for 'fatigue-decreased proficiency.' A review of pertinent literature on stress and human reactions to it is included. GRA

**N75-21942#** Gulf General Atomic, San Diego, Calif.  
**THE COMPATIBILITY OF CARBON WITH BLOOD** Annual Report, 1 Mar. 1973 - 31 Oct. 1974  
 C. H. Meyer, Jr., A. D. Haubold, J. Kaae, J. Parez, and H. Shim  
 7 Nov. 1974 106 p refs  
 (Contract NO1-HB-3-2954; Proj. O663)  
 (PB-238753/8; GA-A/3211) Avail: NTIS HC \$5.25 CSCL 06L

The goals of this program were the development of techniques for vacuum vapor depositing carbon films onto various polymer substrates and the determination of the relevant structural and mechanical properties of the resultant composites. Poly (dimethylsiloxane-co-carbonate), Kapton, polyether urethane, cellulose acetate, and 'springy' polypropylene were coated with vacuum-vapor-deposited (VVD) carbon. The deposition techniques for these materials are discussed. The permeability, adhesion, strain-to-fracture, structure, and surface topography of VVD carbon are reported. Vacuum-vapor-deposited carbon has a two-dimensional crystal structure with graphitic layer planes but no order between atoms in adjacent planes. GRA

**N75-21943** United States International Univ., San Diego, Calif.  
**PREDICTION OF NAVAL AVIATOR CAREER MOTIVATION AND JOB SATISFACTION FROM THE STRONG VOCATIONAL INTEREST BLANK** Ph.D. Thesis  
 David William Robertson 1975 194 p  
 Avail: Univ. Microfilms Order No. 75-4294

Job satisfaction questionnaires and strong vocational interest blanks were administered to Navy aviators. The results lead to the following conclusions: (1) the Naval aviator SVIB scales which were constructed could be employed effectively in career guidance and in increasing career retention; (2) scales constructed separately on the noncareer subgroups, as multiple predictors of retention, yield validities slightly larger than does a single scale constructed on the total noncareer group; (3) the obtained low correlations of job satisfaction with SVIB predictors and also with retention suggest that many applicants may enter the program for other than Navy career purposes; and (4) in employing Naval aviator job satisfaction measures to test the function setting value orientation, the extrinsic items provided partial support, and the intrinsic items, strong support. Dissert. Abstr.

**N75-21944** Texas A&M Univ., College Station.  
**THE EFFECT OF CERTAIN GIMBAL ORDERS AND WORKLOADS ON TARGET DETECTION, RECOGNITION, AND IDENTIFICATION** Ph.D. Thesis  
 Dennis Lee Price 1974 158 p  
 Avail: Univ. Microfilms Order No. 75-2883

If air-to-ground imaging sensors are mounted to the aircraft by different gimbal order systems, the scenery at the displays will rotate differently even though the aircraft flight paths are identical. Eighteen experienced pilots were tested in this simulation study in order to investigate the effects such different scene motions might have on target detection, recognition, and identification performance, and also on operator workload. Significant differences existed between gimbal orders. In general, roll-pitch was associated with the poorest performance and pitch-yaw, with the best. Yaw-pitch was associated with scores somewhere between that of the other two orders. Dissert. Abstr.

**N75-21945#** Naval Aerospace Medical Research Lab., Pensacola, Fla.

**DIFFERENTIATING APTITUDE FACTORS AMONG CURRENT AVIATION SPECIALTIES**

Rosalie K. Ambler and Margaret J. Smith 23 Aug. 1974 22 p ref  
 (MF51524002)

(AD-A003033; NAMRL-1207) Avail: NTIS CSCL 05/9

An automated system of test construction is under development that involves accessing a large bank of test item data. In support of this development this study examined test material which, with the exception of a biographical inventory, covered a wide spectrum of cognitive abilities. The objective was to determine the kinds of test items that are most relevant for use in screening and classification for current aviation specialties, and thus to establish guidelines for investments into the test item bank. By means of a series of factor analyses of test scores and criterion data five cognitive ability factors and a motivational factor were identified. The potential discriminatory validity of each factor was defined for the Naval Flight Officer (NFO) and pilot programs, and for various specialties within these programs. GRA

**N75-21946#** Dunlap and Associates, Inc., La Jolla, Calif.  
**EVALUATION OF THE SPECIAL SENSES FOR FLYING DUTIES: PERCEPTUAL ABILITIES OF LANDING SIGNAL OFFICERS (LSOs)**

C. A. Britson Sep. 1974 11 p refs  
 (Contract N00014-73-C-0053; NR Proj. 201-146)  
 (AD-A003040) Avail: NTIS CSCL 05/9

The job of the Landing Signal Officer is to provide for the safe and expeditious recovery of aircraft aboard ship. Perceptual abilities related to job performance were identified and used as a basis to select a preliminary battery of perceptual tests which were administered to qualified LSOs and trainees. Results indicate that LSOs may be differentiated on the basis of perceptual style on a field independence dimension. Suggestions for validation of the test battery against LSO performance criteria are presented and reviewed. GRA

**N75-21947** Wisconsin Univ., Madison.  
**A COMPUTER CONTROLLED MULTI-TASK POWERED EXOSKELETON FOR PARAPLEGIC PATIENTS** Ph.D. Thesis

Jack George Grundmann 1974 285 p  
 Avail: Univ. Microfilms Order No. 74-27739

A hydraulically powered device under computer control is developed which is capable of ambulating a paraplegic patient. It can perform on command such tasks as walking, standing from a seated posture, stepping over obstacles, and climbing stairs. These actions can be executed at different speeds and in partial or full cycles. The system is designed for powering by portable dc batteries housed in a backpack also containing an electric motor, a hydraulic pump, and an accumulator. Computer controlled servovalves provide fluid under pressure to operate actuators placed at the different joints in a preprogrammed pattern for each particular task. The interface between the patient and the structure is at a fiberglass corset which supports the patient's weight. The powered leg braces are connected to the corset and in turn support the structure and the patient. Dissert. Abstr.

**N75-21948#** National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, Tex.

**METHOD AND SYSTEM FOR IN VIVO MEASUREMENT OF BONE TISSUE** Patent Application

John R. Cameron (Harvard Med. Coll.) and Philip F. Judy, inventors (to NASA) (Harvard Med. Coll.) Filed 11 Mar. 1975 24 p  
 Sponsored by NASA

(NASA-Case-MSC-14276-1; US-Patent-Appl-SN-557430) Avail: NTIS HC \$3.25 CSCL 06B

Methods and apparatus are provided for radiologically

determining the bone mineral content of living human bone tissue independently of the concurrent presence of adipose and other soft tissues. A target section of the body of the subject is irradiated with a beam of penetrative radiations of preselected energy to determine the attenuation of such beam with respect to the intensity of each of two radiations of different predetermined energy levels. The resulting measurements are then employed to determine bone mineral content. NASA

**N75-21949#** School of Aerospace Medicine, Brooks AFB, Tex. **AN OXYGEN-SPARING MASK** Final Report, 1 Apr. - 1 Aug. 1974

Robert M. Olson, Ronald D. Holden, and Ewald W. Koegel Oct. 1974 17 p refs (AF Proj. 7164)

(AD-A003431; SAM-TR-74-49) Avail: NTIS CSCL 06/11

A mask has been developed which leads to very substantial oxygen saving without compromising the purity of the oxygen breathed, and without adding clumsy equipment to the subject's gear. The mask is designed so that during exhalation the CO<sub>2</sub>-contaminated oxygen coming from the alveoli is separated from the uncontaminated oxygen coming from the trachea, mouth, and mask dead space. The clean oxygen is stored and rebreathed during the next respiratory cycle. GRA

**N75-21950#** National Bureau of Standards, Washington, D.C. **DEVELOPMENT OF SOLID STATE SAMPLERS FOR WORK ATMOSPHERES** Semiannual Report, 1 Jan. - 30 Jun. 1974 B. Greifer, B. C. Capdoff, J. Wing, and J. K. Taylor Jun. 1974 55 p refs Sponsored in part by National Inst. for Occupational Safety and Health, Cincinnati (COM-74-11720/1; NBSIR-74-527) Avail: NTIS HC \$4.25 CSCL 06J

A program is described for evaluating the efficiency of solid sorbers for collecting trace quantities of hydrogen fluoride, phosphine, hydrogen cyanide, chlorine, and fluorine in work atmospheres for subsequent laboratory analysis. The gas handling and sampling instrumentation is described, and experimental results to date are presented. Sodium acetate is a very efficient sorber for hydrogen fluoride, and its solubility in water proves to be highly advantageous for subsequent HF determination by ion selective electrode. Potassium permanganate impregnated silica gel sorbs phosphine effectively, and Ascarite was found to sorb hydrogen cyanide, but quantitative experiments on the latter two systems are still in progress. GRA

**N75-21951#** Whittaker Corp., Waltham, Mass. Space Sciences Div.

**ION BEAM DEPOSITED CARBON COATINGS FOR BIO-COMPATIBLE MATERIALS** Comprehensive Report, 1 Dec. 1973 - 30 Nov. 1974

S. Aisenberg and R. W. Chabot Nov. 1974 63 p refs (Contract NO1-HB-3-2919)

(PB-238761/1; SSD-P-711-II-CR) Avail: NTIS HC \$4.25 CSCL 06L

Ion beam deposited (IBD) carbon coatings were studied with regard to physico-chemical properties and blood compatibility. Measurements relative to surface charge, chemical surface groups, crystallinity, and surface smoothness were made. The carbon coatings are smooth amorphous, and present an oxidized surface that is rich in hydrocarbons. A low gas permeability, high critical surface tension, and excellent adhesion to various substrates were observed. Results of vena cava, renal embolus, and ex-vivo tests indicate a high degree of thromboresistance for this material. GRA

**N75-22256\*** Kanner (Leo) Associates, Redwood City, Calif. **AUTOMATION IN SPACE**

B. Petrov *In its* Mod. Achievements of Cosmonautics (NASA-TT-F-16221) 14 Apr. 1975 p 1-4 Transl. into ENGLISH from

the book "Sovremennyye Dostizheniya Kosmonavtiki Sbornik" Moscow, Znaniye, 1973 p 3-6

**CSCL 05/8**

The effective use of automatic machines and equipment in space exploration is discussed. Special attention was given to the problem of interacting people and automatic devices. Data are given on computer data processing, planet rovers, and long term orbital stations. E.H.W.

**N75-23079\*#** Scientific Translation Service, Santa Barbara, Calif. **ALIMENTARY ORIGIN OF NYCTOTHEMERAL VARIATIONS IN THE ELECTRICAL ACTIVITY OF THE SMALL INTESTINE IN THE RAT**

M. Ruckebusch and J. P. Ferre Washington NASA May 1975 9 p refs Transl. into ENGLISH from *Comp. Rend. Soc. Biol. (Masson)*, v. 167, no. 12, 1973 p 2005-2009 (Contract NASw-2483)

(NASA-TT-F-16282) Avail: NTIS HC \$3.25 CSCL 06C

Tests were performed on the alimentary origin of nyctothermal variations in the electrical activity of the jejunum in rats accustomed to an intermittent fast of 3 days per week. The roll of gastric fullness seems to be critical in the presence of segmental activity in the rat. Author

**N75-23080#** Joint Publications Research Service, Arlington, Va.

**VESTNIK OF THE USSR ACADEMY OF MEDICAL SCIENCES, NO. 3, 1975**

N. N. Blokhin 1975 154 p refs Transl. into ENGLISH from *Vestn. Akad. Med. Nauk SSSR (USSR)*, no. 3, 1975 p 16-37 (JPRS-64795) Avail: NTIS HC \$6.25

Research on superhigh frequency effects on animal metabolism and trace elements of copper, manganese, molybdenum, and nickel. Methods to increase human radiation tolerance are investigated, using chemical agents primarily.

**N75-23081** Joint Publications Research Service, Arlington, Va. **EFFECTS OF SUPERHIGH FREQUENCY FIELDS OF DIFFERENT INTENSITY ON THE BALANCE AND METABOLISM OF COPPER, MANGANESE, MOLYBDENUM AND NICKEL IN THE ORGANISM OF EXPERIMENTAL ANIMALS**

R. D. Gabovich, A. A. Minkh, and I. A. Mikhalyuk *In its* *Vestnik of the USSR Acad. of Med. Sci.*, No. 3, 1975 (JPRS-64795) 1975 p 19-27 refs Transl. into ENGLISH from *Vestn. Akad. Med. Nauk SSSR (USSR)*, no. 3, 1975 p 16-22

Biological effects of electromagnetic fields are discussed. Changes in metabolic balance due to the synergistic actions of copper, manganese, molybdenum, and nickel exposed to superhigh frequencies are reviewed. Trace element content in feces and urine in rats is shown, along with trace element content in specific rat tissues and organs plotted against superhigh frequency intensity. J.A.M.

**N75-23082** Joint Publications Research Service, Arlington, Va. **THE MECHANISM OF ADAPTOGENIC EFFECT OF ULTRAVIOLET RADIATION**

A. P. Zabaluyeva, Yu. I. Prokopenko, and N. M. Dantsig *In its* *Vestnik of the USSR Acad. of Med. Sci.*, No. 3, 1975 (JPRS-64795) 1975 p 28-32 refs Transl. into ENGLISH from *Vestn. Akad. Med. Nauk SSSR (USSR)*, no. 3, 1975 p 23-26

Methods are discussed whereby an organism's adaptation ability to radiation pollution of the environment can be increased. Activity variations of succinic dehydrogenase (SDH) and alpha-glycerophosphate dehydrogenase (alpha-GPD) in different groups of animals are presented. SDH/alpha-GPD ratio is correlated with hexenal sleep duration. Tumor size and immunity indices are plotted against ultraviolet radiation dosage. A suberythema dose of ultraviolet radiation was found to increase the activity of the protection systems of the organism. J.A.M.

**N75-23083** Joint Publications Research Service, Arlington, Va.  
**EFFECT OF ULTRAVIOLET RADIATION ON TOLERANCE OF THE ORGANISM TO CHEMICAL SUBSTANCES**

R. D. Gabovich, A. A. Minkh, and I. N. Motuzkov *In its Vestnik of the USSR Acad. of Med. Sci.*, No. 3, 1975 (JPRS-64795) 1975 p 33-46 refs Transl. into ENGLISH from Vestn. Akad. Med. Nauk SSSR (USSR), no. 3, 1975 p 26-37

White rats were irradiated daily with ultraviolet radiation for 3 weeks prior to administering chemicals. These chemical agents were used to study the organism at different levels of radiation (deficient, normal, excessive). Biochemical, physiological, and immunological indices of animals are presented as related to the supply of UV radiation. The coproporphyrin content of urine after lead administration is discussed, along with coefficients of bromosulfalein retention. Catechol amine levels in adrenals and myocardium; indices of animals exposed to a combination of methyl mercaptophos, UV, and overheating for 3 months; and benzene and carbon tetrachloride metabolite levels in urine are considered. Copper and lead levels in animal tissues are also reviewed. J.A.M.

**N75-23084#** Advisory Group for Aerospace Research and Development, Paris (France).

**MEDICAL REQUIREMENTS AND EXAMINATION PROCEDURES IN RELATION TO THE TASKS OF TODAY'S AIRCREW: EVALUATION OF THE SPECIAL SENSES FOR FLYING DUTIES**

G. Perdriel, ed. Feb. 1975 94 p refs In ENGLISH; partly in FRENCH Presented at Aerospace Med. Panel Meeting, Naples, 16-20 Sep. 1974

(AGARD-CP-152) Avail: NTIS HC \$4.75

Medical requirements and examination procedures in relation to sensory tasks of aircrews are reported.

**N75-23085** Advisory Group for Aerospace Research and Development, Paris (France).

**MEDICAL REQUIREMENTS AND EXAMINATION PROCEDURES IN RELATION TO THE TASKS OF TODAY'S AIRCREW: INTRODUCTORY REMARKS**

Aristice Scano *In its Med. Requirements and Exam. Procedures in Relation to the Tasks of Today's Aircrew* Feb. 1975 3 p refs

The medical and aptitudinal selection of aircrew and periodical examinations of their psychophysiological efficiency are necessary to define better fitness in relation to perceptive capacities, to standards for visual and hearing devices, and to intelligibility of speech transmitted to the aircrew in flight. G.G.

**N75-23086** Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

**EVALUATION OF ROLL AXIS TRACKING AS AN INDICATOR OF VESTIBULAR/SOMATO SENSORY FUNCTION**

A. M. Junker and C. R. Replogle *In AGARD Med. Requirements and Exam. Procedures in Relation to the Tasks of Today's Aircrew* Feb. 1975 8 p refs

To learn more about the effects of vestibular/somato sensory information upon visual motor control, a roll axis tracking simulator was developed. A description of this simulator, including the ability to run with and without motion cues, is given. Large amplitude roll angle motion cues were used. The effects of various plant dynamics, relating to plant complexity on tracking performance, are discussed. For a particular set of plant dynamics requiring a considerable amount of lead compensation, it is shown that subjects perform significantly better with the presence of motion cues. It has been suggested that primarily vestibular system contributions allow motion cues to aid pilot performance.

Author

**N75-23087** Institute of Aviation Medicine, Fuerstenfeldbruck (West Germany).

**THE EFFECTS OF PURE TONE HEARING LOSSES ON AVIATORS' SENTENCE INTELLIGIBILITY IN QUIET AND IN AIRCRAFT NOISE**

G. R. Froelich *In AGARD Med. Requirements and Exam. Procedures in Relation to the Tasks of Today's Aircrew* Feb. 1975 4 p

Pure tone audiometry remains the basis for the acceptance of applicants as well as the annual follow-ups of rated pilots. Speech audiometry in quiet is very efficient for the assessment of disability for compensation and the selection of hearing aids, but not for decisions on deafened aircrew. Present audiometric standards for rated aircrew make sure that aviators with hearing losses admitted by standards have no difficulties with inflight voice communication. The decision on the disposal of experienced but deafened aircrew should be based on the discrimination of connected speech in the presence of a background aircraft noise. Author

**N75-23088** Naval Aerospace Medical Research Lab., Pensacola, Fla. Acoustical Sciences Div.

**ASSESSING AN AVIATOR'S ABILITY TO HEAR SPEECH IN HIS OPERATIONAL ENVIRONMENT**

Carl E. Williams, James D. Mosko, and James W. Greene *In AGARD Med. Requirements and Exam. Procedures in Relation to the Tasks of Today's Aircrew* Feb. 1975 10 p refs

The use of multiple word test items is analyzed whether it influences the intelligibility function of test words relative to their presentation as single word test items and whether such items provide a sensitive measure of an individual's ability to hear speech in aircraft acoustical environments. High quality tape recordings were constructed of single, double, and triple word test items from six monosyllabic word lists of the Modified Rhyme Test (MRT), a multiple choice intelligibility test. The test words were incorporated in a carrier phrase somewhat analogous to typical aircraft radio messages. The recorded lists were mixed with shaped noise and played back to a group of listeners at three signal-to-noise ratios. At the two best signal-to-noise ratios (+4 db and 0 db), there was little difference in overall listener performance for the single, double, and triple word test items. Author

**N75-23090** Centre Principal d'Expertises Medicales du Personnel Navigant, Paris (France).

**THE ROLE OF VOCAL AUDIOMETRY IN THE SELECTION OF NAVIGATION PERSONNEL [LA PART DE L'AUDIOMETRIE VOCALE DANS LA SELECTION DU PERSONNEL NAVIGANT]**

P. Blanc and J. D. P. Bastien *In AGARD Med. Requirements and Exam. Procedures in Relation to the Tasks of Today's Aircrew* Feb. 1975 3 p In FRENCH

Different clinical procedures and functions of examining and diagnosing hearing problems of navigation personnel are discussed. Data are given on localization of deafness, physiological surveillance of navigation personnel problems, and standards for normal aerial security. The application of these methods to personnel selection are also examined. Transl. by E.H.W.

**N75-23091** Erlangen-Nuremberg Univ. (West Germany). Dept. of Physiology.

**OBJECTIVE ELECTROPHYSIOLOGICAL MEASUREMENTS OF EAR CHARACTERISTICS, INTELLIGIBILITY OF VOWELS AND JUDGEMENT OF THE STAGE OF ATTENTION**

Manfred Spreng *In AGARD Med. Requirements and Exam. Procedures in Relation to the Tasks of Today's Aircrew* Feb. 1975 10 p refs

The influence of short time annoying noise upon evoked human responses can be demonstrated if the noise reaches intensities around 70 db. Ear characteristics measured show objectively the behavior of the individual ear in the range above the increased thresholds. Based upon their course compensating hearing aids can be adapted which do not only amplify in a

variable degree but also may show even a range of attenuation with increasing sound pressure levels in some special cases of recruitment. Using computer generated vowels as exactly triggered stimuli evoked responses have been recorded with a 16 to 37% increase compared with speech noise stimulation of equal intensity near threshold. First trials are reported to select the single responses corresponding to the FFT-EEG spectra, thus, overcoming the influence of different stages of attention. By this means new data may be gathered concerning the change of evoked potentials from change of attention doing additional tasks, having multisensory input or succumbing sedation. Author

**N75-23092** Italian Air Force Medico-Legal Inst., Milan.  
**THE IMPORTANCE OF THE DOSAGE OF THIOCYANATES IN URINE AND BLOOD OF FLYING PERSONNEL FOR THE PREVENTION OF DISEASES OF VISUAL FUNCTION**

G. Durazzini, F. Zazo, and G. Bertoni (Milan Univ.) *In* AGARD Med. Requirements and Exam. Procedures in Relation to the Tasks of Today's Aircrew Feb. 1975 5 p refs

The relationship between the quantity of cyanides introduced into the organism with smoke, the increase of thiocyanides in organic fluids (blood and urine) and any impairment of the multiple and complex functions of the optic nerve was considered. The amount of thiocyanides present was measured in a group of healthy non-smokers and no significant increase of thiocyanides was found, either in the urine or in the blood and for comparative purposes on another group of healthy smokers in whom a clear increase in the average thiocyanide values was found, especially in urine and in proportion to the number of cigarettes smoked, in comparison with non-smokers. Particular tests of central and peripheric visual function showed slight impairments or results at the lower limits of the normal score (particularly in the test of visual acuteness in reduced lighting and in mesopic campimetry) in 50% of the subjects smoking more than 10 cigarettes (average quantity of thiocyanates in urine : 9.3 mg/l). Author

**N75-23093** Dunlap and Associates, Inc., La Jolla, Calif.  
**EVALUATION OF THE SPECIAL SENSES FOR FLYING DUTIES: PERCEPTUAL ABILITIES OF LANDING SIGNAL OFFICERS (LSOs)**

C. A. Bricton *In* AGARD Med. Requirements and Exam. Procedures in Relation to the Tasks of Today's Aircrew Feb. 1975 8 p refs

The job of the landing signal officer is to provide for the safe and expeditious recovery of aircraft aboard ship. Perceptual abilities related to job performance were identified and used as a basis to select a preliminary battery of perceptual tests which was administered to qualified LSOs and trainees. Results indicate that LSOs may be differentiated on the basis of perceptual style on a field independence dimension. Suggestions for validation of the test battery against LSO performance criteria are presented and reviewed. Author

**N75-23094** Naval Aerospace Medical Research Lab., Pensacola, Fla. Aerospace Psychology Dept.

**AIR-TO-AIR VISUAL TARGET ACQUISITION**

James E. Goodson *In* AGARD Med. Requirements and Exam. Procedures in Relation to the Tasks of Today's Aircrew Feb. 1975 9 p refs

A most critical element of tactical advantage in the air combat environment is the early visual acquisition and continued visual tracking of airborne targets. Little data are available which relate specific visual functions or tests to air-to-air performance ability. Initial visual acquisition of airborne targets usually occurs at in each sample. Total yields of petroleum-degrading microorganisms grown on an oil substrate were greater for those organisms exposed to oil in the natural environment. Microorganisms isolated from water and sediment samples collected in Baltimore Harbor grew on substrates representative of the aliphatic, aromatic and refractory hydrocarbons. From analyses of species distribution, it was observed that a hydrocarbon-utilizing fungus, *Cladosporium resinae*, and actinomycetes were predominant among the hydrocarbon-utilizing isolates. GRA

distances far less than calculated visibility ranges. Further, many targets go undetected even though they pass well within the acquisition range. There appears to be great variability among aviation personnel in visual acquisition performance. However, potential procedures for either selecting or training personnel for this special ability have not been validated against in-flight performance criteria. Author

**N75-23095** Centro di Studi e Ricerche di Medicina Aeronautica e Spaziale, Rome (Italy).

**VISUAL ACUITY OF ASTIGMATIC SUBJECTS AND FITNESS TO AIR FORCE SERVICE**

Paolo Rota and Carlo Terrana *In* AGARD Med. Requirements and Exam. Procedures in Relation to the Tasks of Today's Aircrew Feb. 1975 3 p refs

Visual acuity in different axes was studied in astigmatic subjects, and its importance is considered, in view of fitness in flight and on ground special tasks. The research was carried out by means of optotypes made with Landolt rings, on purpose redesigned, for distant and near vision. Author

**N75-23096** School of Aerospace Medicine, Brooks AFB, Tex. Ophthalmology Branch.

**MICROSTRABISMUS IN FLYING PERSONNEL (DIAGNOSIS AND DISPOSITION)**

Thomas J. Tredici *In* AGARD Med. Requirements and Exam. Procedures in Relation to the Tasks of Today's Aircrew Feb. 1975 10 p refs

It is considered of paramount importance for the aviator to have the ability to accurately perceive depth and judge distances. One of the important elements contributing to his depth perception is stereopsis. The United States Air Force (USAF) depth perception tests are in reality tests of stereopsis. Examiners are aware that a number of trained aviators always have difficulties in passing these stereoscopic tests. In the past those who failed these tests but had straight eyes and normal visual acuity were thought to have idiopathic partial lack of stereoacuity, most likely on a central basis. Recently developed subtle diagnostic motility techniques have revealed that many of these airmen in reality have a small degree of strabismus (crossed eyes). Presently, this condition is known as microstrabismus or microtropia. Author

**N75-23097** Amsterdam Univ. (Netherlands).

**LINEAR ACCELERATION PERCEPTION THRESHOLD DETERMINATION WITH THE USE OF A PARALLEL-SWING**

A. J. Greven, W. J. Oosterveld, and W. J. A. C. Rademakers *In* AGARD Med. Requirements and Exam. Procedures in Relation to the Tasks of Today's Aircrew Feb. 1975 4 p refs (For

The perception of linear acceleration in humans is discussed. The parallel swing - as a tool to collect data on the functioning of the otolithic system- is described. In twelve human subjects experiments were conducted with the parallel swing in order to determine the threshold of perception for movements of this swing. The effect of different body positions on this threshold was also determined. In another series of experiments the amplitude of the sinusoidal compensatory eye movements was investigated when the swing was oscillating with an amplitude of 12.5 cm, as well as with an amplitude of 25 cm. Author

**N75-23098#** Oak Ridge National Lab., Tenn.  
**GEOECOLOGY INFORMATION SYSTEM. PART 1: BIOGEOGRAPHIC MAPPING OF SPECIES RANGES: DOCUMENTATION OF INPUT AND DATA CHECKING PROCEDURE FOR COMPUTER STORAGE AND RETRIEVAL OF INFORMATION**

R. K. Schreiber, R. L. Stephenson, F. G. Goff, D. C. West, and G. Muse Dec. 1974 46 p refs Sponsored by ERDA (EDFB-IBP-74-5-Pt-1) Avail: NTIS HC \$3.75

Rationale is presented for the design and development of a regional scale data bank for biogeographical information. Counties are used as the basic cell for storage and retrieval of data.



Application of the described procedure for manual digitization and coding of species range maps is made using tree species found in Little's Atlas of United States Trees. The computer program for storage and retrieval of this spatial data is documented. Author (NSA)

**N75-23099#** Maryland Univ., College Park. Dept. of Microbiology.

**MICROBIAL ECOLOGY AND THE PROBLEM OF PETROLEUM DEGRADATION IN CHESAPEAKE BAY**

R. R. Colwell, J. D. Walker, and J. D. Nelson, Jr. 1974 14 p refs

(Contract N00014-69-A-0220-0006; Grant NSF GD-31707) (AD-A006590) Avail: NTIS CSCL 06/13

Petroleum degradation studies are being done to obtain a seasonal incidence, as well as species distribution of petroleum-degrading microorganisms in Chesapeake Bay. From analysis of water and sediments collected at two stations in Chesapeake Bay it was found that the concentration of petroleum in an oil polluted site in Baltimore Harbor was five times greater than in Eastern Bay. The numbers of petroleum-degrading microorganisms, measured by direct and replica plating, in the water and sediment samples were related to the concentration of oil in each sample. Total yields of petroleum-degrading microorganisms grown on an oil substrate were greater for those organisms exposed to oil in the natural environment. Microorganisms isolated from water and sediment samples collected in Baltimore Harbor grew on substrates representative of the aliphatic, aromatic and refractory hydrocarbons. From analyses of species distribution, it was observed that a hydrocarbon-utilizing fungus, *Cladosporium resinae*, and actinomycetes were predominant among the hydrocarbon-utilizing isolates. GRA

**N75-23100** Kansas Univ., Lawrence.

**THE EFFECT OF BODY INVERSION ON MIDDLE EAR AIR PRESSURE, ACOUSTIC ADMITTANCE AND AUDITORY THRESHOLD Ph.D. Thesis**

Michael Edward Winston 1973 63 p

Avail: Univ. Microfilms Order No. 75-6275

Data are given on efforts made to: (1) investigate the influence of altered middle ear pressure, produced by positional change, on auditory sensitivity and acoustic admittance and, (2) determine if the effects of the middle ear air pressure change can be reduced or eliminated by physiological middle ear ventilation. Middle ear air pressure, acoustic admittance and auditory sensitivity at 220 Hz was measured on ten normal adults in an upright and, by means of a special examining table, an inverted position. Results indicated that a change in body position from upright to inverted produced a significant increase in middle ear air pressure that could be totally resolved by ventilation of the middle ear. Acoustic admittance based on ambient pressure values was reduced by more than half in the inverted position while admittance values based on maximum amplitude values were not significantly affected by the inversion. Ambient admittance values improved after middle ear ventilation. Dissert. Abstr.

**N75-23101** Wisconsin Univ., Madison.

**EFFECTS OF HYPOXIA WITH AND WITHOUT HYPERVENTILATION ON THE CONTROL OF VENTILATION Ph.D. Thesis**

Michael Thomas Sharratt 1974 290 p

Avail: Univ. Microfilms Order No. 74-28827

Sustained hyperventilation for periods of two or more hours results in ventilatory responses to imposed CO<sub>2</sub> which is substantially greater than before the period of hyperventilation. However, the magnitude of the changes which occur in ventilatory control is not coordinate with the severity of the hyperventilation. It was the principal hypothesis that the addition of arterial hypoxemia would partially overcome the cerebral vasoconstriction which accompanies hyperventilation. Unanesthetized dogs were intubated and trained to lie in the right lateral decubitus position

for periods of up to eight hours. Ventilatory data were recorded on magnetic tape and processed using LINC computers. It appears, relative to man, that resting dogs are mildly hypoxemic and chronically tend to hyperventilate. The mild arterial hypoxemia appears to be due to right to left shunting rather than due to an hypoxic ambient environment, global hypoventilation or impaired diffusion capacity of the lung. Dissert. Abstr.

**N75-23102** Columbia Univ., New York.

**DYNAMIC RESPONSE OF A FUEL-FILLED SPHEROIDAL SHELL; AN IMPROVED MODEL FOR STUDYING HEAD INJURY Ph.D. Thesis**

Osama M. Y. Talhouni 1974 53 p

Avail: Univ. Microfilms Order No. 75-7539

The human head is modelled by considering the skull to be an elastic prolate spheroidal shell enclosing an acoustic medium which represents the brain. A suddenly applied, uniformly distributed, pressure is applied to the shell surface. Time histories of the distribution of stress in the shell and pressure in the fluid are obtained for material and geometrical parameters representative of a human head. It is found that there is a significant difference in the results obtained using this model from those obtained when the assumption of zero eccentricity, i.e., spherical geometry, is made, but not in the important maximum negative pressure developed in the fluid. Dissert. Abstr.

**N75-23103** Albany Medical Coll., N.Y.

**THE EFFECTS OF SYSTEMIC HYPOXEMIA ON THE PARTITION OF PULMONARY BLOOD FLOW DURING UNILATERAL HYPOXIC VENTILATION Ph.D. Thesis**

Michael Gordon Levitzky 1974 113 p

Avail: Univ. Microfilms Order No. 75-7079

The effects of inducing systemic arterial hypoxemia on the partition of blood flow between both lungs during unilateral hypoxic ventilation of one lung were studied on dogs. When both lungs were ventilated with 100% O<sub>2</sub> the left lung received about 42% of the cardiac output. In contrast, when the left lung was ventilated with 6% O<sub>2</sub> while the right lung was maintained with 100% O<sub>2</sub>, blood flow to the left lung decreased to about 24% of the cardiac output. This decrease in flow was associated with the appearance of a large retrograde flow component in the phasic flow trace. Substitution of room air for the 100% O<sub>2</sub> inspired by the normoxic right lung significantly decreased arterial PO<sub>2</sub>, and increased flow through the hypoxic left lung to near control levels. Dissert. Abstr.

**N75-23104** Clemson Univ., S.C.

**A HEART RATE MONITORING SYSTEM UTILIZING ADVANCED MICROELECTRONIC CONCEPTS Ph.D. Thesis**

John Michael Murray 1974 257 p

Avail: Univ. Microfilms Order No. 75-11506

A prototype system capable of monitoring and storing heart rate information for 24-hour periods was designed, constructed, and tested. LSI register memories were used for data storage and small and medium scale CMOS integrated circuits formed the control logic. Micropower operational amplifiers performed the analog signal processing functions. The monitor was used to obtain data from six subjects selected from the University community. Each subject wore the heart rate monitor for a period of 24 hours and each provided a written log of his daily activities. Treadmill testing provided an additional source of information. Data obtained from the monitoring system was transferred to and analyzed by a digital computer. The computer analysis programs provided two primary results: a plot of heart rate as a function of time, and a statistical analysis of the data over any specified time interval. Dissert. Abstr.

**N75-23106** Houston Univ., Tex.  
**FATIGUE IN SELECTED LOWER LIMB MUSCLE GROUPS WHILE WALKING IN A FULL PRESSURE SUIT Ph.D. Thesis**

John W. Dyck, Jr. 1974 88 p  
 Avail: Univ. Microfilms Order No. 75-10586

The technique of frequency analysis was used to interpret EMG signals generated in an operational situation which involved isotonic exercise to develop baseline indexes of local muscle fatigue and to fill descriptive gaps about changes in the EMG signal as selected muscle groups were exercised to develop fatigue. The purpose of the full pressure suit was to load the selected muscle groups and to provide muscle fatigue data from loaded muscles for comparisons with muscle fatigue data from unloaded muscles. Results of the non-parametric statistical analyses and graphic comparisons showed the individual activity of the muscle groups and the interdependent relationships between the effect of walking speed and suited or unsuited conditions on each muscle group. These relationships were interpreted from the patterns of EMG percentages in the time series samples taken at five minute intervals during each 15-minute exercise trial. Dissert. Abstr.

**N75-23106\*#** Kanner (Leo) Associates, Redwood City, Calif.  
**WEIGHTLESSNESS, MEDICAL AND BIOLOGICAL RESEARCH**

V. V. Parin, ed., O. G. Gizenko, ed., Ye. M. Yuganov, ed., P. V. Vasilyev, ed., and I. I. Kasyan, ed. Washington NASA Mar. 1975 543 p refs Transl. into ENGLISH of the book "Nevesemost: Mediko-biologicheskoye Issledovaniye" Moscow, Meditsina Press, 1974 455 p (Contract NASw-2481)  
 (NASA-TT-F-16105) Avail: NTIS HC \$12.50 CSCL 06S

Physiological aspects of manned space flight are discussed with emphasis on weightlessness as the primary unfavorable factor.

**N75-23107\*** Kanner (Leo) Associates, Redwood City, Calif.  
**PHYSIOLOGICAL PROBLEMS OF WEIGHTLESSNESS**  
 P. V. Vasilyev and I. I. Kasyan *In its Weightlessness: Med. and Biol. Res. (NASA-TT-F-16105) Mar. 1975 p 1-15* Transl. into ENGLISH from the book "Nevesemost: Mediko-Biologicheskoye Issledovaniye" Moscow, Meditsina Press, 1974 p 7-18 (For availability see N75-23106 14-52)  
 CSCL 06S

A brief review of the compensatory-adjusting body changes observed during and after human exposure to prolonged spaceflight is given. Pathological disturbances caused by increased functional hypokinesia and weightlessness loads affect the cardiovascular system, the nervous and hormonal systems, and the state of the skeletal musculo apparatus. G.G.

**N75-23108\*** Kanner (Leo) Associates, Redwood City, Calif.  
**REACTIONS OF ASTRONAUTS UNDER WEIGHTLESS CONDITIONS**  
 I. I. Kasyan, V. I. Kopanov, and V. I. Yazdovskiy *In its Weightlessness: Med. and Biol. Res. (NASA-TT-F-16105) Mar. 1975 p 15-32* Transl. into ENGLISH from the book "Nevesemost: Mediko-Biologicheskoye Issledovaniye" Moscow, Meditsina Press, 1974 p 19-33  
 CSCL 06S

Experimental data show that weightlessness conditions lasting 5 days or more (18-25) do not produce significant disturbances in physical reactions of astronauts, with the exception of some singularities in functioning of the cardiovascular system: A reduction in heart rate and somewhat large fluctuations in the physiological indicators of cutaneous galvanic reactions. Author

**N75-23109\*** Kanner (Leo) Associates, Redwood City, Calif.  
**PHYSIOLOGICAL MECHANISMS OF THE EFFECT OF WEIGHTLESSNESS ON THE BODY**  
 I. I. Kasyan and V. I. Kopanov *In its Weightlessness: Med. and Biol. Res. (NASA-TT-F-16105) Mar. 1975 p 32-40* Transl. into ENGLISH from the book "Nevesemost: Mediko-Biologicheskoye Issledovaniye" Moscow, Meditsina Press, 1974

p 34-40  
 CSCL 06S

Experimental data show that physiological reactions observed under weightlessness conditions are caused by: (1) The direct effect of weightlessness, as a consequence of decrease ("disappearance") of the weight of body tissues and organs; and (2) the mediated effect of weightlessness, as a result of changes in the functional state of the central nervous system and the cooperative work of the analyzers. The human body adapts to weightless conditions under the prolonged effects of it. In this case, four periods can be distinguished: The first period, a transitional process lasting from 1 to 24 hours; second period, initial adaptation to conditions of weightlessness and readjustment of all functional systems of the body; the third period, adaptation to the unusual mechanical conditions of the external environment, lasting from 3 to 8 days and more; and the fourth period, the stage of possible imbalance of the functions and the systems of some astronauts, as a result of the prolonged effect of weightlessness. Author

**N75-23110\*** Kanner (Leo) Associates, Redwood City, Calif.  
**REACTIONS OF ANIMALS AND PEOPLE UNDER CONDITIONS OF BRIEF WEIGHTLESSNESS**  
 L. A. Kitayev-Smik *In its Weightlessness: Med. and Biol. Res. (NASA-TT-F-16105) Mar. 1975 p 41-71* Transl. into ENGLISH from the book "Nevesemost: Mediko-Biologicheskoye Issledovaniye" Moscow, Meditsina Press, 1974 p 41-66

CSCL 06S

It has been shown that under brief weightlessness sensory reactions arise in a number of people, mainly those under these conditions for the first time, in the form of spatial and visual illusions, motor excitation, in which tonic and motor components can be distinguished, and vestibular-vegetative disturbances (nausea, vomiting, etc.). In repeated flights with creation of weightlessness, a decrease in the extent of expression and, then, disappearance of these reactions occurred in a significant majority of those studied. Experiments in weightlessness with the vision cut off and with the absence of vestibular functions in the subjects confirm the hypothesis that spatial conceptions of people in weightlessness depend on predominance of gravireceptor or visual afferent signals under these conditions. Author

**N75-23111\*** Kanner (Leo) Associates, Redwood City, Calif.  
**PERCEPTION OF TIME UNDER CONDITIONS OF BRIEF WEIGHTLESSNESS**  
 V. I. Lebedev, I. F. Chekidra, and I. A. Kolosov *In its Weightlessness: Med. and Biol. Res. (NASA-TT-F-16105) Mar. 1975 p 71-76* Transl. into ENGLISH from the book "Nevesemost: Mediko-Biologicheskoye Issledovaniye" Moscow, Meditsina Press, 1974 p 67-70  
 CSCL 05E

Results of experiments under conditions of brief weightlessness confirmed the theoretical concepts of the dependence of time perception on the emotional state of a man. The time test, together with other methods, can be used to precisely define the emotional state of subjects in stress situations. Author

**N75-23112\*** Kanner (Leo) Associates, Redwood City, Calif.  
**STATIC-KINETIC REACTIONS OF MAN UNDER CONDITIONS OF BRIEF WEIGHTLESSNESS**  
 I. A. Kolosov *In its Weightlessness: Med. and Biol. Res. (NASA-TT-F-16105) Mar. 1975 p 76-81* Transl. into ENGLISH from the book "Nevesemost: Mediko-Biologicheskoye Issledovaniye" Moscow, Meditsina Press, 1974 p 71-75

CSCL 06S

Physical characteristics of human responses to weightlessness simulation during parabolic flights establish body immobilization and visual illusions as the most manifest causes of sensory disturbances. Repeated brief weightlessness exposures gradually decreased expressions of static-kinetic disorders. G.G.

**N75-23113\*** Kanner (Leo) Associates, Redwood City, Calif.  
**SPACE FORM OF MOTIONSICKNESS**

G. L. Komendantov and V. I. Kopanev *In its Weightlessness: Med. and Biol. Res. (NASA-TT-F-16105) Mar. 1975 p 82-91* Transl. into ENGLISH from the book "Nevesemost: Mediko-Biologicheskkiye Issledovaniye" Moscow, Meditsina Press, 1974 p 76-83  
CSCL 06S

Spacesickness under weightlessness conditions is explained mainly by disruption of the activity of the functional system perceiving space and participating in carrying out the balancing function, consisting, in particular, of the vestibular, proprioceptive, interoceptive, visual and cutaneomechanical analyzers. It can be assumed that, under specific conditions, Coriolis acceleration also is a cause of spacesickness. Adaptation is possible by formation of a new functional system which is adequate to the new mechanical conditions of weightlessness. Selection, training, creation of optimum conditions in the spacecraft cabin, medicinal, and technical improvement of spacecraft play an important role in prophylaxis of the space form of seasickness. Author

**N75-23114\*** Kanner (Leo) Associates, Redwood City, Calif.  
**VESTIBULAR REACTIONS OF ASTRONAUTS DURING FLIGHT IN VOSKHOD SPACECRAFT**

Ye. M. Yuganov, A. I. Gorshkov, I. I. Kasyan, I. I. Bryanov, I. A. Kolosov, V. I. Kopanev, F. A. Solodovnik, V. I. Lebedev, and N. I. Popov *In its Weightlessness: Med. and Biol. Res. (NASA-TT-F-16105) Mar. 1975 p 91-98* Transl. into ENGLISH from the book "Nevesemost: Mediko-Biologicheskkiye Issledovaniye" Moscow, Meditsina Press, 1974 p 84-88

## CSCL 06S

It is shown that differing human vestibular resistances to weightlessness stress are connected with the nonuniform initial sensitivity of the vestibular apparatus, as well as with different lengths of vestibular training. However, intensive vestibular training of persons with a moderate degree of sensitivity of the vestibular analyzer does not ensure vestibular stability under weightlessness conditions. G.G.

**N75-23115\*** Kanner (Leo) Associates, Redwood City, Calif.  
**BLOOD CIRCULATION UNDER WEIGHTLESS CONDITIONS**

I. I. Kasyan, V. I. Kopanev, and V. I. Yazdovskiy *In its Weightlessness: Med. and Biol. Res. (NASA-TT-F-16105) Mar. 1975 p 99-116* Transl. into ENGLISH from the book "Nevesemost: Mediko-Biologicheskkiye Issledovaniye" Moscow, Meditsina Press, 1974 p 89-105

## CSCL 06S

Biomedical data obtained on men and animals during weightlessness conditions establish instabilities in pulse rate and blood circulation that smooth out in proportion to adaptation to the weightless condition. The unusual slowness of recovery of pulse rate to initial values after space flight stress is attributed to biological simulation of hormonal shifts and discharge of humoral substances into the blood that prevent a rapid recovery of some biological indicators to initial values. G.G.

**N75-23116\*** Kanner (Leo) Associates, Redwood City, Calif.  
**SOME RESULTS OF MEDICAL STUDIES OF VOSKHOD 2 SPACECRAFT CREW MEMBERS**

I. I. Kasyan, D. G. Maksimov, I. G. Popov, D. G. Terentyev, and L. S. Khachatryan *In its Weightlessness: Med. and Biol. Res. (NASA-TT-F-16105) Mar. 1975 p 116-128* Transl. into ENGLISH from the book "Nevesemost: Mediko-Biologicheskkiye Issledovaniye" Moscow, Meditsina Press, 1974 p 106-116  
CSCL 06S

Clinical and psychological examinations of the astronauts before, during and after space flight established fluctuations in heart rate, blood circulation, metabolism and sensorimotor reactions that disappeared completely one month after flight. G.G.

**N75-23117\*** Kanner (Leo) Associates, Redwood City, Calif.  
**BASIC RESULTS OF MEDICAL EXAMINATIONS OF SOYUZ SPACECRAFT CREW MEMBERS**

N. N. Gurovskiy, A. D. Yegorov, L. I. Kakurin, and Yu. G. Nefedov *In its Weightlessness: Med. and Biol. Res. (NASA-TT-F-16105) Mar. 1975 p 128-147* Transl. into ENGLISH from the book "Nevesemost: Mediko-Biologicheskkiye Issledovaniye" Moscow, Meditsina Press, 1974 p 117-132

## CSCL 06S

Weightlessness, hypokinesia and intense activity of crew members caused changes in human physiological functions during prolonged space flight as expressed in unusual diurnal rhythms. Microclimate, radiation and the nervous emotional state were not of significance in emergence of human body response reactions. G.G.

**N75-23118\*** Kanner (Leo) Associates, Redwood City, Calif.  
**CONDITION OF CARDIOVASCULAR SYSTEMS OF ASTRONAUTS DURING FLIGHT OF SOYUZ ORBITAL STATION**

V. A. Degtyarev, I. I. Popov, T. V. Batenchuk-Tusko, N. D. Kolmykova, N. A. Lapshina, Z. A. Kirillova, V. G. Doroshev, and Yu. A. Kukushkin *In its Weightlessness: Med. and Biol. Res. (NASA-TT-F-16105) Mar. 1975 p 147-173* Transl. into ENGLISH from the book "Nevesemost: Mediko-Biologicheskkiye Issledovaniye" Moscow, Meditsina Press, 1974 p 133-157

## CSCL 06S

Extensive studies of blood circulation functions during manned space flight demonstrated a pronounced tendency toward an increase in minute volume of the blood and a decrease in pulse wave propagation rate. Individual blood circulation indices had large amplitude fluctuations. Physical work loads caused slow recovery of heart rate, arterial pressure and minute blood volume. G.G.

**N75-23119\*** Kanner (Leo) Associates, Redwood City, Calif.  
**RESPIRATION, RESPIRATORY METABOLISM AND ENERGY CONSUMPTION UNDER WEIGHTLESS CONDITIONS**

I. I. Kasyan and G. F. Makarov *In its Weightlessness: Med. and Biol. Res. (NASA-TT-F-16105) Mar. 1975 p 174-195* Transl. into ENGLISH from the book "Nevesemost: Mediko-Biologicheskkiye Issledovaniye" Moscow, Meditsina Press, 1974 p 158-175  
CSCL 06S

Changes in the physiological indices of respiration, respiratory metabolism and energy consumption in spacecrews under weightlessness conditions manifest themselves in increased metabolic rates, higher pulmonary ventilation volume, oxygen consumption and carbon dioxide elimination, energy consumption levels in proportion to reduction in neuroemotional and psychic stress, adaptation to weightlessness and work-rest cycles, and finally in a relative stabilization of metabolic processes due to hemodynamic shifts. G.G.

**N75-23120\*** Kanner (Leo) Associates, Redwood City, Calif.  
**UREA, SUGAR, NONESTERIFIED FATTY ACID AND CHOLESTEROL CONTENT OF THE BLOOD IN PROLONGED WEIGHTLESSNESS**

I. S. Balakhovskiy and T. A. Orlova *In its Weightlessness: Med. and Biol. Res. (NASA-TT-F-16105) Mar. 1975 p 196-207* Transl. into ENGLISH from the book "Nevesemost: Mediko-Biologicheskkiye Issledovaniye" Moscow, Meditsina Press, 1974 p 176-187  
CSCL 06S

Biochemical blood composition studies on astronauts during weightlessness flight simulation tests and during actual space flights showed some disturbances of metabolic processes. Increases in blood sugar, fatty acid and cholesterol, and urea content are noted. G.G.

**N75-23121\*** Kanner (Leo) Associates, Redwood City, Calif.  
**EFFECT OF WEIGHTLESSNESS ON MINERAL SATURATION OF BONE TISSUE**

I. G. Krasnykh *In its Weightlessness: Med. and Biol. Res. (NASA-TT-F-16105)* Mar. 1975 p 208-215 Transl. into ENGLISH from the book "Nevesemost: Mediko-Biologicheskkiye Issledovaniye" Moscow, Meditsina Press, 1974 p 186-192

**CSSL 06S**

X-ray photometry of bone density established dynamic changes in mineral saturation of bone tissues for Soyuz spacecraft and Salyut orbital station crews. Calcaneus optical bone densities in all crew members fell below initial values; an increase in spacecrew exposure time to weightlessness conditions also increased the degree of decalcification. Demineralization under weightlessness conditions took place at a higher rate than under hypodynamia. G.G.

**N75-23122\*** Kanner (Leo) Associates, Redwood City, Calif.  
**METHODS OF BODY ORIENTATION IN SPACE IN THE ABSENCE OF SUPPORT UNDER WEIGHTLESS CONDITIONS**

A. V. Yerebin, V. I. Stepantsov, I. F. Chekidra, I. P. Borisenko, and I. A. Kolosov *In its Weightlessness: Med. and Biol. Res. (NASA-TT-F-16105)* Mar. 1975 p 216-228 Transl. into ENGLISH from the book "Nevesemost: Mediko-Biologicheskkiye Issledovaniye" Moscow, Meditsina Press, 1974 p 193-203

**CSSL 06S**

The experience accumulated in training subjects in methods of body orientation in space indicates the necessity of clear planning of the training process. After theoretical familiarization with the principles of body orientation in space and reviewing training films, practical mastery of the body orientation methods begins with working out of the individual elements on the Zhukovskiy stool. Then, the correctness and sequence of movements are carefully mastered in water, and the motor skills are then reinforced under time deficit conditions, on the vaulting bars, trampolines, and, in the concluding stage of training, the methods of orienting the body in space in weightlessness are worked out in laboratory-aircraft, with and without the spacesuit and with and without a load. Author

**N75-23123\*** Kanner (Leo) Associates, Redwood City, Calif.  
**MOTOR ACTIVITY OF ASTRONAUTS IN UNSUPPORTED STATE**

I. I. Kasyan, I. A. Kolosov, and V. I. Kopanev *In its Weightlessness: Med. and Biol. Res. (NASA-TT-F-16105)* Mar. 1975 p 228-239 Transl. into ENGLISH from the book "Nevesemost: Mediko-Biologicheskkiye Issledovaniye" Moscow, Meditsina Press, 1974 p 203-212

**CSSL 06S**

The performance quality of movements away and approaches to an airlock by astronauts was tested during parabolic flights for weightlessness simulation. Coordination of movement, orientation and performance capacity of the astronauts were not significantly disrupted. Observed physiological shifts are characterized by an increase in pulse and respiration rate and an increase in arterial pressure under g-forces, a gradual decrease in these indices during repeated stays in weightlessness or during the prolonged effect of it, by a reduction of the length of postrotational nystagmus and counterrotation illusions under weightless conditions. Author

**N75-23124\*** Kanner (Leo) Associates, Redwood City, Calif.  
**BIOELECTRIC ACTIVITY OF SKELETAL MUSCLE UNDER CONDITIONS OF ALTERNATING ACTION OF g-FORCES AND WEIGHTLESSNESS**

Ye. M. Yuganov, I. I. Kasyan, and B. F. Asyamolov *In its Weightlessness: Med. and Biol. Res. (NASA-TT-F-16105)* Mar. 1975 p 239-245 Transl. into ENGLISH from the book "Nevesemost: Mediko-Biologicheskkiye Issledovaniye" Moscow, Meditsina Press, 1974 p 213-218

**CSSL 06S**

The bioelectric activity of the musculature of animals and

man was studied during alternating g-forces and weightlessness. The appropriate conditions were reproduced in flight along a parabolic curve; in this case, weightlessness lasting 25-30 sec alternated with g-forces of about 2 g magnitude. Quite regular changes in the bioelectric activity of various groups of muscles were disclosed under g-forces and in weightlessness. Thus, muscle biopotential amplitudes of 130-180 microvolt in horizontal flight, increased to 190-330 microvolt under g-forces. In the subsequent weightlessness, an abrupt reduction in oscillation voltage was observed and, in a number of cases, phenomena similar to the picture of bioelectric silence were noted. Author

**N75-23125\*** Kanner (Leo) Associates, Redwood City, Calif.  
**MOTOR ACTIVITY UNDER WEIGHTLESS CONDITIONS**

I. I. Kasyan, V. I. Kopanev, M. A. Cherepakhin, and Ye. M. Yuganov *In its Weightlessness: Med. and Biol. Res. (NASA-TT-F-16105)* Mar. 1975 p 245-265 Transl. into ENGLISH from the book "Nevesemost: Mediko-Biologicheskkiye Issledovaniye" Moscow, Meditsina Press, 1974 p 218-236

**CSSL 06S**

The material presented on the motor activity under weightless conditions (brief and long) leads to the conclusion that it is not significantly disrupted, if those being examined are secured at the workplaces. Some discoordination of movement, moderately expressed disruption of the precision of reproduction of assigned muscular forces, etc., were observed. Motor disorders decrease significantly in proportion to the length of stay under weightless conditions. This apparently takes place, as a consequence of formation of a new functional system, adequate to the conditions of weightlessness. Tests on intact and labyrinthectomized animals have demonstrated that signaling from the inner ear receptors is superfluous in weightlessness, since it promotes the onset of disruptions in the combined work of the position analyzers. Author

**N75-23126\*** Kanner (Leo) Associates, Redwood City, Calif.  
**PATHOPHYSIOLOGICAL ANALYSIS OF THE EFFECT OF WEIGHTLESSNESS ON THE BODY**

Ye. A. Kovalenko *In its Weightlessness: Med. and Biol. Res. (NASA-TT-F-16105)* Mar. 1975 p 265-314 Transl. into ENGLISH from the book "Nevesemost: Mediko-Biologicheskkiye Issledovaniye" Moscow, Meditsina Press, 1974 p 237-278

**CSSL 06S**

A general scheme of pathogenesis of the effect of weightlessness on the human body is constructed that considers a shift of body fluids, decrease and change in afferent impulses, and metabolic changes in muscle and bony tissues. G.G.

**N75-23127\*** Kanner (Leo) Associates, Redwood City, Calif.  
**PROPHYLAXIS OF UNFAVORABLE EFFECT OF WEIGHTLESSNESS ON THE BODY**

P. V. Vasilyev *In its Weightlessness: Med. and Biol. Res. (NASA-TT-F-16105)* Mar. 1975 p 314-335 Transl. into ENGLISH from the book "Nevesemost: Mediko-Biologicheskkiye Issledovaniye" Moscow, Meditsina Press, 1974 p 278-299

**CSSL 06S**

Artificial gravitation is judged to be the most effective universal method of prophylaxis for the negative effects of weightlessness on the human body. G.G.

**N75-23128\*** Kanner (Leo) Associates, Redwood City, Calif.  
**MEANS AND METHODS OF PHYSICAL CONDITIONING OF MAN IN LONG SPACE FLIGHTS**

V. I. Stepantsov, A. V. Yerebin, and M. A. Tikhonov *In its Weightlessness: Med. and Biol. Res. (NASA-TT-F-16105)* Mar. 1975 p 335-351 Transl. into ENGLISH from the book "Nevesemost: Mediko-Biologicheskkiye Issledovaniye" Moscow, Meditsina Press, 1974 p 289-315

**CSSL 06S**

Methods of prophylaxis for disorders caused predominantly by reduction or absence of hydrostatic blood pressure in weightlessness and in experimental stimulation of it (readjustment of the watersalt metabolism, relative dehydration, disruption of competence of the cardiovascular system with respect to orthostatic loads, etc.), are adequately substantiated. Two theoretically possible approaches to prophylaxis of this type of disorder are examined: The use of methods of simulation of the effect of hydrostatic blood pressure in flight and the decrease in the gravitational redistribution of blood to the lower part of the body in the postflight period. In particular, the method of negative pressure in the lower region of the body gave favorable results. A significant decrease in orthostatic disorders after completion of such experiments was achieved by use of g-suits or other types of special clothing. Author

**N75-23129\*** Kanner (Leo) Associates, Redwood City, Calif.  
**PROBLEM OF ARTIFICIAL GRAVITY FROM THE POINT OF VIEW OF EXPERIMENTAL PHYSIOLOGY**

Ye. M. Yuganov and M. D. Yemelyanov *In its Weightlessness: Med. and Biol. Res. (NASA-TT-F-16105) Mar. 1975 p 351-357* Transl. into ENGLISH from the book "Nevesemost: Mediko-Biologicheskoye Issledovaniye" Moscow, Meditsina Press, 1974 p 314-318

CSCAL 06S

Artificial gravity in spacecraft and orbital stations is considered as prophylactic method for preventing disorders under weightlessness conditions and for readaptation of astronauts to the gravity of earth. The creation of 0.28 to 0.31 g artificial gravity during weightlessness is adequate to orient the human body in space, to preserve movement coordination, as well as to maintain the necessary level of certain physiological indices. This range of artificial weightiness can be reached by various angular accelerations of the satellite rotation as a function of the radius or orientation. G.G.

**N75-23130\*** Kanner (Leo) Associates, Redwood City, Calif.  
**TRAINING OF ASTRONAUTS IN LABORATORY-AIRCRAFT UNDER WEIGHTLESS CONDITIONS FOR WORK IN SPACE**

Ye. V. Khrunov, I. F. Chekidra, and I. A. Kolosov *In its Weightlessness: Med. and Biol. Res. (NASA-TT-F-16105) Mar. 1975 p 357-365* Transl. into ENGLISH from the book "Nevesemost: Mediko-Biologicheskoye Issledovaniye" Moscow, Meditsina Press, 1974 p 318-325

CSCAL 05E

Analyses of occupational activities of astronauts in laboratory-aircraft flights simulating weightlessness conditions permit the development of training methods and optimization of the interaction of man with various spacecraft designs. G.G.

**N75-23131\*** Kanner (Leo) Associates, Redwood City, Calif.  
**PRESERVATION OF HUMAN PERFORMANCE CAPACITY UNDER PROLONGED SPACE FLIGHT CONDITIONS**

A. V. Yerebin, R. M. Bogdashvskiy, and Ye. F. Baburin *In its Weightlessness: Med. and Biol. Res. (NASA-TT-F-16105) Mar. 1975 p 365-383* Transl. into ENGLISH from the book "Nevesemost: Mediko-Biologicheskoye Issledovaniye" Moscow, Meditsina Press, 1974 p 325-341

CSCAL 06S

Prophylactic measures directed toward preservation of health and maintenance of the performance ability of a man during prolonged space flight stress center on the selection of optimum work and rest cycles, physical exercises, the use of pharmacological agents, conditioning of the cardiovascular apparatus, etc. A specially selected set of hormone and pharmacological preparations is recommended to stimulate hemopoiesis. G.G.

**N75-23132\*** Kanner (Leo) Associates, Redwood City, Calif.  
**ASTRONAUT ACTIVITY IN WEIGHTLESSNESS AND UNSUPPORTED SPACE**

Ye. A. Ivanov, V. A. Popov, and L. S. Kachaturyants *In its Weightlessness: Med. and Biol. Res. (NASA-TT-F-16105) Mar. 1975 p 383-429* Transl. into ENGLISH from the book

"Nevesemost: Mediko-Biologicheskoye Issledovaniye" Moscow, Meditsina Press, 1974 p 341-380

CSCAL 06S

For the purpose of study of the performance ability of a human operator in prolonged weightless conditions was studied by the following methods: (1) psychophysiological analysis of certain operations; (2) the dynamic characteristics of a man, included in a model control system, with direct and delayed feedback; (3) evaluation of the singularities of analysis and quality of the working memory, in working with outlines of patterned and random lines; and (4) biomechanical analysis of spatial orientation and motor activity in unsupported space. Author

**N75-23133\*** Kanner (Leo) Associates, Redwood City, Calif.  
**SOME RESULTS OF BIOMEDICAL STUDIES CARRIED OUT IN THE GEMINI AND APOLLO PROGRAMS**

V. I. Kopanov and Ye. M. Yuganov *In its Weightlessness: Med. and Biol. Res. (NASA-TT-F-16105) Mar. 1975 p 429-482* Transl. into ENGLISH from the book "Nevesemost: Mediko-Biologicheskoye Issledovaniye" Moscow, Meditsina Press, 1974 p 385-428

CSCAL 06S

Biomedical changes in Gemini and Apollo astronauts indicate physiological shifts in the majority of organs and systems of the body during space flight. Weightlessness conditions affected body weight, blood circulation, hematological indices, metabolisms, etc. Prophylactic measures to minimize the various physiological and psychological effects constitute activity and rest cycles, supplementary potassium addition to space food, artificial gravity, etc. G.G.

**N75-23134\*#** Kanner (Leo) Associates, Redwood City, Calif.  
**LIFE IN WEIGHTLESSNESS**

J. Lavernhe Washington NASA May 1975 5 p Transl. into ENGLISH from Presse Med. (Paris), no. 48, 13 Nov. 1971 p 2190

(Contract NASw-2481)

(NASA-TT-F-16361) Avail: NTIS HC \$3.25 CSCAL 06S

Organic disorders arising during extended space flights are discussed, including the medical and psychological aspects of weightlessness. The environment of the Skylab station is also described. Author

**N75-23135\*#** Scientific Translation Service, Santa Barbara, Calif.  
**PERIODS OF MAXIMUM PERFORMANCE AND CIRCADIAN RHYTHM OF PHYSIOLOGICAL FUNCTIONS**

V. A. Doskin and N. A. Lavrentyeva Washington NASA May 1975 11 p refs Transl. into ENGLISH from Sov. Med. (USSR), v. 8, Aug. 1974 p 140-145

(Contract NASw-2483)

(NASA-TT-F-16310) Avail: NTIS HC \$3.25 CSCAL 06P

An investigation is made of maximum performance and circadian rhythm of physiological functions in students of the Moscow Medical Institute. It is concluded that periods of high performance are determined by the circadian rhythm of physiological functions. Author

**N75-23136\*#** Scientific Translation Service, Santa Barbara, Calif.  
**CIRCADIAN FLUCTUATIONS IN THE NUMBER OF THROMBOCYTES IN PATIENTS WITH ACUTE MYOCARDIAL INFARCTION**

R. M. Zaslavskaya and Ye. G. Perepelkin Washington NASA May 1975 5 p Transl. into ENGLISH from Ter. Arkh. (USSR), v. 46, no. 6, 1974 p 94-96

(Contract NASw-2483)

(NASA-TT-F-16309) Avail: NTIS HC \$3.25 CSCAL 06E

The quantitative dynamics of thrombocytes in patients with acute myocardial infarction is studied. The studies showed that there is a definite rhythmicity of circadian fluctuations in the number of thrombocytes in healthy individuals. In patients with acute myocardial infarction, the rhythmicity is distorted. Author

**N75-23137\*#** Scientific Translation Service, Santa Barbara, Calif.  
**CIRCADIAN RHYTHM OF PHYSIOLOGICAL FUNCTIONS IN CLINOSTATIC HYPOKINESIA**

V. M. Koroleva-Munts Washington NASA May 1975 10 p refs Transl. into ENGLISH from Fiziol. Zh. SSSR (USSR), v. 60, no. 8, 1974 p 1145-1149

(Contract NASw-2483)

(NASA-TT-F-16308) Avail: NTIS HC \$3.25 CSCL 06S

In the first 10 days of a strict bed regime (for medical reasons) changes were noted in the circadian rhythm of the heart rate, body temperature, minute volume of respiration and openness of the bronchial passages. By the 19-21st day in bed initial rhythms of the first three indices reappeared. Changes in the character of individual rhythm curves and correlations between rhythms of heart rate and body temperatures were statistically significant while no significant differences were found for mean values of sinusoid amplitude and phase with which empirical curves of rhythms were approximated. Author

**N75-23138\*# Kanner (Leo) Associates, Redwood City, Calif. SOME PECULIARITIES OF INTRACARDIAC AND INTRACEREBRAL HEMOCIRCULATION IN PATIENTS SUFFERING FROM RHEUMATOID ARTHRITIS**

I. Ye. Oranskiy and L. A. Kozlova Washington NASA May 1975 11 p refs Transl. into ENGLISH from Vop. Revmatizma (USSR), no. 3, Jul. - Sep. 1974 p 47-52

(Contract NASw-2481)

(NASA-TT-F-16307) Avail: NTIS HC \$3.25 CSCL 06E

The indices of intracardiac and intracerebral hemodynamics and the rhythm of their diurnal changes were studied in 225 patients suffering from rheumatoid arthritis. Serious disorders were shown in the systemic and regional blood circulation and intracardiac hemodynamics, caused by a general pathological process. The relation between frequency of change in the cerebral hemocirculation and condition of the cardiovascular system on the whole was discussed. Author

**N75-23139\*# Scientific Translation Service, Santa Barbara, Calif. FITNESS FOR AIR TRAVEL, THE MEDICAL POINT OF VIEW**

H. H. Renemann, K. Wink, and H. Reindell Washington NASA May 1975 13 p refs Transl. into ENGLISH from Med. Klin. (Munich), v. 69, no. 32/33, 1974 p 1311-1316

(Contract NASw-2483)

(NASA-TT-F-16304) Avail: NTIS HC \$3.25 CSCL 06E

The stresses of air travel on medical patients are described as well as the airlines' obligation with respect to transporting patients. A number of heart, circulation system and other diseases are evaluated with respect to air travel safety. Author

**N75-23140\*# Scientific Translation Service, Santa Barbara, Calif. ON ROD AND CONE VISUAL ACUITY**

Felix Koester Washington NASA Apr. 1975 7 p Transl. into ENGLISH from Centrablatt fur Physiol., v. 10, no. 15, 17 Oct. 1896 p 433-436

(Contract NASw-2483)

(NASA-TT-F-16303) Avail: NTIS HC \$3.25 CSCL 06P

Dark and light visual acuity of various parts of the eye were determined. Results were compared with the theory. Author

**N75-23141\*# Kanner (Leo) Associates, Redwood City, Calif. STUDIES AND INVESTIGATIONS. DAILY VARIATIONS OF URINARY EXCRETION OF 5-HYDROXY-INDOLE-ACETIC ACID IN NORMAL SUBJECTS**

R. Fogari, C. Goi, and L. Corradi Washington NASA Apr. 1975 7 p refs Transl. into ENGLISH from Arch. Sci. Med. (Italy), v. 131, no. 2, Apr. - Jun. 1974 p 57-59

(Contract NASw-2481)

(NASA-TT-F-16302) Avail: NTIS HC \$3.25 CSCL 06P

Urinary excretion of 5-hydroxy-indole-acetic acid, the main catabolite of 5-HT, was studied in 25 normal males at 8-hour intervals in the search for a circadian pattern. The method of Udenfriend was employed. A maximum nocturnal value and a minimum value between 8 a.m. and 4 p.m. were noted. The differences lacked significance. Author

**N75-23142\*# Kanner (Leo) Associates, Redwood City, Calif. BRIGHTNESS SENSATION IN INDIRECT VISION**

A. Kirschmann Washington NASA May 1975 44 p refs Transl. into ENGLISH from Phil. Stud., v. 5, 1888-1889 p 447-497

(Contract NASw-2481)

(NASA-TT-F-16286) Avail: NTIS HC \$3.75 CSCL 06P

Sensitivity to brightness is greater in the peripheral regions of the retina than in the center. This sensitivity is a maximum at a certain distance from the center, which depends on the direction, and then slowly declines further out. The peripheral retina is more sensitive than the center to rapid motion. In order to make the alternating sectors of a rotating disc blend into one another, a higher rate of rotation is required in indirect vision than in direct vision. These properties of the eye seem useful for vision, and offer substantial advantages with respect to perception of objects upon which the eye is not fixed and of motions occurring at the boundaries of the field of vision. It is very likely that the outer segments of the rods, acting as catoptric instruments, bring about this increased sensitivity of the retinal periphery, which would also explain the different distribution of rods and cones in the human retina. Author

**N75-23143\*# Kanner (Leo) Associates, Redwood City, Calif. VALIDITY OF DETERMINATION OF DIURNAL CORTISOL PRODUCTION RATE BY ISOTOPE DILUTION METHOD**

W. Massalski Washington NASA Apr. 1975 10 p refs Transl. into ENGLISH from Pol. Arch. Med. Wewn. (Poland), v. 4, no. 52, 1972 p 329-334

(Contract NASw-2481)

(NASA-TT-F-16285) Avail: NTIS HC \$3.25 CSCL 06E

Examined is a basic assumption made in all methods attempting to determine the diurnal cortisol production rate by determination of the specific activity of one of its metabolites, namely that the radioactive steroid is metabolized in the same pathways and in an identical manner as its nonradioactive counterparts. It is shown that the presence of the radioactive isotope may lead to considerable changes in enzymatic activity. Since the specific activity of different cortisol metabolites determined in one person is not the same, the differences being as high as 60 percent of the value, there is no theoretical basis for an accurate determination of the diurnal cortisol production rate by the isotope dilution method. Author

**N75-23144\*# Scientific Translation Service, Santa Barbara, Calif. AEROBIOCONTAMINATION EMITTED BY A PERSON PLACED IN A LAMINAR FLUX CHAMBER**

J. D. Joubert, J. Citterio, B. Dewimille, and E. Lefort Washington NASA May 1975 12 p Transl. into ENGLISH from Lyon Chirurgial (France), v. 70, no. 5, 1974 p 349-351

(Contract NASw-2483)

(NASA-TT-F-16284) Avail: NTIS HC \$3.25 CSCL 06P

Laminar air flux systems for surgery operating rooms are evaluated and compared with classical systems, from the standpoint of effectiveness against contamination. Author

**N75-23145\*# North Carolina State Univ., Raleigh. THE UTILIZATION OF HABROBRACON AND ARTEMIA AS EXPERIMENTAL MATERIALS IN BIOASTRONAUTIC STUDIES Final Report**

D. S. Grosch Sep. 1972 62 p refs

(Contract NAS2-6684)

(NASA-CR-114590) Avail: NTIS HC \$4.25 CSCL 06F

In the reproductive performance of female braconids striking contrasts were revealed between the results from the actual biosatellite flight and those from experiments when the recovered vehicle was subjected to the forces of simulated launching and recovery. Second week decreases in egg production due to the radiation damage of cells in mitosis were minimized for the females irradiated during space flight. It was demonstrated that females irradiated for two days during orbital flight laid as many eggs during the second week as the unirradiated ground-based controls. After the 10th day their oviposition records exceeded control values. The hatchability of eggs deposited by Biosatellite II females was excellent. Explanations were sought for the space flight's cancellation of the characteristic radiation-induced

decrease in egg production, and for the exceptionally good hatchability of eggs derived from most of the cell types in the irradiated ovarioles. Eggs from only two classes of cells showed enhanced embryonic lethality: those poised in meiotic metaphase during their mother's orbital flight, and those from oocytes beginning vitellogenesis. Author

**N75-23146\*#** Scientific Translation Service, Santa Barbara, Calif. **EXPERIMENTAL STUDY OF PHYSIOLOGICAL VARIATIONS IN URINARY SODIUM AND POTASSIUM RELATED TO TIME ZONE CHANGES**

J. P. Chevrier Washington NASA May 1975 8 p refs Transl. into ENGLISH from Compt. Rend. Soc. Biol. (Paris), v. 167, no. 12, 1973 p 2014-2018 (Contract NASw-2483) (NASA-TT-F-16281) Avail: NTIS HC \$3.25 CSCL 06P

Time zone shift experiments associated with aircraft travel were simulated. Twenty-day experiments were carried out with four subjects under controlled conditions. Recovery of functions was found to take place within 5 to 7 days after the tests. Author

**N75-23147\*#** Scientific Translation Service, Santa Barbara, Calif. **THE EFFECT OF TRYPTOPHAN ON THE SOMATOTROPIC HORMONE DURING SLEEP IN SCHIZOPHRENICS**

L. Murri, G. Cerone, F. Feriozzi, G. M. Mancini, and A. Nurzia Washington NASA May 1975 8 p refs Transl. into ENGLISH from Boll. Soc. Ital. Biol. Sper. (Naples), v. 49, no. 24, 30 Dec. 1973 p 1490-1495 (Contract NASw-2483) (NASA-TT-F-16280) Avail: NTIS HC \$3.25 CSCL 06E

It is determined whether tryptophan administration during sleep is able to induce a release of the somatotrophic hormone in schizophrenic subjects. Author

**N75-23148\*#** Scientific Translation Service, Santa Barbara, Calif. **DIURNAL VARIATIONS OF THE PHYSIOLOGICAL MOBILITY OF HUMAN TEETH**

H. Schnell and J. Greif Washington NASA Apr. 1975 7 p Transl. into ENGLISH from Deut. Zahnarztz. Z. (East Germany), v. 29, no. 9, Sep. 1974 p 879-880 (Contract NASw-2483) (NASA-TT-F-16277) Avail: NTIS HC \$3.25 CSCL 06P

An experimental system for measuring the diurnal variation of the physiological mobility of human teeth is reported, based on strain gages. The major result of the studies is that the physiological mobility of the teeth is subject to spontaneous rhythmic variations with a cycle of 48 hours. Author

**N75-23149\*#** Scientific Translation Service, Santa Barbara, Calif. **RADIATION AND PROTECTION**

U. Ya. Margulis Washington NASA Apr. 1975 174 p refs Transl. into ENGLISH from the book "Radiatsiya i Zashchita" Moscow, Atomizdat, 1974 p 160 (Contract NASw-2483) (NASA-TT-F-16209) Avail: NTIS HC \$6.25 CSCL 06R

Described are the interaction of ionizing radiation with matter, the action of radiation on living organisms, and the protective measures necessary in working with radioactive materials and with sources of ionizing radiation. Information regarding atomic structure and nature of the interaction of radiation with matter are presented. Author

**N75-23150#** Advisory Group for Aerospace Research and Development, Paris (France). **SPINAL INJURY AFTER EJECTION**

R. Auffret and R. P. Delahaye Feb. 1975 59 p refs (AGARD-AR-72) Avail: NTIS HC \$4.25

The statistical results of a survey conducted by 7 NATO Nations are analyzed, and the death rate as well as the rate and distribution of rachis fractures are given. Anatomical and physiological aspects are reviewed, and the pathogenic mechanism of fractures is discussed. In most cases, it is difficult to determine whether the rachis fractures occur when the seat is released or at landing. The pilot's position in the seat plays a fundamental role in the success of the ejection. The radiological aspects of rachis fractures are described, and the stress is laid on the difference between stable and unstable fractures. The therapy applied and the durations of unavailability from duty are indicated. An X-ray examination of the whole spine is recommended after each ejection. Author

**N75-23151#** Oak Ridge National Lab., Tenn. **CALCULATIONAL TECHNIQUES FOR ESTIMATING POPULATION DOSES FROM RADIOACTIVITY IN NATURAL GAS FROM NUCLEARLY STIMULATED WELLS**

C. J. Barton, R. E. Moore, P. S. Rohwer, and S. V. Kaye 1974 25 p refs Presented at the Fourth IAEA Panel on Peaceful Nuclear Explosives, Vienna, Austria, 20 Jan. 1975 (Conf-750109-1) Avail: NTIS HC \$3.25

Techniques for estimating radiation doses from exposure to combustion products of natural gas obtained from wells created by use of nuclear explosives were first developed in the Gasbuggy Project. These techniques were refined and extended by development of a number of computer codes in studies related to the Rulison Project, the second in the series of joint government-industry efforts to demonstrate the feasibility of increasing natural gas production from low permeability rock formations by use of nuclear explosives. These techniques are described and dose estimates that illustrate their use are given. These dose estimation studies have been primarily theoretical, but the hypothetical exposure conditions correspond as closely as possible with conditions that could exist if nuclearly stimulated natural gas is used commercially. Author (NSA)

**N75-23152#** Institut Franco-Allemand de Recherches, St. Louis (France). **INVESTIGATIONS ON THE PROBLEM OF SLEEP DISTURBANCES CAUSED BY SUPERSONIC BOOMS [EXPERIMENTELLE UNTERSUCHUNGEN ZUM PROBLEM DER SCHLAFSTOERUNGEN DURCH UEBERSCHALLKNALL]**

G. Jansen and B. Griefahn 2 Jul. 1974 37 p refs In GERMAN (Contract DRME-72/693) (ISL-21/74) Avail: NTIS HC \$3.75

The influence of supersonic booms, generated in a hypersonic wind tunnel, on the natural sleep of two probands, notably on the profoundness of the sleep, on the total sleeping process and on the peripheral circulation was investigated. The booms cause a significant and regular increase of the cerebral electric activity. As the sleep is more profound the intensity and the duration of the reaction is higher. The shorter the interval between two booms becomes, the weaker is the effect on the stimulus. Habituation to supersonic booms did not occur. ESRO

**N75-23153#** Aerospace Medical Research, Labs., Wright-Patterson AFB, Ohio. **THE EFFECT OF FLARE DRIFT ON TARGET ACQUISITION PERFORMANCE Final Report**

Russell A. Sorenson Oct. 1974 30 p refs (AF Proj. 7184) (AD-A006756; AMRL-TR-74-73) Avail: NTIS CSCL 17/8

Thirty male college students participated in an experiment to determine the effect of three velocities of flare drift (0, 5, and 10 knots) on target acquisition performance measured by number of targets detected. Additionally, acquisition performance was evaluated as a function of incentive pay for targets acquired, slant range, and target type. The experiment utilized terrain model simulation techniques, a simulated slow speed (100 knots) aircraft at 2,000-ft AGL and a simulated 2,000,000 candlepower LUU-2B/B parachute flare. GRA

**N75-23154** North Carolina State Univ., Raleigh.  
**THE COMBINED EFFECTS OF NOISE AND VIBRATION ON HUMAN ANNOYANCE** Ph.D. Thesis  
 Michael Jerome Goodman 1974 149 p  
 Avail: Univ. Microfilms Order No. 75-7724

The nature of the influence of one stimulus (noise, vibration) upon judged annoyance to a second stimulus (vibration, noise) on human subjects was evaluated. An evaluation was also made to determine the combined annoyance of noise and vibration individually. The importance of sensitivity to noise and vibration, differences in response between the sexes, and the relationship between changes in heart rate and annoyance were also considered. Results show a number of significant relationships discovered between (a) the manner in which noise and vibration interact subjectively, and (b) situational (e.g., the nature of the variables. Results also show uniformity in response (cardiac deceleration) between subjects, with some dependence of changes on rate and upon the nature of the stimulus. It is concluded that annoyance is most adequately defined in terms of an intrusion into an ongoing activity which results in emotional and/or physical discomfort. Dissert. Abstr.

**N75-23155** Minnesota Univ., Minneapolis.  
**A COMPARISON OF ALTERNATIVE DESENSITIZATION PROCEDURES FOR TREATMENT OF FLIGHT PHOBIA** Ph.D. Thesis  
 Sylvia Jane Solberg 1974 174 p  
 Avail: Univ. Microfilms Order No. 75-2152

An evaluation of the efficacy of two preprogrammed, automated group desensitization treatments for the fear of flying was performed. Treatments were preprogrammed in that hierarchy items and rates of item presentation were determined prior to treatment, and the treatments were automated in that all desensitization sessions were presented via tape recordings. Positive data indicates that group, preprogrammed, automated desensitization is an efficacious treatment for the fear of flying. Conclusions revealed by the study are: (1) flight phobics tend to experience most flight fear prior to and during take-off and ascent of the plane. (2) Treatment for the fear of flying led to post-treatment changes specific to flight phobia, but did not influence other personality traits, such as anxiety or neuroticism. Dissert. Abstr.

**N75-23156** Indiana Univ., Bloomington.  
**STRESS AND TASK PERFORMANCE: A COMPARISON OF PHYSICAL AND PSYCHOLOGICAL STRESSORS** Ph.D. Thesis  
 Herschel Nehemiah Chait 1974 102 p  
 Avail: Univ. Microfilms Order No. 75-8933

The failure of a stressor to affect motor task performance was explained by the assumed sensitivity of the motor task to such influences as ability and fatigue, and by the short duration of the task. A cognitive task was assumed to be less sensitive to these influences, the finding that only two of the measures of cognitive performance were affected by the stressors was explained as being the result of stressors influencing measures of speed, but not of accuracy. It was concluded that same stress state, cannot be unambiguously answered by the data collected in this study. It was also noted that some multivariate techniques, which are used for the development of taxonomies of situations, may provide another method of answering this basic question. Dissert. Abstr.

**N75-23157\*** National Aeronautics and Space Administration, Langley Research Center, Langley Station, Va.  
**EFFECTS OF THREE ACTIVITIES ON ANNOYANCE RESPONSES TO RECORDED FLYOVERS**  
 Walter J. Gunn, William T. Shepherd, and John L. Fletcher (Memphis State Univ., Tenn.) Apr. 1975 47 p refs  
 (NASA-TM-X-72673) Avail: NTIS HC \$3.75 CSCL 05E

Human subjects participated in an experiment in which they were engaged in TV viewing, telephone listening, or reverie (no activity) for a 1/2-hour session. During the session, they were exposed to a series of recorded aircraft sounds at the rate of one flight every 2 minutes. At each session, four levels of flyover noise, separated by 5 db increments were presented several

times in a Latin Square balanced sequence. The peak levels of the noisiest flyover in any session was fixed at 95, 90, 85, 75, or 70 db. At the end of the test session, subjects recorded their responses to the aircraft sounds, using a bipolar scale which covered the range from very pleasant to extremely annoying. Responses to aircraft noises are found to be significantly affected by the particular activity in which the subjects are engaged. Author

**N75-23158#** Defence and Civil Inst. of Environmental Medicine, Downsview (Ontario).  
**SPECULATIONS ON BILINGUALISM AND THE COGNITIVE NETWORK**  
 M. M. Taylor Mar. 1974 59 p refs Repr. from Working Papers on Bilingualism (Toronto), Issue 2, Mar. 1974 p 68-124  
 (DCIEM-74-RP-1013) Avail: NTIS HC \$3.75

A theory on the cognitive network of human language development is expounded. The network consists of concepts linked together by relationships which are themselves concepts. Concepts are learned according to simple rules, and the network grows as new concepts are learned. Lower level concepts are stabilized and become parts of patterns which form higher level concepts. The growth and structure of language is also discussed. The growth of language within the network follows the same rules as the growth of perceptual ability. Labels are attached to some concepts, programs. Some problems of bilingualism are also considered. The growth of two languages at once presents special problems to the infant. Instead of linking labels and syntactic programs directly to concepts in the network, his linkages depend on conversation with other humans. The bilingual infant should have early difficulty with language, but should eventually derive a richer concept structure than the monolingual infant. Author

**N75-23159#** Illinois Univ., Savoy. Aviation Research Lab.  
**A THEORETICAL AND EMPIRICAL COMPARISON OF TWO MIXED FACTOR CENTRAL COMPOSITE DESIGNS**  
 Christine Clark Oct. 1974 12 p refs  
 (Contract F44620-70-C-0105; AF Proj. 9778; AF Proj. 6813) (AD-A007004; ARL-74-16/AFOSR-74-11; AFOSR-75-0386TR)  
 Avail: NTIS CSCL 05/9

This paper provides a brief review of the application of central-composite designs (CCD) in human performance research. Particular mention is made of the mixed-factor CCD, which allows simultaneous consideration of within-subject and between-subjects factors. The current paper details the construction of two alternative versions of such a design. After the two versions have been compared on theoretical grounds, an empirical investigation is proposed to determine the relative predictive accuracy and validity of prediction equations derived from data collected in accordance with each design version. GRA

**N75-23160#** Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.  
**SCIENTIFIC TECHNICAL REVOLUTION AND CHANGE IN STRUCTURE OF SCIENTIFIC PERSONNEL IN THE USSR, APPENDIX**

K. M. Varsharskii 29 Jan. 1975 108 p refs Transl. into ENGLISH from the monograph "Nauchno-Tekhnicheskaya Revolyutsiya i izmenenie Struktury Nauchnykh Kadrov SSSR" Moscow, 1973 p 128-199  
 (AD-A006556; FTD-HC-23-2304-74) Avail: NTIS CSCL 05/9

Contents: Principal sources of data in studying the structure and dynamics of scientific personnel in the U.S.S.R.; Mathematical methods for studying the structure and dynamics of scientific personnel; Methods of forecasting the number and structure of scientific personnel. GRA

**N75-23161** Iowa State Univ. of Science and Technology, Ames.  
**SPECTRAL ANALYSIS OF BIOLOGICAL SIGNALS USING COHERENT OPTIKAL TECHNIQUES** Ph.D. Thesis  
 Robert Frank Cannata 1974 195 p  
 Avail: Univ. Microfilms Order No. 75-10468



The utility of coherent optical parallel processing techniques for the analysis of real one dimensional biological signals as an alternate to the digital computer methods was investigated. Data input formats suitable for optical processing are evaluated. The primary methods were area and density modulation of the amplitude transmittance of photographic film transparencies. The optical system used consisted of a He-Ne laser, a spatial filter used to produce a diverging beam, and a thin converging lens. A transparency placed in the converging beam has its diffraction pattern focused on a specific plane. The light distribution at this plane is proportional to the Fourier transform of the data on the transparency. It was found that such transparencies produced by use of 16 mm movie sound track records, photographing amplitude modulated rectilinear paper chart records, and photographing chart records manually darkened beneath the signal were effective for spectral analysis of such signals as ECG, EEG, blood flow, etc. A method was also developed for optical computation of convolution and correlation functions based on spectral description of the input data. Dissert. Abstr.

**N75-23162** Ohio State Univ., Columbus.  
**COMPUTER-TELEVISION ANALYSIS OF BIPED LOCOMOTION** Ph.D. Thesis

In-Sheng Cheng 1974 147 p  
Avail: Univ. Microfilms Order No. 75-11329

By making use of a television camera as a detecting device, an interface was built to connect the television camera to a PDP-11 minicomputer. Tiny pin lights were attached to the anatomically significant landmarks on the human subject such as hip, knee, and ankle joints. The positions of the pin lights are transformed into corresponding x and y coordinates by the interface and stored in the computer. From the coordinate information of the landmarks, important parameters associated with locomotion, such as hip angle, knee angle, and ankle angle, can be obtained. Fourier series and least-square polynomial regression techniques were used to smooth the parameters obtained directly from the calculations of the raw data. The angle diagrams can be plotted on a CALCOMP plotter or the values of the angles can be fed to the kinematic model of human locomotion to simulate the same walking characteristics as those of the human subject. Dissert. Abstr.

**N75-23163\*** Analytical Research Labs., Inc., Monrovia, Calif.  
**DEVELOPMENT OF SPACECRAFT TOXIC GAS REMOVAL AGENTS** Annual Summary Report

R. Starnes Moore Dec. 1974 73 p refs  
(Contract NAS9-13746)  
(NASA-CR-141757; ARLI-3006-S) Avail: NTIS HC \$4.25 CSCL 06K

The development of agents suitable for removal of CO, NH<sub>3</sub>, NO<sub>2</sub>-SO<sub>2</sub>, and other spacecraft contaminants was approached. An extensive technology review was conducted, yielding a large number of potentially useful materials and/or concepts. Because the two toxic gases of greatest interest, CO and NH<sub>3</sub>, suggested the use of catalysis principles emphasis was placed on the investigation of transition metals on various supports. Forty-three materials were prepared or obtained and 25 were tested. Gas chromatographic techniques were used to find seven candidates that effectively managed various combinations of the four toxic gases: none managed all. These candidates included six transition metal-containing preparations and a supported LiOH material. Three commercial charcoals showed some efficiency for the toxic gases and may constitute candidates for enhancement by doping with transition metals. Author

**N75-23164\*** Scientific Translation Service, Santa Barbara, Calif.  
**LIFE AND WORK ON BOARD A SPACE STATION**

I. Pestov May 1975 8 p Transl. into ENGLISH from Aviatika i Kosmonavtika (USSR), no. 11, Nov. 1974 p 38-39  
(Contract NASw-2483)  
(NASA-TT-F-16283) Avail: NTIS HC \$3.25 CSCL 05H

The daily routine of the cosmonauts is reviewed and their medical and exercise program is discussed. The cosmonaut's working day began at about 9:00 a.m. and ended at about 1:00 a.m. The medical equipment used included: Polinom for

recording EKG; arterial Reseda for determining pulmonary ventilation and volume; and Impuls for evaluating vestibular apparatus function by determining threshold amounts of electrical stimulation creating an illusion of pitching. The taste sensitivity of the tongue was also examined. Reconstitution of freeze-dried food was studied. The exercise and anti-gravity suits are described. Author

**N75-23165\*** General Electric Co., Houston, Tex.  
**CREW INTERFACE SPECIFICATIONS DEVELOPMENT FOR INFLIGHT MAINTENANCE AND STOWAGE FUNCTIONS** Final Report

John G. Carl 12 Nov. 1974 152 p refs  
(Contract NAS9-13375)  
(NASA-CR-141775) Avail: NTIS HC \$6.25 CSCL 05H

Findings and data products developed during crew specification study for inflight maintenance and stowage functions are reported. From this information base, a family of data concepts to support crew inflight troubleshooting and corrective maintenance activities was developed and specified. Recommendations are made for the improvement of inflight maintenance planning, preparations and operations in future space flight programs through the establishment of an inflight maintenance organization and specific suggestions for techniques to improve the management of the inflight maintenance function. Author

**N75-23166\*** Advisory Group for Aerospace Research and Development, Paris (France).  
**STANDARDISATION OF IMPACT TESTING OF PROTECTIVE HELMETS** A Working Group Report

D. H. Glaister, ed. Feb. 1974 14 p refs  
(AGARD-R-629) Avail: NTIS HC \$3.25

Standardization of biodynamic impact testing on aircrew helmets is considered. A classification of currently used test procedures is attempted and a compromise approach is proposed which could form the basis for agreement within the NATO membership. In addition to impact protection, penetration resistance and helmet retention, it specifies requirements for blast protection, maximum all-up weight and location of helmet's center of gravity. Author

**N75-23167\*** Utah Univ., Salt Lake City. Inst. for Biomedical Engineering.

**BIOMEDICAL ENGINEERING SUPPORT**

W. J. Kolff 1974 149 p refs  
(Contract AT(11-1)-2155)  
(COO-2155-13) Avail: NTIS HC \$5.75

The development of an artificial heart is reported. A total of ten heart replacement experiments in calves was conducted using the bench model blood pump. Both an externally and internally (in the abdomen) located electric motor was used to drive the blood pump. The ultimate goal is to develop a fully implantable artificial heart for humans powered by a Pu-238 heat source. NSA

**N75-23168\*** School of Aerospace Medicine, Brooks AFB, Tex.  
**PORTABLE OXYGEN-CONTAMINANT DETECTOR: DEVELOPMENT TEST AND EVALUATION** Interim Report, Oct. 1973 - Oct. 1974

Kenneth G. Ikels and Walter L. Crow Feb. 1975 10 p refs  
(AF Proj. 7164)  
(AD-A007039; SAM-TR-75-6) Avail: NTIS CSCL 06/11

A portable oxygen-contaminant analyzer developed by the USAF School of Aerospace Medicine underwent an extensive 3-month field test and evaluation at 4 participating bases. Oxygen was sampled from aircraft, LOX service carts and bulk storage tanks, and reference samples. The field-test managers unanimously recommended that the analyzer development continue with an operational test and evaluation program. GRA

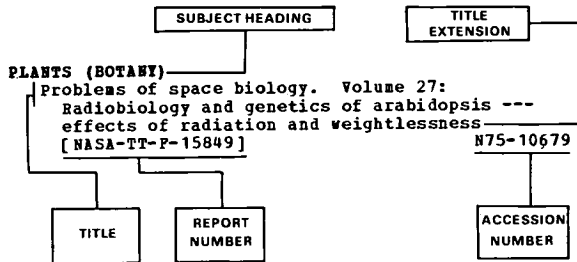
**N75-23169#** San Diego State Coll., Calif. Dept. of Biology.  
**ORIGIN AND STRUCTURE OF AMERICAN ARID-ZONE  
ECOSYSTEMS. THE PRODUCERS: INTERACTIONS  
BETWEEN ENVIRONMENT, FORM, AND FUNCTION**  
P. C. Miller and H. A. Mooney (Stanford Univ., Calif.) 1974  
18 p refs Presented at the 1st Intern. Congr. of Ecol., The  
Hague, 8 Sep. 1974 Sponsored by ERDA  
(Conf-740912-3) Avail: NTIS HC \$3.25

The Mediterranean scrub regions of California and Chile occur in a climate with winter rain and summer drought and mild winter temperatures and are comprised predominantly of evergreen sclerophyllous shrubs. Within these regions gradients occur in both countries; the coast is drier than the inland and has a higher frequency of drought deciduous shrubs. California tends to have a greater frequency of narrow, steeply inclined leaves than Chile. The evergreen form occurs where the carbon cost of maintaining leaves through periods of low photosynthesis is lower than the cost of producing new leaves. The deciduous form occurs where the carbon cost of maintaining leaves is higher than the cost of producing new leaves. The shrub form, which is associated with the utilization of deep soil water in the summer, places the photosynthetic tissue above the hot soil surface increasing photosynthesis and water use efficiency.

Author (NSA)

# SUBJECT INDEX

## Typical Subject Index Listing



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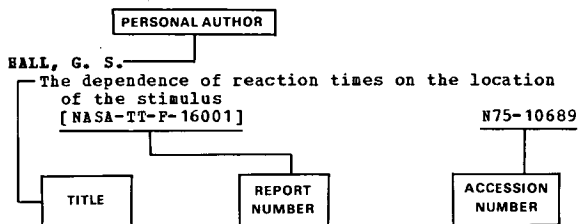
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