

**NASA SP-7011 (151)**



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# **AEROSPACE MEDICINE AND BIOLOGY**

**A CONTINUING BIBLIOGRAPHY  
WITH INDEXES**

**( Supplement 151 )**

**FEBRUARY 1976**

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**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION**

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# AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY  
WITH INDEXES

(Supplement 151)

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in January 1976 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 195 reports, articles and other documents announced during January 1976 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.

Two indexes—subject and personal author—are included.

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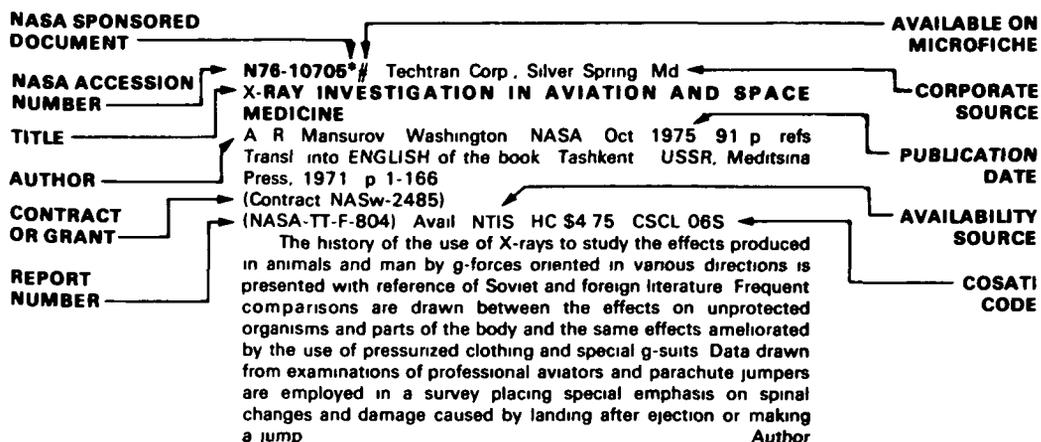
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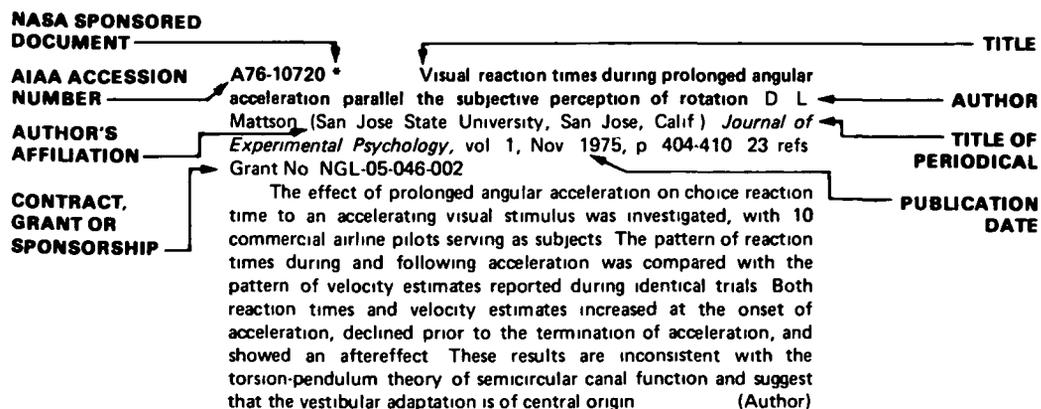
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## TYPICAL CITATION AND ABSTRACT FROM IAA



# AEROSPACE MEDICINE AND BIOLOGY

*A Continuing Bibliography ( Suppl. 151)*

FEBRUARY 1976

## IAA ENTRIES

**A76-10098 \*** Prostaglandin control of renal circulation in the unanesthetized dog and baboon J A Swain, S F Vatner (Harvard University, Peter Bent Brigham Hospital, Children's Hospital Medical Center, Boston, New England Regional Primate Research Center, Southborough, Mass ), G R Heyndrickx, and D H Boettcher *American Journal of Physiology*, vol 229, Sept 1975, p 826-830 21 refs Research supported by the American Heart Association and NASA, Grants No PHS-HL-15416, No PHS-HL-17549, No PHS-HL-1043609

Effects of indomethacin and meclofenamate, inhibitors of prostaglandin synthesis, were evaluated in the regulation of renal blood flow in conscious and anesthetized dogs and in tranquilized baboons, instrumented with arterial pressure catheters and renal blood flow probes Indomethacin, 10 mg/kg, did not alter renal blood flow or resistance significantly in the conscious dog In the anesthetized dog, however, indomethacin caused a reduction in renal blood flow and an elevation of renal vascular resistance Meclofenamate, 4 mg/kg, reduced renal flow and increased renal vascular resistance in conscious dogs In conscious dogs and tranquilized primates, indomethacin and meclofenamate reduced the reactive hyperemia in the renal bed Methoxamine and angiotensin II infused in graded doses induced significantly greater renal vasoconstriction in conscious dogs in the presence of indomethacin Thus, in the conscious animal, prostaglandins appear to play only a minor part in the control of renal circulation at rest, but they are of greater importance in mediating the renal responses to reactive hyperemia and to vasoconstriction (Author)

**A76-10303 #** Radiation safety in space flights Radiobiological aspects (Radiatsionnaya bezopasnost' kosmicheskikh poletov Radiobiologicheskie aspekty) lu G Grigor'ev Moscow, Atomizdat, 1975 256 p 549 refs In Russian

The radiation doses to which man in space can be exposed are discussed, and criteria for evaluating the radiation safety during space flights are proposed Data on the biological action of protons and heavy ions are reviewed, along with the results of radiobiological experiments performed in space The modifying influence environmental physical factors on the radiobiological effect is examined Means of protecting space crews from radiation are described V P

**A76-10480 \*** Responses to load disturbances in human shoulder muscles - The hypothesis that one component is a pulse test information signal J H J Allum (MIT, Cambridge, Mass ) *Experimental Brain Research*, vol 22, no 3, 1975, p 307-326 31 refs Grant No NGR-22-009-025

**A76-10650** Cs-131 myocardial scintigraphy - Application to assessment of anterior myocardial infarction W Burguet, G Merchie, and H Kulbertus (Liege, Université, Liege, Belgium) *British Heart Journal*, vol 37, Oct 1975, p 1037-1044 21 refs

One hundred and ten cases with documented anterior myocardial infarction are studied by cesium-131 myocardial scintigraphy

in order to assess the potentials of this technique The clinical usefulness of the technique is discussed, and its suitability for semiquantitative evaluation of anterior necrotic lesions is stressed An index of necrosis is proposed from planimetric measurements of the infarcted area as compared to the total left ventricular surface in both the anteroposterior and left anterior oblique projections This index of necrosis is shown to correlate with the incidence of major complications following the acute episode of coronary occlusion The sensitivity, specificity, and accuracy of the technique are briefly discussed In order to visualize the intracardiac cavities, Cs 131 investigation is usually completed by an In-113m scintigram to be able to recognize parietal aneurism The results so far obtained are promising enough to justify further efforts in this field S D

**A76-10718** On the relation between time and space in the visual discrimination of velocity J S Lappin, H H Bell, O J Harm, and B Kottas (Vanderbilt University, Nashville, Tenn ) *Journal of Experimental Psychology*, vol 1, Nov 1975, p 383-394 22 refs Grant No PHS-MH-21105

Two experiments were conducted to verify whether perception of velocity is determined by prior discrimination of spatial and temporal distances, by comparing the discriminabilities of moving stimuli varied in spatial extent, temporal duration, or in redundant combinations of both variables The subject's task was to identify which of two alternative stimuli was presented on each trial A set of four stimuli was constructed from two values of spatial extent and two values of temporal duration Separate conditions required discrimination of each of the six possible pairs of these stimuli Experiment 1 examined continuous motion and Experiment 2 examined apparent motion for stimuli with short (50 vs 65 msec) and with long (500 vs 650 msec) interstimulus intervals With continuous motion and with good apparent motion (short intervals), the discrimination between the different-velocity bivariate pairs was too accurate to be attributed only to discriminations of the spatial and temporal extents of the motion This did not occur with poor apparent motion (Author)

**A76-10719** Perception and extrapolation of velocity and acceleration D A Rosenbaum (Stanford University, Stanford, Calif ) *Journal of Experimental Psychology*, vol 1, Nov 1975, p 395-403 8 refs

A moving target disappeared behind a screen and subjects predicted when the target passed behind a marker on the screen When the target moved with constant velocity, predictions were extremely accurate, regardless of the spatial and temporal exposure and concealment of the target and regardless of its rate of velocity When the target accelerated, accuracy of prediction decreased with increasing acceleration and with increasing target concealment Analyses of the results suggest that the perception of velocity and acceleration incorporates concrete and abstract characteristics of the motion that was seen It is proposed that the motion perception system is tuned to accelerated rather than to constant velocity movement (Author)

**A76-10720 \*** Visual reaction times during prolonged angular acceleration parallel the subjective perception of rotation D L Mattson (San Jose State University, San Jose, Calif) *Journal of Experimental Psychology*, vol 1, Nov 1975, p 404-410 23 refs Grant No NGL-05-046-002

The effect of prolonged angular acceleration on choice reaction time to an accelerating visual stimulus was investigated, with 10 commercial airline pilots serving as subjects The pattern of reaction times during and following acceleration was compared with the pattern of velocity estimates reported during identical trials Both reaction times and velocity estimates increased at the onset of

**A76-10808 #** DNA synthesis in the lymphoid organs of rats during adaptation to high-altitude conditions (Sintez DNK v limfoidnykh organakh kryz pri adaptatsii k usloviyam vysokogor'ia) F T Guseinov, G S Komolova, I A Egorov, and V A Isabaeva (Akademii Nauk SSSR, Institut Biokhimi, Moscow, USSR) *Akademiia Nauk SSSR, Doklady*, vol 223, Aug 1, 1975, p 1018, 1019 12 refs In Russian

**A76-10809 #** The dependence of the content and concentration of products of enzymatic oxidation on the size of coacervate droplets (Zavisimost' soderzhanii i kontsentratsii produktov fermentativnogo oksileniia ot razmerov koatservatnykh kapel') T V Mamontova, T N Evreinova, and Iu R Khrust (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR) *Akademiia Nauk SSSR, Doklady*, vol 223, Aug 1, 1975, p 1020-1022 7 refs In Russian

The oxidation of pyrogallol and o-dimethoxybenzidine by peroxidase in the presence of H<sub>2</sub>O<sub>2</sub> was studied in protein-carbohydrate (histone-gum arabic) and protein-nuclein (histone-DNA) coacervate systems. Quantitative measurements of oxidation products in individual coacervate droplets were carried out using a probing scintillation spectrophotometer and a scanning integrating microphotometer It was found that with increasing droplet size the content of oxidized substances increased, while their concentration decreased The concentration of oxidized compounds was greater in DNA-histone droplets than in gum arabic-histone droplets of the same size Equations describing the dependence of the concentration of individual oxidation products on droplet size are derived from analysis of the data C K D

**A76-10823** Comments on fire toxicity R R Montgomery, C F Reinhardt, and J B Terrill (Du Pont de Nemours and Co, Inc, Wilmington, Del) *Journal of Fire and Flammability, Combustion Toxicology Supplement*, vol 2, Aug 1975, p 179-212 83 refs

Factors identified as causes of death and incapacitation in fires are heat, either as direct burns or thermal shock, carbon monoxide, oxygen deficiency, thermal decomposition gases, smoke, and panic or trauma Among these factors, two recent epidemiological surveys of fire fatalities identified carbon monoxide poisoning, smoke poisoning or asphyxia, and burns as principal causes of fire deaths Test methods for evaluating fire toxicity are characterized as analytical, biological, a combination of these two, or predictive The review includes data from laboratory experiments of these various types and also data from room and building fires The need to put data into practical context or present it on a comparable basis with standard or natural materials is emphasized Suggestions for future research are presented (Author)

**A76-10824** Toxicity of decomposition products. K Sumi and Y Tsuchiya (National Research Council, Div of Building

Research, Ottawa, Canada). *Journal of Fire and Flammability, Combustion Toxicology Supplement*, vol 2, Aug 1975, p 213-225 40 refs

Studies on toxic decomposition products to provide an experimental basis for the possible restriction of materials that generate large amounts of harmful gases upon combustion are summarized Results of several investigations of fire fatalities show that the majority are caused by inhalation of combustion products Experiments to determine the toxicity of various combustion products and to identify the synergistic, additive, or antagonistic effects of certain combinations of toxic gases are described Quantitative analyses of

pyrolysis products are discussed, and a method of evaluating the toxic hazard from experimental data is proposed Fire regulations of various countries limiting the use of potentially toxic materials are outlined C K D

**A76-10825** A bibliography of published information on combustion toxicology C J Hildado (San Francisco, University, San Francisco, Calif) and R P Chapman (California, University, Davis, Calif) *Journal of Fire and Flammability, Combustion Toxicology Supplement*, vol 2, Aug 1975, p 244-261 241 refs

**A76-10991** Absorption characteristics of multilayered sphere models exposed to UHF/microwave radiation C M Weil (U S Environmental Protection Agency, Experimental Biology Laboratory, Research Triangle Park, N C) *IEEE Transactions on Biomedical Engineering*, vol BME-22, Nov 1975, p 468-476 20 refs

The interaction of electromagnetic plane waves with multilayered spherical models composed of lossy dielectric media that represent different biological tissues found in human and animal heads is examined in the frequency range 0.1 to 10 GHz The model ranges in size from 2 to 12.5 cm outer radius and consists of a core of brain-like material surrounded by five outer layers of CSF, bone, fat and skin-dura tissues The absorption properties of the model have been analyzed throughout this range of size and frequency The distribution of internally deposited energy has also been investigated in detail for three basic spheres of 3.3, 6 and 10 cm radii, with emphasis on the creation of localized regions of strong heating (hot-spots) Based on these results, some generalized conclusions are presented on the interaction of microwaves with different sized biological objects (Author)

**A76-10997** Computation of the electromagnetic fields and induced temperatures within a model of the microwave-irradiated human eye A Taflov (ITT Research Institute, Chicago, Ill) and M E Brodwin (Northwestern University, Evanston, Ill) *IEEE Transactions on Microwave Theory and Techniques*, vol MTT 23, Nov 1975, p 888-896 25 refs

**A76-11064** Detection of a change in plant dynamics in a man-machine system R J Niemela (U S Army, Electronics Command, Fort Monmouth, NJ) and E S Krendel (Pennsylvania, University, Philadelphia, Pa) *IEEE Transactions on Systems, Man, and Cybernetics*, vol SMC-5, Nov 1975, p 615-617 10 refs

A description of the detection portion of a concise model of human operator adaptation in manually tracking a step change in polarity of double integral plant dynamics is presented A general form of the detection boundaries in error state space was postulated based on examination of man-machine error trajectory responses This form was corroborated by experimental data (Author)

**A76-11138 \*** Increased rate of response of the pituitary-adrenal system in rats adapted to chronic stress. P C Sakellaris and J Vernikos-Danellis (NASA, Ames Research Center, Biomedical Research Div., Moffett Field, Calif ) *Endocrinology*, vol 97, Sept. 1975, p 597-602 22 refs

The response and adaptation of the pituitary-adrenal system to chronic stresses was investigated. These included individual caging, confinement, and exposure to cold for varying periods of time. Studies were carried out demonstrating that during the period of adaptation when plasma corticosterone concentrations returned toward their prestress level despite continued exposure to the stressor, the animals responded to additional stimuli of ether for 1 min, a saline injection, or release from confinement with a faster increase (within 2.5 min) in plasma corticosterone than controls (10 min). It is concluded that during adaptation to a chronic stress the pituitary-adrenal system is not inhibited by the circulating steroid level but is actually hypersensitive to additional stimuli. (Author)

**A76-11200** Frequency analyzer for EEG signals (Frequenzanalysator für EEG-Signale) H N Karp *Elektronik*, vol 24 Oct 1975, p 107-109 12 refs In German

The paper describes an EEG recording system that displays to the subject under investigation the time variation of his alpha waves and their frequency spectrum. This bio-feedback system is particularly suited for experiments in which test subjects exercise control over their alpha-wave generation. Block scheme and circuit diagram of the system are shown. The frequency range (7-14 MHz) is divided into seventeen channels. Tests showed that some subjects were able to control the amplitude of the EEG signals, but only when they could observe the display screen. P T H

**A76-11238 #** Reaction of erythrocytes and granulocytes in the peripheral blood of rate to hyperbaric oxygenation during oxygen deficiency in the organism (Reaktsiia eritrotsitov i granulotsitov perifericheskoi krovi krysa na giperbaricheskuiu oksigenatsiiu pri kislorodnoi nedostatochnosti organizma) Z G Tsagareli, E S Chertkova, and M A Dgebuadze (Akademiia Nauk Gruzinskoï SSR, Institut Eksperimental'noi Morfologii, Tiflis, Georgian SSR) *Akademiia Nauk Gruzinskoï SSR, Soobshcheniia*, vol 79, Aug 1975, p 477-480 In Russian

**A76-11376 #** Computer-aided analysis of the probability characteristics of the brain biopotentials in healthy man (Analiz veroiatnostnykh kharakteristik biopotentsialov golovnogo mozga zdorovogo cheloveka s pomoshch'iu elektronno-vychislitel'noi tekhniki) V I Kondratenko and A A Rybalov (Donetskii Meditsinskii Institut, Donetsk, USSR) *Zhurnal Vysshei Nervnoi Deiatel'nosti*, vol 25, July-Aug 1975, p 792-798 9 refs In Russian

**A76-11377 #** Dynamics of the skin-galvanic reflex for different stages and cycles of nighttime sleep (Dinamika kozhno-gal'vanicheskogo refleksa v razlichnykh stadiakh i tsiklakh nochnogo sna) V S Rotenberg, B I Kochubei, and V M Shakhnarovich (I Moskovskii Meditsinskii Institut, Vsesoiuznyi Nauchno-Issledovatel'skii Institut Zheleznodorozhnoi Gигieny, Moscow, USSR) *Zhurnal Vysshei Nervnoi Deiatel'nosti*, vol 25, July-Aug 1975, p 858-860 5 refs In Russian

**A76-11419** Two-point fluorophotometer for the human ocular fundus C Riva and I Ben-Sira (Retina Foundation, Eye Research Institute, Boston, Mass ) *Applied Optics*, vol 14, Nov 1975, p 2691-2693 5 refs Research supported by the Adler

Foundation and Massachusetts Lions Eye Research Fund, Grant No NIH-1-R01-EY-01242-01

A technique for making on-line recordings of fluorescein dilution curves from two locations in the human retina has been devised. A modified Zeiss fundus camera with two optical fibers mounted in a scanning ocular collects the light emitted by fluorescein dye from two spots in the fundus. Two fiber-optic cables transmit the collected light to a photomultiplier. The detector output current is transmitted to a two-channel pulse sorter. The output signals from the pulse sorter are amplified and displayed on a two-channel recorder. Since this technique utilizes only small amounts of fluorescein, multiple measurements in the same subject are possible. (Author)

**A76-11449** Effects of age on responses to isometric exercise - Isometric handgrip in noninvasive screening for cardiovascular disease M Kino, V W Lance, A Shahamatpour, and D H Spodick (Lemuel Shattuck Hospital, Tufts University, Boston, Mass ) *American Heart Journal*, vol 90, Nov 1975, p 575-581 42 refs Grant No NIH-HE-13608

**A76-11450** Electrophysiology and pharmacology of cardiac arrhythmias IX - Cardiac electrophysiologic effects of beta adrenergic receptor stimulation and blockage Part B A L Wit, B F Hoffman, and M R Rosen (Columbia University, New York, N Y ) *American Heart Journal*, vol 90, Nov 1975, p 665-675 70 refs

**A76-11451 #** Dynamics of biped walk II (Dinamika dvunogoi khod'by II) V V Beletskii *Akademiia Nauk SSSR, Izvestiia, Mekhanika Tverdogo Tela*, July-Aug 1975, p 3-13 5 refs In Russian

Analytical solutions in closed form are obtained for several problems in which a biped system is simulated as a solid with two inertialess legs with many joints suspended at one point. The compensating motions of the body (balancer), the control moments in the leg joints, and the reactions of the suspension are determined from the given trajectory of the suspension point and the trail trajectory. V P

**A76-11468** Aviation cardiology in Canada G W Manning (University Hospital, London, Ontario, Canada), R Thatcher, and I H Anderson (Canadian Armed Forces, Defence and Civil Institute of Environmental Medicine, Toronto, Department of National Health and Welfare, Civil Aviation Medicine Medical Services Branch, Ottawa, Canada) (*American College of Cardiology, Bethesda Conference, 8th, Washington, D C, Apr 25, 26, 1975*) *American Journal of Cardiology*, vol 36, Oct 31, 1975, p 576-583 7 refs

A summary of military and civilian aspects of aviation cardiology in Canada is given. Electrocardiographic screening of applicants for military aircrew training is discussed, and procedures for the detection and review of existing or potential cases of cardiovascular disease in airmen are described. Preliminary results of a follow-up program of 5000 men who had routine ECGs during the Second World War indicate that first degree atrioventricular block does not increase morbidity or mortality over that of the normal population and that primary T wave changes may indicate the presence of asymptomatic coronary heart disease. The evaluation of the cardiovascular fitness of applicants for civil aviation licenses is outlined, and the guidelines used in granting licenses when cardiovascular problems exist are presented. The risk of civil aviation accidents due to cardiovascular problems is discussed. C K D

**A76-11469** Operational aspects of pilot incapacitation in a multicrew airliner H W Orlady (United Air Lines, Inc, Chicago, Ill) (*American College of Cardiology, Bethesda Conference, 8th, Washington, D C, Apr 25, 26, 1975*) *American Journal of Cardiology*, vol 36, Oct 31, 1975, p 584-588 12 refs

The risks due to obvious or subtle (not immediately apparent to crew members) pilot incapacitation during critical flight stages were studied in simulated incidents in DC-8 and B-737 aircraft The studies revealed three critical tasks for airline crews dealing with an incapacitation maintaining control of the aircraft, caring for the incapacitated crew member, and reorganizing the cockpit and landing Effective transfer of control was achieved by crews with no previous training in less than 5 seconds in 93% of the simulated incidents There were wide variations in crew performance in caring for the incapacitated member Reorganization of the cockpit was not a problem It is suggested that air crews receive training in the recognition of subtle incapacitation and in coping with the incapacitated pilot Such training might permit conservative modifications of medical standards while attaining a reduction of operational risk C K D

**A76-11470** On experts and expertise - The effect of variability in observer performance D H Spodick (Lemuel Shattuck Hospital, Boston, Mass) (*American College of Cardiology, Bethesda Conference, 8th, Washington, D C, Apr 25, 26, 1975*) *American Journal of Cardiology*, vol 36, Oct 31, 1975, p 592-596 16 refs

Variation in the performance of cardiology experts is dependent upon quantity and quality of the available data, but is also a function of two personal factors perception and interpretation of data Comparisons of expert interpretations of electrocardiograms and vectorcardiograms made with and without biasing information demonstrate wide divergence of opinion Two controlled perception trials involving recognized cardiology experts produced similar results It is suggested that biases in data acquisition and interpretation be minimized as far as possible by standardization of evaluation protocols and that multi-observer controlled trials of diagnostic methods be conducted to reveal the level of built-in discrepancies C K D

**A76-11471** Identification of ischemic heart disease Mr Ellestad (Memorial Hospital Center, Long Beach, Calif), Mr Fox (George Washington University, Bethesda, Md), Mr Bruce, Mr Dodge (Washington, University, Seattle, Wash), Mr Gensini (St Joseph's Hospital, Syracuse, N Y), Mr Humphries (Johns Hopkins University, Baltimore, Md), Mr Kannel (National Heart Institute, Framingham, Mass), Mr Levy (National Institutes of Health, National Heart and Lung Institute, Bethesda, Md), Mr Mankin (Mayo Clinic, Rochester, Minn), and Mr McHenry (Indiana University, Indianapolis, Ind) (*American College of Cardiology, Bethesda Conference, 8th, Washington, D C, Apr 25, 26, 1975*) *American Journal of Cardiology*, vol 36, Oct 31, 1975, p 597-608 33 refs

The construction of cardiovascular risk profiles for asymptomatic individuals is discussed, together with the use of resting and exercise electrocardiograms to identify cardiovascular conditions presenting a potential hazard The evaluation procedures currently required for pilots of different classes are summarized Criteria for qualifying persons beginning or continuing an aviation career are proposed Procedures are recommended for the initial evaluation and periodic follow-up of the cardiovascular health of pilots C K D

**A76-11472** Recommendations for subjects with ischemic heart disease Mr Likoff (Hahnemann Medical College and Hospital, Philadelphia, Pa), Mr Knoebel (Indiana University, Indianapolis, Ind), Mr Amsterdam (California, University, Davis, Calif), Mr Frykholm (Aviation Medical Section, Montreal, Canada), Mr McMeekin (U S Armed Forces Institute of Pathology, Walter Reed Hospital, Washington, D C), Mr Roberts (National Institutes of Health, National Heart and Lung Institute, Bethesda, Md), and Mr Morris (*American College of Cardiology, Bethesda Conference, 8th,*

*Washington, D C, Apr 25, 26, 1975*) *American Journal of Cardiology*, vol 36, Oct 31, 1975, p 608, 609

Guidelines are recommended for the exercise of flexibility in the application of International Civil Aviation standards regarding ischemic heart disease It is suggested that recertification of patients with ischemic heart disease be denied if coronary angiography indicates obstructive narrowing of two or more major coronary arteries, and that it be granted if the coronary arteries are normal In other cases where there is coronary luminal narrowing, recertification should be withheld if there is other evidence of active myocardial ischemia Persons with a history of myocardial infarction but with no evidence of current myocardial ischemia should not be considered for recertification until one year after the infarction C K D

**A76-11473** Hypertension Mr Gifford (Cleveland Clinic, Cleveland, Ohio), Mr Martz (Dow Chemical Co, Indianapolis, Ind), Mr Carter (Mayo Clinic, Rochester, Minn), Mr Berry (Texas, University, Houston, Tex), Mr Caris (U S Veterans Administration Hospital, San Antonio, Tex), Mr Freis (U S Veterans Administration Hospital, Washington, D C), and Mr Hickler (Memorial Hospital, Worcester, Mass) (*American College of Cardiology, Bethesda Conference, 8th, Washington, D C, Apr 25, 26, 1975*) *American Journal of Cardiology*, vol 36, Oct 31, 1975, p 613-616 12 refs

Recommendations regarding the qualification of pilots with hypertension are presented Risks permitted by the present regulations are judged to be acceptable, but it is suggested that serum cholesterol and glucose concentrations and smoking habits be included in the equation with blood pressure in determining fitness for flight Guidelines are presented for the qualification of pilots whose hypertension has been surgically corrected or is controlled by antihypertensive drugs Disqualifying evidence of target organ disease is summarized, and a method of monitoring hypertension in pilots is outlined It is recommended that the same hypertension standards be applied to all classes of pilots C K D

**A76-11474** Valvular heart disease Mr Hall (Texas Heart Institute, Houston, Tex), Mr Bristow (Oregon, University, Portland, Ore), Mr Hultgren (U S Veterans Administration Hospital, Palo Alto, Calif), Mr Kouchoukous (Alabama, University, Birmingham, Ala), Mr McAllister (U S Armed Forces Institute of Pathology, Walter Reed Hospital, Washington, D C), and Mr Chetlin (*American College of Cardiology, Bethesda Conference, 8th, Washington, D C, Apr 25, 26, 1975*) *American Journal of Cardiology*, vol 36, Oct 31, 1975, p 617-620 30 refs

A procedure for detecting and evaluating valvular heart disease in qualified pilots and applicants for flight qualification is outlined It is recommended that all acquired valvular heart disease be disqualifying on the initial examination for flight qualification, and that newly discovered and previously undocumented valvular abnormalities in certified flight personnel be disqualifying until their stability and severity have been determined by serial observation Guidelines for continuing flight certification of personnel with mild aortic stenosis, mild aortic regurgitation, or mild mitral regurgitation are presented C K D

**A76-11475 \*** The capability of fluoroscopic systems to determine differential Roentgen-ray absorption N A Baily and R L Crepeau (California, University, La Jolla, Calif) *Radiology*, vol 115, May 1975, p 439-445 8 refs Grant No NGL-05 009-103

A clinical fluoroscopic unit used in conjunction with a TV image digitization system was investigated to determine its capability to evaluate differential absorption between two areas in the same field Fractional contrasts and minimum detectability for air, several concentrations of Renografin-60, and aluminum were studied using phantoms of various thicknesses Results showed that the video-metric response, when treated as contrast, shows a linear response with absorber thickness up to considerable thicknesses (Author)

**A76-11703 Biomedical cost of low-level flight in a hot environment** R R Bollinger (USAF, School of Aerospace Medicine, Brooks AFB, Tex ) and G R Carwell (USAF, Regional Hospital, Shaw AFB, S C ) *Aviation, Space, and Environmental Medicine*, vol 46, Oct 1975, p 1221-1226 20 refs

The physiologic and performance effects of low level reconnaissance flying in hot environments were documented and quantitated RF-4C pilots and weapons system operators were studied in hot and cool seasons during both high and low missions to distinguish environmental temperature from flight level effects ECG, sternal and thigh skin temperatures, and cockpit temperature at helmet level were monitored continuously Body weights, oral temperatures, sweat Na/K ratios, and urine electrolytes, steroids, and catecholamines, as well as sleep and fatigue scores, were measured Mission performance was assessed using photo target acquisition scores RF-4C aircrews are exposed to moderate heat stress and acute dehydration (12% over 90 min) during low level summer flights where cockpit temperature occasionally exceeded 50 C Photo target scores indicated that the potential for crew error was increased and that the margin of safety was accordingly decreased during such hot missions The RF-4C cockpit air conditioning system proved inadequate (Author)

**A76-11704 Body composition of mice following exposure to 4300 and 6100 meters** J P Hannon and G B Rogers (US Army, Letterman Army Institute of Research, Presidio of San Francisco, Calif ) *Aviation, Space, and Environmental Medicine*, vol 46, Oct 1975, p 1232-1235 20 refs

Male Swiss mice were exposed for 3 and 7 d to simulated altitudes of 4300 and 6100 m Body weight losses were enhanced at the higher elevation and after longer exposure at each elevation Carcass analyses showed the weight losses to be attributable to decrements in body water and fat content The water decrements were a little greater than the fat decrements after all exposure conditions At both elevations, however, fat loss increased significantly as exposure was extended from 3 to 7 d whereas water loss remained unchanged (Author)

**A76-11705 Cardiomyopathy - The frequently forgotten mimic Clinical and open-chest myocardial biopsy studies** G M FitzGibbon (National Defence Medical Centre Ottawa, Canada) (*Joint Committee on Aviation Pathology, Symposium, Downsview, Ontario, Canada, Sept 17-19, 1974*) *Aviation, Space, and Environmental Medicine*, vol 46, Oct 1975, p 1248-1250 7 refs

Attention is drawn to the cardiomyopathies, 25 idiopathic cases being presented and the features noted which may mimic other conditions, especially coronary heart disease Subtle clinical manifestations may be missed or misinterpreted unless these disorders are kept in mind The diagnosis can usually be suspected at the bedside but specialized tests may be required to confirm it Open chest myocardial biopsy has yielded exciting but not yet apparently useful results in six instances Recognition of cardiomyopathy in aviation cardiology is important because of the high incidence of cardiac arrhythmia and sudden death associated with the condition (Author)

**A76-11706 Heart pathology associated with exposure to high sustained +Gz** R R Burton and W F MacKenzie (USAF, School of Aerospace Medicine, Brooks AFB, Tex ) (*Joint Committee on Aviation Pathology, Symposium, Downsview, Ontario, Canada, Sept 17-19, 1974*) *Aviation, Space, and Environmental Medicine*, vol 46, Oct 1975, p 1251-1253 6 refs

Unanesthetized adult miniature and immature pigs were exposed to accelerations of +8 or 9 Gz for 45-90 seconds Necropsies of adult pigs revealed gross evidence of hemorrhage in the endocardial area of

the left ventricles involving both the wall and the papillary muscles The severity and extent of the subendocardial hemorrhage were quantified on a scale of 1 (slight) to 4 (extremely severe) Hemorrhaging in the papillary muscles of adult pigs following a single 45 90 second exposure to +9 Gz ranged from a mean of 2.3 to 3.3, and the extent of ventricular wall involvement was 2.5-3.3 Heart hemorrhage was limited to the subendocardial region, primarily the space between the heart muscle and the endocardium, and was particularly evident around Purkinje's fibers Young farm pigs were much less susceptible to hemorrhage It is suggested that particular attention be given to the endocardium of victims of high-performance aircraft accidents C K D

**A76-11707 Medical and psychiatric aspects of accident investigation** R E Yanowitch (FAA, Office of Aviation Medicine, Washington, D C ) (*Joint Committee on Aviation Pathology, Symposium, Downsview, Ontario, Canada, Sept 17-19, 1974*) *Aviation, Space, and Environmental Medicine*, vol 46, Oct 1975, p 1254-1256

Mechanical failures are causative factors in 10-20% of fatal aircraft accidents, while biomedical factors account for 80-90% of such incidents Accident investigation includes a complete autopsy and, where possible, toxicological studies of the blood, bile, urine, gastric contents, etc to reveal the presence of substances causing pilot incapacitation such as alcohol, drugs, and carbon monoxide The investigation of factors contributing to destructive stress reactions in aircraft crew members is described, and the role of stress response in aircraft accidents is discussed C K D

**A76-11709 Analysis of human factors in aircraft accidents** P J Dean and R F Thatcher (Defence and Civil Institute of Environmental Medicine, Downsview, Ontario, Canada) (*Joint Committee on Aviation Pathology, Symposium, Downsview, Ontario, Canada, Sept 17-19, 1974*) *Aviation, Space, and Environmental Medicine*, vol 46, Oct 1975, p 1260-1262

Basic approaches used in the analysis of human factors are discussed and a description is given of two recent examples of studies which led to a new evaluation of the employed methods of analysis In the operational analysis, possible factors which might have played a role in the accident are identified with the aid of a guide list of about 100 items G R

**A76-11710 Cervicocranium and the aviator's protective helmet** E J Colangelo (US Navy, Naval Safety Center, Norfolk, Va ) (*Joint Committee on Aviation Pathology, Symposium, Downsview, Ontario, Canada, Sept 17-19, 1974*) *Aviation, Space, and Environmental Medicine*, vol 46, Oct 1975, p 1263, 1264

It has been held that there is an analogy between the APH-6 aviator's helmet and the hangman's noose, with the inferior edge of the helmet, when visualized as part of a continuous circle completed by nape-strap and chin-strap, forming the noose, and with the lesions made about the neck by the straps or edge of the helmet paralleling the abrasions and the contusions that might be associated with a rope It had been thought that a fractured, displaced odontoid process is the prototype lesion which endangers the victim with cervical cord, injury and death, but recent studies show mortality incidence of odontoid (or hangman's) fracture to be less than 10% B J

**A76-11711 Helmets and head protection in CF ejections 1967-1973** R E Noble (Defence and Civil Institute of Environmental Medicine, Downsview, Ontario, Canada) (*Joint Committee on Aviation Pathology, Symposium, Downsview, Ontario, Canada, Sept 17-19, 1974*) *Aviation, Space, and Environmental Medicine*, vol 46, Oct 1975, p 1265, 1266

During the period 1967-1973, helmet retention and minor head injuries were significant problems in ejections from Canadian Forces (CF) aircraft There were 73 ejections in which Canadian-designed helmets were worn Eighty-four percent of those who lost their helmets and 38% of those who retained their helmets received minor

head injuries. This paper reports on analysis of helmet loss versus air speed and G force. Specific problems are addressed, including the fitting and method of wearing helmets, and some guidelines for enhancing helmet retention are recommended. (Author)

**A76-11712** Crew rest and nap-of-the-earth flying. D S Berliner (U.S. Army, 101st Airborne Division /Airmobile/, Fort Campbell, Ky.) (*Joint Committee on Aviation Pathology, Symposium, Downsview, Ontario, Canada, Sept 17-19, 1974*) *Aviation, Space, and Environmental Medicine*, vol 46, Oct 1975, p 1267-1270. 8 refs.

Nap-of-the-earth (NOE) flying was conceived to evade enemy detection of rotary wing aircraft, requiring the stressful technique of aircraft movement only inches above the ground terrain. The NOE concept was tested from 12 June, 1973, to 30 June, 1974, for 3267.6 h in NOE training. Four aircraft incidents occurred during this training period, with three of these taking place prior to 1 March, 1974. At that point, after 59.2% of the total hours had been flown, NOE pilot training was curtailed from 8 h/d to 4 h/d. Objective and subjective data infer that pilot (crew) rest and the length of the flying day are important factors in the safety of NOE flying. (Author)

**A76-11713** Alcohol and other drugs in aircraft accidents. A F Zeller (USAF, Air Force Inspection and Safety Center, Norton AFB, Calif.). (*Joint Committee on Aviation Pathology, Symposium, Downsview, Ontario, Canada, Sept 17-19, 1974*) *Aviation, Space, and Environmental Medicine*, vol 46, Oct 1975, p 1271-1274.

During the 12-year period from 1962 through 1973, there were 89 USAF aircraft accidents or incidents in which alcohol and/or other drugs were mentioned as being in some way associated with the mishap. A review of these indicates a relatively constant level of occurrence each year, with no indication that such accidents are increasing. Alcohol was by far the most prominent drug mentioned. A great variety of over-the-counter and prescription preparations were cited. There were no instances in which illicit narcotics were involved. Analysis indicates that the relationship was, in most instances, associative and not causative. In some instances, the background disease for which the medication was being taken was far more probable as a cause agency. The need for better documentation and greater cooperation between the flight surgeons and pathologists was indicated. (Author)

**A76-11714** Alcohol associated with fatal light aircraft accidents, United Kingdom - 1964-1973. K E Underwood Ground (RAF, Institute of Pathology and Tropical Medicine, Halton, Bucks, England) (*Joint Committee on Aviation Pathology, Symposium, Downsview, Ontario, Canada, Sept 17-19, 1974*) *Aviation, Space, and Environmental Medicine*, vol 46, Oct 1975, p 1275-1279. 19 refs.

**A76-11715** Error and artefact in post mortem toxicological analysis. D G Wootton (RAF, Institute of Pathology and Tropical Medicine, Halton, Bucks, England) (*Joint Committee on Aviation Pathology, Symposium, Downsview, Ontario, Canada, Sept 17-19, 1974*) *Aviation, Space, and Environmental Medicine*, vol 46, Oct 1975, p 1280-1283. 14 refs.

Factors influencing the quality of post mortem specimens obtained from victims of aircraft accidents and affecting the results of toxicological analyses are presented. The effects of putrefaction processes on the results of such studies are considered, and lists of endogenous and artifact compounds found in connection with putrefaction are given. Artifacts due to contamination of body tissues by bacteria and fuel products are discussed. C K D

**A76-11716** Impaired pilot performance - Drugs or alcohol. K E Underwood Ground (RAF, Institute of Pathology and Tropical Medicine, Halton, Bucks, England) (*Joint Committee on Aviation*

*Pathology, Symposium, Downsview, Ontario, Canada, Sept 17-19, 1974*) *Aviation, Space, and Environmental Medicine*, vol 46, Oct 1975, p 1284-1288.

The circumstances leading to forced landing of a three-seat light cabin monoplane due to engine failure are described. The pilot, an airline pilot employed as a Boeing 707 captain, and one of the two passengers were killed. The liver of the pilot showed diffuse fatty changes and toxicological examination revealed a blood alcohol concentration of 149 mg/100 ml and 139 mg/100 ml in the urine. On initial screening for drugs, the presence of nitrazepam or chlordiazepoxide was suspected and the medical investigation was further complicated by the finding of chlordiazepoxide in the personal effects. Although the cause of the accident was a stall at low altitude during an attempted forced landing following loss of engine power, it was concluded that the pilot's ability to avoid onset of stall was impaired by the concentration of alcohol in his system. (Author)

**A76-11717** What is the mechanism of carbon monoxide toxicity. L R Goldbaum, R G Ramirez, and K B Absalon (U.S. Armed Forces Institute of Pathology, Washington Hospital Center, Washington, D C.) (*Joint Committee on Aviation Pathology, Symposium, Downsview, Ontario, Canada, Sept 17-19, 1974*) *Aviation, Space, and Environmental Medicine*, vol 46, Oct 1975, p 1289-1291. 9 refs.

The probable toxic action of CO is on the cellular respiration, in which CO competes with O<sub>2</sub> for cytochrome a<sub>3</sub>. Studies indicate that a relatively high concentration of COHb (50%) does not interfere with the O<sub>2</sub>-carrying capacity of the blood. The dissolved CO in plasma, which is necessary for CO to enter the tissue, probably occurs when the exchange takes place between alveolar air and the blood in the lungs. This would explain why the central nervous system could be impaired when COHb levels are below 10% and death could occur at 35%. (Author)

**A76-11718** Analysis of gases and pH of blood at altitude. J H Wolcott and R R McMeekin (U.S. Armed Forces Institute of Pathology, Washington, D C.) (*Joint Committee on Aviation Pathology, Symposium, Downsview, Ontario, Canada, Sept 17-19, 1974*) *Aviation, Space, and Environmental Medicine*, vol 46, Oct 1975, p 1292-1296.

The accuracy of a system for measuring pH and gas in blood in a changing-altitude environment was studied. No problems were encountered when arterial blood was measured, provided the instrument was properly calibrated. Failure to calibrate to the correct altitude settings caused major variations in measuring oxygen levels in blood. Standard gases used for calibrating were measured at altitude without recalibrating the system, approximately 80% of the oxygen and 90% of the carbon dioxide partial-pressure values were within 3 mm Hg of their expected value. More deviation occurred for PO<sub>2</sub> values as the altitude increased. Frequently, the PO<sub>2</sub> electrode malfunctioned, particularly above 8000 ft (2438 m). The Corning blood gas system used in this study was capable of making accurate determinations of gas in blood if properly operated and calibrated to specific altitude levels. (Author)

**A76-11719** Application of radioimmunoassay techniques in support of toxicologic investigations of aircraft accidents. W W Manders and A M Dominguez (U.S. Armed Forces Institute of Pathology, Washington, D C.) (*Joint Committee on Aviation Pathology, Symposium, Downsview, Ontario, Canada, Sept 17-19, 1974*) *Aviation, Space, and Environmental Medicine*, vol 46, Oct 1975, p 1297, 1298.

**A76-11720** Coronary artery disease and preventive cardiology in aviation medicine F S Pettyjohn (U S Army, Aeromedical Research Laboratory, Fort Rucker, Ala) and R R McMeekin (U S Armed Forces Institute of Pathology, Washington, D C) *Joint Committee on Aviation Pathology, Symposium, Downsview, Ontario, Canada, Sept. 17-19, 1974* *J Aviation, Space, and Environmental Medicine*, vol 46, Oct 1975, p 1299 1304 18 refs

A review of 6500 autopsied cases of deaths resulting from aircraft mishaps revealed 816 deaths (13%) attributed to pre-existing heart disease. The presence of atherosclerotic coronary artery disease (CAD) was noted in 89.1% of these cases. The incidence of CAD was studied as a function of the year in which death occurred and age of death, both in 5-year ranges, to determine the frequency of CAD in the aviation community. Results are compared with those of other autopsy studies. A progressive rise in the incidence of combined moderate and severe CAD is noted in the 20-34 age group. Recommendations are given for programs of preventative and predictive cardiology in the aviation community. C K D

**A76-11844** Experimental models for the evaluation of microwave biological effects P Czernski (National Research Institute of Mother and Child, Warsaw, Poland) *IEEE, Proceedings*, vol 63, Nov 1975, p 1540-1544 55 refs

The theoretical and empirical approaches to biological effects of microwaves are discussed. The bioeffects should be considered as a chain of events: primary interaction analyzed in terms of biophysics and early direct, early indirect, late (delayed) effects analyzed in terms of physiology. Thermal balance experiments are discussed pointing out the necessity to take unequal deep body heating by microwaves into account. The use of physiologic rhythms in microwave bioeffects experimentation is presented. Possible use of pharmacodynamic approaches (simultaneous use of drugs and microwave exposure) is outlined. Possible ways of developing biological response microwave dosimetry are indicated. Unexplained effects are pointed out and the necessity of further experiments to clarify these is stressed. Some possible experimental models are presented.

(Author)

**A76-11874** # Pathological-anatomical studies involving vascular stenoses (Pathologisch-anatomische Untersuchungen an Gefassstenosen). H Buss, H Richter, and J Schoenmackers (Rheinisch-Westfälische Technische Hochschule, Aachen, West Germany) *Rheinisch-Westfälische Technische Hochschule, Aerodynamisches Institut, Abhandlungen*, no 22, 1975, p 166-171 11 refs. In German. Research supported by the Deutsche Forschungsgemeinschaft.

It is shown with the aid of an example involving arterial vascular stenosis that different methodological approaches can be used to obtain results which describe the same phenomenon as a disturbance of, for example, the flow of the blood, the function of the heart, or the vascular wall structure. Attention is given to the preparation of models for the conduction of flow experiments, the techniques used to observe the flow characteristics, and studies with a scanning electron microscope. The results obtained in the various investigations are discussed. G R

**A76-11917** # Some particulars on the training of aviation physicians (Nekotorye osobennosti podgotovki aviatsionnykh vrachei) N M Rudnyi, I I Vavilov, and V I Kopanov *Voenna Meditsinskii Zhurnal*, Aug 1975, p 18-21. In Russian.

The training of specialists in aviation medicine must emphasize skill in diagnosis and in basic clinical practice while developing expertise in the evaluation of psychological and physical stresses placed on pilots and aircraft crew. It is particularly essential that these physicians receive training in the early detection of disease. To assess the experience and qualifications of individual physicians it is suggested that specialists in this field receive classifications, subject to revision on the basis of periodic reviews. C K D

**A76-11918** # Ways of further perfecting methods of vestibular selection (Puti dal'neishego sovershenstvovaniia metodov vestibuliarnogo otbora) E M Iuganov, E V Lapaev, V V Ivanov, and O A Vorob'ev *Voenna-Meditsinskii Zhurnal*, Aug 1975, p 55-57. In Russian.

The cumulative effects of Coriolis and centripetal accelerations upon the vestibular apparatus was studied in a group of healthy men from 20 to 45. It was found that tolerance of Coriolis acceleration was strongly dependent upon the angle of inclination of the head and torso: relatively high (0.1 g) Coriolis accelerations produced less disturbance with the head in a vertical position than relatively low (0.025 g) accelerations experienced with the head sharply inclined. The rapidity with which centripetal accelerations produced symptoms of vestibular disturbance was proportional both to their magnitude and to their duration. C K D

**A76-11919** # Aviation audiometric lists (Aviatsionnye audiometricheskie tablitsy) V S Kuznetsov, V A Kurashvili, M I Katalov, and A S Zharkaiia *Voenna-Meditsinskii Zhurnal*, Aug 1975, p 57-60. In Russian.

The composition of aircraft radio telephony communications was analyzed to determine the frequency of individual words and the percentage of words of a given length. Audiometric lists were formulated on the basis of these data and on the basis of similar data reflecting patterns in nonspecialized speech. A group of aviation specialists, 1/3 of whom had some reduction of tonal hearing, and a control group with no specialized training were tested at various noise levels with both types of lists. Results demonstrate that audiometric lists using the aviation lexicon are more useful in evaluating the hearing of pilots. The specialized vocabulary could be distinguished at relatively high noise levels by the pilots having some loss of tonal hearing. C K D

**A76-11920** # Hemodynamic indicators in air personnel of varying ages (Pokazateli gemodinamiki u letnogo sostava razlichnykh vozrastov). V V Lemesh *Voenna-Meditsinskii Zhurnal*, Aug 1975, p 70, 71. In Russian.

The age characteristics of hemodynamic indicators were investigated in four groups of aircraft personnel: groups 1 and 2 (mean ages 29.1 and 39.3 years) made up of healthy men; groups 3 and 4 (mean ages 30.6 and 39.3) composed of men suffering from hypertonic neurocirculatory dystonia. Spirograms, combined electrocardiograms, and arterial pressure were recorded over a 5 minute period during which subjects breathed either pure oxygen or 9.5% oxygen, 90.5% nitrogen. For the healthy men, the changes in the hemodynamic indicators due to hypoxia were smaller in the older men, while in the other groups the reaction to hypoxia was not age dependent. In healthy men breathing pure oxygen, all indicators studied increased with increasing age, with the exception of peripheral resistance which showed age-dependent decrease. C K D

**A76-11921** # Apparatus for the combined study of the functions of the auditory and visual analyzers (Pribor dlia kompleksnogo obsledovaniia funktsii slukhovogo i zritel'nogo analizatorov) M S Gonchar and T S Voronin *Voenna-Meditsinskii Zhurnal*, Aug 1975, p 75-77. In Russian.

A portable apparatus for the investigation of the visual and auditory analyzers has been developed. It permits the study of a wide range of factors including the critical frequency of the achromatic and chromatic flicker fusion, the period of a simple motor reaction, selective responses to achromatic and chromatic light stimuli, perception of sound signals of various frequencies and intensities, and the functional lability of the visual analyzer. The schematic circuit of the apparatus is presented, and its use is discussed. C K D

**A76-12097** Effect of elastic loading on ventilatory response to hypoxia in conscious man. A S Rebeck, M Betts, and N A Saunders (McMaster University, Hamilton, Ontario, Canada). *Journal of Applied Physiology*, vol 39, Oct 1975, p 548-551 19 refs Medical Research Council of Canada Grant No MA-5126

Ventilatory responses to isocapnic hypoxia, with and without an inspiratory elastic load, were measured in seven healthy subjects using a rebreathing technique. During each experiment, the end-tidal CO<sub>2</sub> partial pressure was held constant using a variable-speed pump to draw gas from the rebreathing bag through a CO<sub>2</sub> absorbing bypass. Elastic loading did not significantly alter the ventilatory response to progressive hypoxia. In all subjects there was, however, a change in breathing pattern during loading, whereby increments in ventilation were attained by smaller tidal volumes and higher frequencies than in the control experiments. These results support the hypothesis that a similar control pathway appears to be involved in response to the application of loads to breathing, whether ventilation is stimulated by hypoxia or hypercapnia. (Author)

**A76-12098** Effect of altitude exposure on platelets. G W Gray, A C Bryan, M H Freedman, C S Houston, W F Lewis, D M McFadden, and G Newell (Defence and Civil Institute of Environmental Medicine, Hospital for Sick Children, Toronto, Arctic Institute of North America, Mt Logan, Yukon Territory, Canada). *Journal of Applied Physiology*, vol 39, Oct 1975, p 648-651 18 refs

Since decompression from depth is known to produce a fall in platelet count, the effect of altitude decompression and high-altitude exposure on platelets was investigated. Sixteen subjects decompressed without hypoxia to 20,000 ft simulated altitude for two hours showed a significant drop in circulating platelet count of approximately 10% for three days following decompression. Subjects exposed to 9,800 ft and then 17,600 ft in a mountain environment showed a significant mean decrease in platelet count on day 2 of 7% and 25% respectively, which had returned to control by day 5. It is postulated that altitude decompression produces platelet reductions similar to these seen after decompression from depth, and that platelets sequester in the pulmonary vascular bed. (Author)

**A76-12099** Changes in the single-breath nitrogen washout curve on exposure to 17,600 ft. G W Gray, D M McFadden, C S Houston, and A C Bryan (Defence and Civil Institute of Environmental Medicine, Toronto, Arctic Institute of North America, Kluane Lake, Yukon Territory, Canada). *Journal of Applied Physiology*, vol 39, Oct 1975, p 652-656 22 refs

Seventeen volunteers were exposed to 17,600 ft after an acclimatization period at 9,800 ft. Single breath nitrogen washout curves were done at base camp (2,600 ft), on days 2 and 4 at 9,800 ft, and on days 1, 2, 3, 4 and 7 at 17,600 ft. There was a significant 39% increase in the slope of phase III on day 2 at 9,800 ft, accompanied by a 125 ml mean increase in anatomic dead space (VD) and a marked decrease in cardiac oscillations. By day 4 at 9,800 ft phase III slopes were reduced and were not significantly different from base-line controls, while cardiac oscillations were increased and VD decreased from day 2. Subsequent exposure to 17,600 ft produced another significant increase in phase III slope to 87% above control, which by day 7 had decreased significantly to 63% above control. These changes suggest a pathophysiological lung lesion which impairs gas mixing and increases asynchronous emptying during early altitude exposure. (Author)

**A76-12162** Biventricular dynamics during quantitated anteroseptal infarction in the porcine heart. H Brooks, J Al-Sadir, J Schwartz, B Rich, P Harper, and L Resnekov (Chicago, University, Franklin McLean Memorial Research Institute, Chicago, Ill.). *American Journal of Cardiology*, vol 36, Nov 1975, p 765-775 32 refs. Research supported by the Louis Block Fund and University of Chicago, Grants No NIH-HL-70-132-02, No NIH-N01-81334, No PHS-BM-18940

**A76-12163** Measurement of regional myocardial blood flow in man - Description and critique of the method using xenon-133 and a scintillation camera. P J Cannon, R R Sciacca, D L Fowler, M B Weiss, D H Schmidt, and W J Casarella (College of Physicians and Surgeons, New York, N.Y.). *American Journal of Cardiology*, vol 36, Nov 1975, p 783-792 44 refs. Grants No PHS-HL-14148, No PHS-HL-14236

**A76-12164** The application of conductive cooling to human operators. E Shvartz (Chamber of Mines of South Africa, Human Sciences Laboratory, Johannesburg, Republic of South Africa). *Human Factors*, vol 17, Oct 1975, p 438-445 18 refs

The application of conductive cooling for men working in different systems is discussed with respect to work load, heat stress, and clothing. Two types of conductive cooling are considered: circulating water, and ice. A brief review of the effects of whole and partial body cooling on the responses of man to heat stress serves as a basis for suggestions about desirable types of cooling which would allow the human operator to maintain satisfactory performance for extended periods. (Author)

**A76-12165** Training transfer of a formation flight trainer. G B Reid (USAF, Human Resources Laboratory, Williams AFB, Ariz.). *Human Factors*, vol 17, Oct 1975, p 470-476 11 refs

The present research was conducted to measure transfer of training from a formation simulator to aircraft formation flying. Evidence in support of positive transfer was obtained by comparing students trained in the formation simulator with students who were essentially untrained and with students trained in the aircraft. This design provided data for a direct comparison of five simulator sorties with two aircraft sorties, in an effort to establish quickly a training cost/transfer comparison. The results indicate that simulator training has at least the effectiveness of two aircraft sorties. (Author)

**A76-12211 #** Changes in the oxygen tension and bioelectrical activity of the animal brain in acute hypoxia (Izmeneniia napriazheniia kisloroda i bioelektricheskoi aktivnosti golovnogo mozga zhivotnykh pri vozdeistvii ostroi gipoksii). N S Akopian and O G Baklavadzhan (Erevanski Gosudarstvennyi Universitet, Yerevan, Armenian SSR). *Fiziologicheskii Zhurnal SSSR*, vol 61, Sept 1975, p 1303-1309 24 refs. In Russian

Simultaneous recording of oxygen tension (PO<sub>2</sub>) and bioelectrical potentials for different cerebral structures in rabbits and rats was carried out through implanted electrodes under conditions of acute oxygen deficiency. A pronounced activation of EEG considered as an electrophysiological correlate of behavioral response was observed in rabbits only at the beginning of ascent to high altitude and descent from it, whereas rats did not show any response of this kind. EEG, respiration, and cardiac activity changes due to a drop in the PO<sub>2</sub> of the brain tissue were almost of the same character in both species. S D

**A76-12212 #** Microelectrode study of the distribution of oxygen tension in the brain (Issledovanie mezhkapillarnogo raspredeleniia PO<sub>2</sub> v golovnom mozge s pomoshch'iu mikroelektrodov). I T Demchenko (Akademiia Nauk SSSR, Institut Evolutsionnoi Fiziologii i Biokhimi, Leningrad, USSR) and A E Chuikin (Leningradskii Gosudarstvennyi Universitet, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol 61, Sept 1975, p 1310-1317 19 refs. In Russian

The behavior of oxygen tension (PO<sub>2</sub>) distribution in the intercapillary spaces in the cortex of nonanesthetized and immobilized cats under normal and hypoxic conditions is investigated through specially designed microelectrodes 1-3 microns in diameter. A simple technique is proposed for estimating the resulting intercapillary PO<sub>2</sub>. Under normal conditions, absolute values of PO<sub>2</sub> are found to vary between 1 and 95 mm Hg. Initially high PO<sub>2</sub> undergoes maximum changes in hypoxia, whereas lower PO<sub>2</sub> values show no significant change. Analysis of the parameters of PO<sub>2</sub> distribution is helpful in developing a method for estimating the effectiveness of oxygen supply to the brain tissue. S D

**A76-12213 #** On the role of the hypothalamus in the mechanism of positional nystagmus (O roli gipotalamusa v mekhanizme pozitsionnogo nistagma) V E Koriukin (Voenno-Meditsinskaya Akademiya, Akademiya Meditsinskikh Nauk, Leningrad, USSR) *Fiziologicheskii Zhurnal SSSR*, vol 61, Sept 1975, p 1337-1342 19 refs In Russian

**A76-12214 #** Rotatory and vertical components of the eye nystagmus induced by rotation in a horizontal plane (O rotatornoi i vertikal'noi sostavliaushchikh v glaznom nistagme, vyzvanom vrascheniem v gorizonta'noi ploskosti) M M Levashov and Iu K Stolbkov (Akademiya Nauk SSSR, Institut Fiziologii, Leningrad, USSR) *Fiziologicheskii Zhurnal SSSR*, vol 61, Sept 1975, p 1343-1350 11 refs In Russian

The eye movements of a rabbit rotating about a vertical axis were recorded on film. The rotation test involved positive angular acceleration, two-minute rotation at a constant angular speed, and negative angular acceleration. Two types of rotation were used: rotation about a vertical axis between the labyrinths and an off-centered rotation providing a centrifugal force of 0.5 g. Successive film processing revealed the simultaneous movements of the eye in three planes: horizontal, frontal, and sagittal. The movements in all the planes consisted of rhythmic nystagmic and tonic components. In addition, a tonic otolith reflex occurred during the off-centered rotation. The complex form of the resulting vestibular nystagmus is attributed to hydromechanical interaction between the semicircular canals. S D

**A76-12215 #** The processing of a colored signal by various types of ganglionic cells in the frog retina (Obrabotka tsvetovogo signala razlichnymi tipami ganglioznykh kletok setchatki liagushki). B A Funtikov and I K Boreisha (Leningradskii Gosudarstvennyi Universitet, Leningrad, USSR) *Fiziologicheskii Zhurnal SSSR*, vol 61, Sept 1975, p 1351-1358 34 refs In Russian

The response to colored stimuli was studied using sections of frog retina containing two types of rod cells (with maximum absorptions in the region of 502 and 433 nm) and two types of cone cells: single, with maximum absorption at 575 nm, and duplex, with the main and complementary parts absorbing at in the region of 575 and 502 nm, respectively. It was found that only a few neurons functioned according to the opponent principle when the stimulus color was changed. A large number of the slow-firing on-off neurons altered their discharge pattern, and a sizeable group of on-neurons was sensitive to the order of the colored stimuli, displaying delays in their response that were dependent on the color of the initial stimulus. On the basis of these results it is suggested that temporal rather than spatial comparison is the mechanism of color identification. C K D

**A76-12216 #** The condition of the vascular net and the hemoecephalic barrier in the brain cortex of rats in the course of training for hypoxia (Sostoianie sosudistoi seti i gematoentsefalicheskogo bar'era v kore golovnogo mozga krysa v protsesse trenirovki k gipoksii) L N Simanovskii, A A Nikiforov, and V M Bresler (Akademiya Nauk SSSR, Institut Evoliutsionnoi Fiziologii i Biokhimi, Leningrad, USSR) *Fiziologicheskii Zhurnal SSSR*, vol 61, Sept 1975, p 1373-1380 33 refs In Russian

**A76-12217 #** Interaction between pressor and depressor mechanisms in the self-regulation of arterial pressure (O vzaimodeistvii pressornykh i depressornykh mekhanizmov v samoregulatsii arterial'nogo davleniia) K V Sudakov and M M Rasulov (I Moskovskii Meditsinskii Institut, Moscow, USSR) *Fiziologicheskii Zhurnal SSSR*, vol 61, Sept 1975, p 1387-1396 20 refs In Russian

The paper discusses the interaction of pressor and depressor effects in a functional system maintaining a constant level of blood pressure in the body. It is shown that under normal conditions the threshold depressor effects of the aortic nerve are stronger than its threshold pressor effects during stimulation of both the hypothalamic pressor points and the pressor zones of the bulbar

vasomotor center. Monomodal and polymodal neurons as related to the excitation of pressor zones in the posterior hypothalamus and of the aortic depressor nerve are revealed in some structures of the cardiovascular center in the medulla oblongata. It is suggested that convergent neurons are responsible for the end result of antagonistic pressor and depressor interactions at the level of the medulla oblongata neurons. S D

**A76-12244** Variations in psychomotor efficiency during prolonged stay at high altitude. V M Sharma, M S Malhotra, and A S Baskaran (Defence Institute of Physiology and Allied Sciences, Delhi, India) *Ergonomics*, vol 18, Sept 1975, p 511-516 15 refs

Alterations in psychomotor efficiency of 25 young adults (age range 21-30 yr) were studied during their stay up to two yr at an altitude of 4000 m. Psychomotor performance, its speed and accuracy were measured by administering an eye-hand coordination test at sea level and altitude after stay periods of 1, 10, 13, 18 and 24 months. Overall psychomotor efficiency, its accuracy and speed declined during early stages of altitude exposure. A progressive recovery was registered in overall performance by way of improvement in accuracy after 13 months, presumably due to acclimatization. Speed in performance showed no such gradual return to sea-level standard. (Author)

**A76-12301 #** Changes in peripheral vessels tone during acute hypoxia (Pro zmini tonusu periferichnykh sudin pri gostrii gipoksichnii gipoksii) V V Bratus' and N N Volkova (Akademiya Nauk Ukrain's'koi RSR, Institut Fiziologii, Kiev, Ukrainian SSR) *Fiziologicheskii Zhurnal*, vol 21, Sept-Oct 1975, p 602-606 22 refs In Ukrainian

The changes in the systemic hemodynamics as well as in the arterial and venous tone were studied at the initial stages of acute hypoxia. All the investigated effector elements of the cardiovascular system are shown to take an active part in development of the pressor reaction on respiration by the hypoxic mixture. But an increase in the heart activity and the rise of the venous tone occur much earlier than the distinct arterial constriction. (Author)

**A76-12302 #** Change in brain blood circulation during mental activity (Zmini mozgovogo krovoobigu pri rozumovii diial'nosti) S M Rashman (Kiyv's'kii Pedagogicheskii Institut, Kiev, Ukrainian SSR) *Fiziologicheskii Zhurnal*, vol 21, Sept-Oct 1975, p 607-611 10 refs In Ukrainian

The brain circulation was studied by the method of rheoencephalography during mental activity of different character. When mental activity is long and without developed emotions a tendency is observed to an increase in the brain blood supply after the work to slowing down in the rate of blood flow through the brain vessels with definite changes in the rheoencephalographical curve shape. With a short period but nervous-emotional mental activity the changes in blood supply or blood flow rate are not developed, however the curve shape may vary considerably, being the plateau shaped, dome-shaped or pointed for a short period of time with appearance of the additional diastolic teeth and with sharp unsynonymous fluctuations in some rheoencephalographic indices. (Author)

**A76-12303 #** Change in absorption and secretion functions of small intestine under the influence of rocking (Zmina vsmoktival'noi i sekretornoii diial'nosti kishechnika pid vplivom priamolininiikh priskoren') R O Faitel'berg, Iu F Udalov, L I S'omik, and G V Gladkii (Odesskii Gosudarstvennyi Universitet, Odessa, Ukrainian SSR) *Fiziologicheskii Zhurnal*, vol 21, Sept-Oct 1975, p 659-666 14 refs In Ukrainian

The absorption and secretion functions of the small intestine under rocking were studied in 7 dogs with the jejunum isolated by the Thyry method. It was found that under the influence of rocking absorption of glucose and glycine is decreased but that of copper and manganese trace elements is increased. Preparation "Pitaf" removes

the depressing influence of rocking on absorption of glucose and glycine. Simultaneously with a change in absorption a change in secretion of the intestinal juice was observed in response to the introduced substances. The proteolytic and aminolytic activities of the intestine juice under the effect of rocking increased. (Author)

**A76-12304 #** Change in the functional state of the central nervous system and the motor apparatus of athletes under different conditions of activity and rest (Zminy funktsional'nogo stanu tsentral'noi nervovoi sistemi i rukhovogo aparata sportsmeniv v umovakh riznikh rezhimiv dial'nosti i vidpochinku) P L Levakovs'kii, O Ia Pirogova, and G M Chaichenko (Kiiivs'kii Derzhavnyi Universitet, Kiiivs'kii Institut Medichnikh Problem Fizichnoi Kul'turi, Kiev, Ukrainian SSR) *Fiziologichnii Zhurnal*, vol 21, Sept-Oct 1975, p 675-681 15 refs In Ukrainian

**A76-12305 #** Multichannel rheograph with linear conversion characteristic and demodulation of pulsed blood filling at minimum probe current (Bagatokanal'nyi reograf z liniinomu kharakteristiku peretvorennia i demodulatsii pul'sovogo krovonapovnennia pri minimal'nomu strumi zonduvannia) A A Novikov and F F Getman (Odes'kii Medichnii Institut, Odessa, Ukrainian SSR) *Fiziologichnii Zhurnal*, vol 21, Sept-Oct 1975, p 698-700 10 refs In Ukrainian

**A76-12337** Backward recognition masking. D W Massaro (Wisconsin, University, Madison, Wis.) *Acoustical Society of America, Journal*, vol 58, Nov 1975, p 1059-1065 10 refs Grant No PHS-MH-19399

Backward recognition masking refers to the interference of a second sound on recognition of another sound presented earlier in time. Previous experiments have demonstrated backward recognition masking in an absolute judgment task. In those experiments, all of the experimental conditions were varied randomly within a test session. In the first experiment reported here, backward-masking functions generated between blocks of trials were compared to those determined within an experimental session. The results showed backward masking using both experimental procedures. The next two experiments evaluate backward-masking effects in a two-interval forced-choice task and a successive-comparison task. Backward masking was observed in both experiments. The final experiment showed that selectively attending to the ear of the test tone presentation does not attenuate the backward-masking effect of a second tone presented to the opposite ear. (Author)

**A76-12430 \*** Ernst Mach on the vestibular organ 100 years ago. V Henn (Zurich, Universitat, Zurich, Switzerland, MIT, Cambridge, Mass.) and L R Young *ORL*, vol 37, 1975, p 138-148 27 refs Grant No NGR-22-009-701

The paper reviews the contributions of Ernst Mach to vestibular research. His experiments, mainly psychophysical in nature, included measurements of threshold and investigation of the vestibular-visual interaction. Among his conclusions are that the adequate stimulus for the semicircular canals must be pressure, and that the sustained endolymph flow theory of Breuer (1874) and Crum Brown (1874) is erroneous. Excerpts are given of Mach's publications on vestibular functions. B J

**A76-12445 \*** Effects of shifts in the rate of repetitive stimulation on sustained attention. J E Krulowitz (Iowa State University of Science and Technology, Ames, Iowa), J S Warm, and T H Wohl (Cincinnati, University, Cincinnati, Ohio) *Perception and Psychophysics*, vol 18, no 4, Oct 1975, p 245-249 18 refs. Research sponsored by the U.S. Department of Health, Education, and Welfare, Grant No. N01L-36-004-014

The effects of shifts in the rate of presentation of repetitive

neutral events (background event rate) were studied in a visual vigilance task. Four groups of subjects experienced either a high (21 events/min) or a low (6 events/min) event rate for 20 min and then experienced either the same or the alternate event rate for an additional 40 min. The temporal occurrence of critical target signals was identical for all groups, irrespective of event rate. The density of critical signals was 12 signals/20 min. By the end of the session, shifts in event rate were associated with changes in performance which resembled contrast effects found in other experimental situations in which shift paradigms were used. Relative to constant event rate control conditions, a shift from a low to a high event rate depressed the probability of signal detections, while a shift in the opposite direction enhanced the probability of signal detections. (Author)

**A76-12446** Influence of foveal load on the functional visual field. M Ikeda and T Takeuchi (Tokyo Institute of Technology, Tokyo, Japan) *Perception and Psychophysics*, vol 18, no 4, Oct 1975, p 255-260 26 refs

The functional visual field defined in terms of a discrimination task of a target presented peripherally among ambiguous background patterns was investigated for various foveal loads which were to be recognized at the central retina. Foveal loads were numbers, letters, place names, traffic signs, and other figures to simulate commonplace situations for foveal information processing, and grouped into three in order of recognition difficulty based on daily experience. Boundaries of the functional visual field were obtained for simple fixation and for certain foveal loads. Comparison of these boundaries clearly showed shrinkage of the functional visual field size with the foveal loads of greater recognition difficulty. (Author)

**A76-12447 \*** Intermodal transfer in temporal discrimination. J S Warm, R M Stutz, and P A Vassolo (Cincinnati, University, Cincinnati, Ohio) *Perception and Psychophysics*, vol 18, no 4, Oct 1975, p 281-286 28 refs Grants No DA-49-193-2918, No NGL-36-004-014

This study determined if training for accuracy in temporal discrimination would transfer across sensory modalities. A fractionation method was used in which subjects bisected the durations of acoustic and visual signals at three standard intervals (6, 12, and 18 sec). Absolute error was the performance index. Half of the subjects were trained with acoustic stimuli and then tested in vision, the remainder were trained in vision and tested in audition. Similar negatively accelerated acquisition functions were noted for both modalities. Positive intermodal transfer, characterized by symmetry across modalities, was obtained at all standard durations. The results were considered to provide support for the notion that a common mechanism underlies temporal discriminations in different sensory systems. (Author)

**A76-12475** Biochemical aspects of acclimatization of man to high altitude stress. K K Srivastava (Defence Institute of Physiology and Allied Sciences, Delhi, India) *Defence Science Journal*, vol 25, July 1975, p 121-126 64 refs

The paper reviews the biochemical aspects of acclimatization of human body to high altitude with particular reference to the adaptive changes in skeletal muscles, hepatic function, adrenal function and carbohydrate metabolism. (Author)

**A76-12481 #** Human aspects of observation outside the space cabin (Chelovecheskie aspekty vnekabin'nogo nabludeniia) A G Nikolaev (Ergonomic dynamic control systems, Kiev, Izdatel'stvo Naukova Dumka, 1975, p 94-109 15 refs In Russian)

The paper examines the dynamics of the visual operative capacity of astronauts in flight. An algorithmic schematic representation of visual observation is presented, describing an astronaut's activity as he observes and describes an atmospheric phenomenon.

Data are presented showing the variation of visual capacity over a long-duration flight. Some tests and materials used for monitoring vision in flight are described. P T H.

**A76-12525** Effects of hypoxia on peripheral visual response to dim stimuli. J L Kobrnick (U S Army, Research Institute of Environmental Medicine, Natick, Mass.) *Perceptual and Motor Skills*, vol 41, Oct 1975, p 467-474 12 refs

Response times (RTs) of 9 Ss were obtained for detection of 48 flash stimuli distributed throughout the visual field during 3-1/4-hr exposures to each of 4 hypoxia conditions (0, 13,000, 15,000, 17,000 feet equivalent elevation). The luminances of all stimuli were set in common at the detection threshold value for the visual periphery. RTs were impaired in direct relation to hypoxic exposure severity, the peak impairments occurring within 90 min followed by gradual recovery. Since the present results showed less impairment than previous data for brighter stimuli using the same task, it is concluded that stimulus contrast is more critical to peripheral signal detection than absolute stimulus luminance, particularly under hypoxic exposure. (Author)

**A76-12551** All-Union Conference on Engineering and Medical Biomechanics, 1st, Riga, Latvian SSR, October 1975, Reports (Vsesoiuznaia Konferentsiia po Inzhenernoi i Meditsinskoj Biomekhanike, 1st, Riga, Latvian SSR, October 1975, Doklady) *Mekhanika Polimerov*, July-Aug 1975 192 p. In Russian

The papers collected represent theoretical and experimental studies of the mechanical properties of biological tissues and structures. Some of the topics covered include a model of vascular tonus, study of the dynamical behavior of skeletal muscle as a viscoelastic body, the elastic and damping properties of the human. Cooling decreased the toxicity of cyclizine and had no significant effect on that of trimethobenzamide or aspirin. These findings indicate that alterations in environmental temperature markedly affect drug toxicity. They emphasize that such alterations, and particularly increases in temperature, do not have to be particularly drastic, but that 'mild' variations in the environment are effective in altering an animal's sensitivity to a drug. (Author)

**A76-12552 #** Mathematical description of the properties of muscle tissue (Matematicheskoe opisaniie svoistv myshechnoi tkani). S A Regirer, P I Usik, and I V Chernova (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR) (Vsesoiuznaia Konferentsiia po Inzhenernoi i Meditsinskoj Biomekhanike, 1st, Riga, Latvian SSR, Oct 1975) *Mekhanika Polimerov*, July-Aug 1975, p 579-584 37 refs. In Russian

A brief survey of theoretical investigations devoted to the mathematical description of the properties of muscle tissue is given. Basic approaches to the problem are described, and their merits and disadvantages are discussed. The need for a continuum model of muscle is expressed, corresponding to modern concepts regarding continuous media. A procedure for constructing such a model is outlined, and fundamental and auxiliary hypotheses and conclusions following from a comparison of the theory with experimental data are studied. P T H.

**A76-12553 #** Model of vascular tonus (Model' sosudistogo tonusa). S A Regirer, I M Rutkevich, and P I Usik (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR). (Vsesoiuznaia Konferentsiia po Inzhenernoi i Meditsinskoj Biomekhanike, 1st, Riga, Latvian SSR, Oct 1975) *Mekhanika Polimerov*, July-Aug 1975, p 585-589 13 refs. In Russian

The paper investigates the use of general concepts of the mechanics of muscle tissue in constructing a simplified model describing the mechanical behavior of a blood vessel wall containing muscular layers. The concept of tonus is mathematically formalized, and a control parameter is introduced that has the sense of the concentration of the activator of mechanical-physical reactions in the myofibrils. The properties of vessels whose static characteristic has a

section with negative slope are investigated, with special attention given to the case when this segment is due to the strong dependence of tonus on the stress state of the vessel wall. P T H.

**A76-12554 #** Governing law of statistical biomechanics (Zakonomernost' statisticheskoi biomekhaniki). F K Agashin (Moskovskii Aviatsionnyi Institut, Moscow, USSR) (Vsesoiuznaia Konferentsiia po Inzhenernoi i Meditsinskoj Biomekhanike, 1st, Riga, Latvian SSR, Oct 1975) *Mekhanika Polimerov*, July-Aug 1975, p 590-596 6 refs. In Russian

A principle of statistical biomechanics is formulated in the form of an inverted distribution of the population of levels of a biological system, such as the system of sarcomeres. It is shown that in such a system a new type of condensation appears, which takes place at a maximally high energy level for the given system. The activity of the sarcomere system, appearing in the form of induced radiation of elastic waves, provides an additional mechanism for the transmission of information in man and a related mechanism of programmed automatic control of fast processes. P T H.

**A76-12555 #** The deformation properties of contractile polymer structures - Artificial muscles (O deformativnykh svoistvakh sokratitel'nykh polimernykh struktur - Iskusstvennykh myshts) R V Beliakov (Kievskii Institut Inzhenеров Grazhdanskoi Aviatsii, Kiev, Ukrainian SSR) (Vsesoiuznaia Konferentsiia po Inzhenernoi i Meditsinskoj Biomekhanike, 1st, Riga, Latvian SSR, Oct 1975) *Mekhanika Polimerov*, July-Aug 1975, p 597-602 14 refs. In Russian

A dynamic theory is presented for the longitudinal deformation of contractile polymer structures (artificial muscles). A linear approximation for small deformations is developed. Attention is given to elastic-osmotic structures consisting of disperse systems of more or less diluted gels in which the deformation depends on the degree of swelling. Viscoelastic properties of the gel matrix are represented by the classical Kelvin-Voigt model. Material exchange between the surrounding medium and the polymer body is considered in the form of a flow of penetrating particles through the membrane surface of an equivalent elastic-osmotic cell. P T H.

**A76-12556 #** Effect of a sequence of activating pulses on the contractile properties of muscle (Vlianie posledovatel'nosti aktiviruiushchikh impulsov na sokratitel'nye svoistva myshtsy) Iu S Levik (Akademiiia Nauk SSSR, Institut Problem Peredachi Informatsii, Moscow, USSR) (Vsesoiuznaia Konferentsiia po Inzhenernoi i Meditsinskoj Biomekhanike, 1st, Riga, Latvian SSR, Oct 1975) *Mekhanika Polimerov*, July-Aug 1975, p 613-617 12 refs. In Russian

The effect of a doublet stimulus pulse on isometric muscular contraction in man was investigated. Experiments were conducted on the flexor digitorum sublimis, the abductor muscle of the index finger, and the frontal tibial muscle. Changes in the active state were measured by recording muscle contraction force and its derivative. It is shown that a persistent increase in the contraction force after the doublet pulse is related to the intensification of the active state and the inhibition of its decay. Significant changes in the rate of force development were also observed, due to transmission. P T H.

**A76-12557 #** Theoretical study of some features of the dynamics of the behavior of skeletal muscle as a one-dimensional viscoelastic medium (Teoreticheskoe izucheniie nekotorykh osobennostei dinamiki povedeniia skeletnoi myshtsy kak odnomernoi viazkouprugoj sredy) E I Pal'tsev (Akademiiia Nauk SSSR, Institut Problem Peredachi Informatsii, Moscow, USSR) (Vsesoiuznaia Konferentsiia po Inzhenernoi i Meditsinskoj Biomekhanike, 1st, Riga, Latvian SSR, Oct 1975) *Mekhanika Polimerov*, July-Aug 1975, p 618-625 15 refs. In Russian

**A76-12558 #** Determination of the elastic and damping properties of the human femoral bone during bending (Opredelenie uprugikh i dempfirovushchikh svoystv bedrennoi kosti cheloveka pri izgibe) V N Butriakov, G Ia Panovko, and B A Potemkin (*Vsesoiuznaia Konferentsiia po Inzhenernoi i Meditsinskoii Biomekhanike, 1st, Riga, Latvian SSR, Oct 1975*) *Mekhanika Polimerov*, July-Aug 1975, p 642-646 13 refs In Russian

**A76-12559 #** The anisotropy of compact bone material subject to impact loads (Anizotropiia kompaktnogo veshchestva kosti pri udarnykh nagruzkakh) A A Uten'kin (*Vsesoiuznaia Konferentsiia po Inzhenernoi i Meditsinskoii Biomekhanike, 1st, Riga, Latvian SSR, Oct 1975*) *Mekhanika Polimerov*, July-Aug 1975, p 655-658 7 refs In Russian

**A76-12560 #** Study of the propagation of vibrations along the human hip bone (Issledovanie rasprostraneniia vibratsii po bedrennoi kosti cheloveka) V N Butriakov, G Ia Panovko, B A Potemkin, G A Safarashvili, and K V Frolov (*Vsesoiuznaia Konferentsiia po Inzhenernoi i Meditsinskoii Biomekhanike, 1st, Riga, Latvian SSR, Oct 1975*) *Mekhanika Polimerov*, July-Aug 1975, p 680-684 7 refs In Russian

**A76-12561 #** Low-frequency acoustic characteristics of biological tissues (Nizkochastotnye akusticheskie kharakteristiki biologicheskikh tkanei) A P Sarvazian (Akademiia Nauk SSSR, Institut Biologicheskoi Fiziki, Moscow, USSR) (*Vsesoiuznaia Konferentsiia po Inzhenernoi i Meditsinskoii Biomekhanike, 1st, Riga, Latvian SSR, Oct 1975*) *Mekhanika Polimerov*, July-Aug 1975, p 691-695 6 refs In Russian

The propagation of elastic waves of various types in biological tissues is studied experimentally and theoretically for the acoustic range of frequencies. The contribution to the velocity of the elastic waves made by the real and imaginary components of the complex elastic modulus is analyzed. It is shown that in soft tissues, low-frequency elastic disturbances propagate mainly with the aid of shear waves. Geometric dispersion of velocity of elastic waves was studied experimentally on models of gel-like systems, and results for a system with Poisson coefficient of about 0.5 were in good agreement with calculated results based on the dispersion equation

P T H

**A76-12562 #** Effect of human psychoemotional stress and physical activity on the age-related changes in the mechanical properties of arterial walls (Vliianie psikhoemotsional'nogo napriazheniia i fizicheskoi aktivnosti cheloveka na vozrastnye izmeneniia mekhanicheskikh svoystv stenok arterii) A D Valtneris (Rizhskii Meditsinskii Institut, Riga, Latvian SSR) (*Vsesoiuznaia Konferentsiia po Inzhenernoi i Meditsinskoii Biomekhanike, 1st, Riga, Latvian SSR, Oct 1975*) *Mekhanika Polimerov*, July-Aug 1975, p 701-703 10 refs In Russian

**A76-12563 #** Differences between the deformation and strength characteristics of large blood vessels depending on their localization, load direction and age of the human subject (Razlichiiia deformatsionnykh i prochnostnykh svoystv krupnykh krovenosnykh sosudov v zavisimosti ot ikh lokalizatsii, napravleniia nagruzheniia i vozrasta cheloveka) V A Kas'ianov and A F Kregers (Akademiia Nauk Latviskoi SSR, Institut Mekhaniki Polimerov, Riga, Latvian SSR) (*Vsesoiuznaia Konferentsiia po Inzhenernoi i Meditsinskoii Biomekhanike, 1st, Riga, Latvian SSR, Oct 1975*) *Mekhanika Polimerov*, July-Aug 1975, p 704-710 13 refs In Russian

**A76-12564 #** Morphological and functional aspects of studying some mechanical properties of the human aorta (Morfologicheskie i funktsional'nye aspekty izucheniiia nekotorykh mekhanicheskikh svoystv aorty cheloveka) Iu A Iartsev (Saratovskii Gosudarstvennyi Meditsinskii Institut, Saratov, USSR) (*Vsesoiuznaia Konferentsiia po Inzhenernoi i Meditsinskoii Biomekhanike, 1st, Riga, Latvian SSR, Oct 1975*) *Mekhanika Polimerov*, July-Aug 1975, p 730-736 25 refs In Russian

**A76-12565 #** Electrical modeling of the blood circulation system (Ob elektricheskom modelirovaniu sistemy krovoobrashcheniia) A K Tsaturian (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR) (*Vsesoiuznaia Konferentsiia po Inzhenernoi i Meditsinskoii Biomekhanike, 1st, Riga, Latvian SSR, Oct 1975*) *Mekhanika Polimerov*, July-Aug 1975, p 761-765 5 refs In Russian

An electrical model of the arterial part of the human vascular system is presented. Impedance, the shape of pressure and discharge waves, and static operating characteristics of the vascular system under normal and artificial circulation conditions are studied on the model. Regarding artificial circulation pumping, the problem of quasi-one-dimensional flow of a viscous fluid in a tube with wave-like varying radius is considered

P T H

**A76-12635 \*** Stress modification of the toxicity of anti motion sickness drugs and Aspirin. D Shields, C Marra, A Goodwin, and J Vernikos-Danellis (NASA, Ames Research Center, Biomedical Research Div., Moffett Field, Calif.) *Pharmacology*, vol 13, 1975, p 241-247 23 refs

The effect of environmental temperature on the toxicity of cyclizine, trimethobenzamide, and Aspirin were studied in mice. LD-50s were compared at 30 C, 22 C, and 15 C. At 30 C the toxicity of all three drugs increased, with that to Aspirin being affected most. Cooling decreased the toxicity of cyclizine and had no significant effect on that of trimethobenzamide or aspirin. These findings indicate that alterations in environmental temperature markedly affect drug toxicity. They emphasize that such alterations, and particularly increases in temperature, do not have to be particularly drastic, but that 'mild' variations in the environment are effective in altering an animal's sensitivity to a drug

(Author)

## STAR ENTRIES

**N76-10695\*#** Food and Drug Administration Cincinnati Ohio  
**ECOLOGY AND THERMAL INACTIVATION OF MICROBES  
 IN AND ON INTERPLANETARY SPACE VEHICLE COMPONENTS** Quarterly Progress Report, 1 Jan - 31 Mar 1975  
 A L Reyes and J E Campbell Jun 1975 11 p  
 (NASA Order W-13411)  
 (NASA-CR-145480 QPR-40) Avail NTIS HC \$3 25 CSCL  
 O6M

Dry heat treatment is specified as the preferred means for the terminal sterilization of spacecraft and for decontamination of spacecraft components. The presence of organisms highly resistant to dry heat in soil and fallout around assembly and industrial manufacturing areas is shown. The dry heat survival characteristics of the Cape Kennedy isolate 4-6 B brevis spores is demonstrated. The presence of hardy organisms from soil samples obtained from geographical areas of the United States is shown. A resistant fraction appears to occur in low numbers in a soil sample. The heat resistance characteristics of 4-6 B brevis and B subtilis var niger spores are compared. Their morphological characteristics are compared by scanning electron microscopy. Author

**N76-10696\*#** Kanner (Leo) Associates Redwood City Calif  
**STARVATION AND REFEEDING OF CARP (CYPRINUS CARPIO L)**  
 Y Creach and A Serfaty Washington NASA Nov 1975  
 25 p refs Transl into ENGLISH from J Physiol (Paris) v 68  
 no 3, 1974 p 245-260  
 (Contract NASw-2790)  
 (NASA-TT-F-16649) Avail NTIS HC \$3 25 CSCL O6C

The main findings on the biochemical changes produced by prolonged total starvation of carp are described. The physiological effects are pointed out in regard to body protein utilization, amino acid metabolism and the problem of fish refeeding after acute starvation. Author

**N76-10697\*#** National Aeronautics and Space Administration  
 National Space Technology Labs Bay Saint Louis Miss  
**WATER HYACINTHS FOR UPGRADING SEWAGE LA-  
 GOONS TO MEET ADVANCED WASTEWATER TREATMENT  
 STANDARDS, PART 1**  
 B C Wolverton and R C McDonald Oct 1975 9 p refs  
 (NASA-TM-X-72729) Avail NTIS HC \$3 25 CSCL O6C

Water hyacinths, Eichhornia crassipes Mart Solms have demonstrated the ability to function as an efficient and inexpensive final filtration system in a secondary domestic sewage lagoon during a three month test period. These plants reduced the suspended solids, biochemical oxygen demanding substances and other chemical parameters to levels below the standards set by the state pollution control agency. The water hyacinth-covered secondary lagoon utilized in this experiment had a surface area of 0.28 hectare (0.70 acre) with a total capacity of 6.8 million liters (1.5 million gallons) receiving an inflow of 522,100 liters (115,000 gallons) per day from a 1.1 hectare (3.8 acre) aerated primary sewage lagoon. These conditions allowed a retention time of 14 to 21 days depending on the water hyacinth evapotranspiration rates. The desired purity of final sewage effluent can be controlled by the water hyacinth surface area, harvest rate and the retention time. Author

**N76-10698\*#** Hawaii Univ, Honolulu Botany Dept  
**THE PERFORMANCE AND CAPABILITIES OF TER-  
 RESTRIAL ORGANISMS IN EXTREME AND UNUSUAL  
 GASEOUS AND LIQUID ENVIRONMENTS PERFORMANCE  
 OF FUNGI IN EXOTIC AND HARSH ENVIRONMENTS**  
**Semiannual Report**  
 Sanford M Siegel Oct 1975 29 p refs  
 (Grant NGL-12-001-042)  
 (NASA-CR-145395 Paper-40) Avail NTIS HC \$3 75 CSCL  
 O6C

The growth of Penicillium in saline and low temperature conditions during a 15 month incubation period was studied. Data are also given on the potential of fungi for modification of the surface geochemistry of the earth and the capacity of these fungi to solubilize and concentrate metals. Author

**N76-10699#** Los Alamos Scientific Lab, N Mex  
**EVALUATION OF LITHIUM BORATE AS A 7000-R DOSIME-  
 TER**  
 D M Holm and R J Payne Apr 1975 6 p refs  
 (Contract W-7405-eng-36)  
 (LA-5927-MS) Avail NTIS HC \$4 00

A lithium borate dosimeter was evaluated as a 7000-R dosimetry system. One hundred dosimeter cards having two dosimeters per card were irradiated by a 250-keV X-ray machine. A twofold change in calibration was observed during the course of 98 irradiation cycles and a decrease in light output versus time lag between irradiation and reading was observed. The first card failed on the 36th cycle and only two cards survived to the 98th cycle. All of the failures were due to damage of the Teflon packaging causing the dosimeters to hang up in the readout or to move in their card. This system could be used for screwworm fly dosimetry but is not considered ideal.

Author (NSA)

**N76-10700#** Environmental Protection Agency Cincinnati Ohio  
 Office of Water Program Operations  
**PLANKTON ANALYSIS TRAINING MANUAL Final Report**  
 R M Sinclair Mar 1975 265 p refs  
 (PB-242008/1, EPA-430/1-75-004) Avail NTIS HC \$8 50  
 CSCL O6F

The manual covers the broad field of plankton analysis including reference outlines on classification and identification of algae and zooplankton, limnology of plankton techniques of collection, and laboratory methods of analysis. GRA

**N76-10703#** Royal Aircraft Establishment Farnborough  
 (England)  
**FRACTURES OF THE SPINE IN HELICOPTER ACCIDENTS  
 (EXAMINATION OF 25 CASES)**

R P Delahaye, R Carre, R Auffret, and Farand Jul 1975  
 10 p refs Transl into ENGLISH from Rev Med Aeronaut et  
 Spatiale (France) v 7 no 26, 1968 p 131-133  
 (RAE-Lib-Trans-1848 BR48896) Avail NTIS HC \$3 25

Fractures of the spine were observed in the survivors of helicopter accidents. The different types of crashes are described and some of the characteristic observations are reported. The positions of the fractures and their pathogenic mechanisms are considered. Author

**N76-10704\*#** Transemantics Inc Washington, D C  
**MEASUREMENTS OF LYSOSOMAL ENZYME ACTIVITIES  
 AND LAUCINE INCORPORATION RATES IN THE BRAINS  
 OF YOUNG AND OLD RATS AFTER APPLICATIONS OF  
 PIRACETAM**

D Platt, H Hering, and F J Hering Washington NASA Nov  
 1975 13 p refs Transl into ENGLISH from Arzneim Forsch  
 Drug Research (West Germany), v 24 no 10, 1974  
 p 1588-1590  
 (Contract NASw-2792)  
 (NASA-TT-F-16653) Avail NTIS HC \$3 25 CSCL O6C

The activities were measured of three lysosomal enzymes: beta-glucuronidase, beta-acetylglucosaminidase, cathepsin D and the incorporation rate of C-14-D-leucine of the brains of young

and old rats after the application of 2-oxo-pyrrolidin-1-acetamid (piracetam) The results demonstrate an increase of the incorporation rate as well as an increase of the protein concentration in the lysosomal sediment of young and old rats The activities of the catabolic lysosomal enzymes decrease in all investigated groups The results are discussed  
Author

**N76-10705\*#** Techtran Corp Silver Spring Md  
**X-RAY INVESTIGATION IN AVIATION AND SPACE MEDICINE**

A R Mansurov Washington NASA Oct 1975 91 p refs  
Transl into ENGLISH of the book "Tashkent" USSR, Meditsina Press, 1971 p 1-166  
(Contract NASw-2485)  
(NASA-TT-F-804) Avail NTIS HC \$4 75 CSCL 06S

The history of the use of X-rays to study the effects produced in animals and man by g-forces oriented in various directions is presented with reference of Soviet and foreign literature Frequent comparisons are drawn between the effects on unprotected organisms and parts of the body and the same effects ameliorated by the use of pressurized clothing and special g-suits Data drawn from examinations of professional aviators and parachute jumpers are employed in a survey placing special emphasis on spinal changes and damage caused by landing after ejection or making a jump  
Author

**N76-10706\*#** Umpqua Research Co Myrtle Creek, Ore  
**EXPERIMENTAL STUDY OF THE CONSTITUENTS OF SPACE WASH WATER Final Report**

David F Putnam and Gerald V Colombo Sep 1975 79 p refs  
(Contract NAS2-8239)  
(NASA-CR-137735 URC-50801) Avail NTIS HC \$4 75 CSCL 06P

This report presents experimental data obtained under controlled conditions which quantify the various constituents of human origin that may be expected in space wash water The experiments were conducted with a simulated crew of two male and two female subjects The data show that the expected wash water contaminants originating from human secretions are substantially lower than theoretical projections indicated The data presented are immediately useful and may have considerable impact on the tradeoff comparisons among various unit processes and systems under consideration by NASA for recycling space wash water  
Author

**N76-10707\*#** Air Force Academy Colo Instrumentation Lab

**ANALYSIS OF CHANGES IN LEG VOLUME PARAMETERS, AND ORTHOSTATIC TOLERANCE IN RESPONSE TO LOWER BODY NEGATIVE PRESSURE DURING 59 DAYS EXPOSURE TO ZERO GRAVITY SKYLAB 3**

Richard D Barnett Richard J Gowen and David R Carroll Jul 1975 300 p refs  
(NASA Order T-66344-G)  
(NASA-CR-144515) Avail NTIS HC \$8 75 CSCL 06S

The cardiovascular responses of the Apollo crewmen associated with postflight evaluations indicate varying decrements of orthostatic tolerance The postflight changes indicate a slightly diminished ability to the cardiovascular system to function effectively against gravity following exposure to weightlessness The objective of the Skylab LBNP experiments (M092) was to provide information about the magnitude and time course of the cardiovascular changes associated with prolonged periods of exposure to weightlessness This report details the equipment signal processing and analysis of the leg volume data obtained from the M092 experiment of the Skylab 3 Mission  
Author

**N76-10708#** Institute for Perception RVO-TNO, Soesterberg (Netherlands)

**REPORT OF THE WORKING PARTY ON STANDARDIZATION OF THE INTERNATIONAL RESEARCH GROUP ON COLOUR VISION DEFICIENCIES**

J J Vos 1975 14 p  
(IZF-1975-7, TDCK-66457) Avail NTIS HC \$3 25

Members of the working party gave their judgment on the performance of color vision tests (Ishihara HRR TMC, Dvorine Farnsworth F2 Farnsworth dichotomous D15, Farnsworth H100 and Anamalosopes Nagel I and II) and on problems of nomenclature The results are discussed and a suggestion is made to set up a list of registered color vision tests with documented performance as a possibly useful step towards standardized color vision tests  
Author (ESA)

**N76-10709#** Naval Medical Research Inst Bethesda Md  
**HUMAN ENGINEERING CONSIDERATIONS IN THE EVALUATION OF DIVING EQUIPMENT Medical Research Progress Report**

A J Bachrach and G H Egstrom 1974 18 p refs Submitted for publication  
(AD-A011680) Avail NTIS CSCL 06/11

Highlights are presented of a particular human factors approach to one aspect of diver performance - the assessment of diving equipment its impact on the divers work and to a degree, his physiological state Briefly reported are a range-of-motion biomechanical analysis of the flexibility of the two systems and a heart rate-work correlation comparison of the two systems  
GRA

**N76-10710#** Harvard Medical School Boston Mass Dept of Physiology

**REGULATION OF PROTEIN AND AMINO ACID DEGRADATION IN SKELETAL MUSCLE**

Alfred L Goldberg and Richard Odessey 1974 15 p refs Presented at Proc of Intern Conf, Carefree Ariz, 15-19 Oct 1973 Submitted for publication  
(Grant AF-AFOSR-1807-69)

(AD-A011508 ISBN-90-21902265) Avail NTIS CSCL 06/1

The article reviews recent investigations on the following aspects of protein metabolism in muscle (1) In muscle the average rates of protein catabolism vary under different physiological conditions e.g fasting Several factors have been found to reduce protein catabolism including insulin glucose and branched chain amino acids In addition repeated contractions and passive tension on the muscle retard net proteolysis (2) Muscle rapidly oxidizes 3 required amino acids - leucine isoleucine and valine This process increases severalfold upon fasting in diabetes and after hypophysectomy (3) Muscle releases into the circulation large amounts of alanine This process is linked to degradation of the branched chain amino acids Since alanine is a major precursor for glucose synthesis in liver and since liver releases branched chain amino acids selectively during gluconeogenesis there appears to be a cycle between muscle and liver of branched chain amino acids and alanine  
GRA

**N76-10711#** Rochester Univ NY Div of Urology  
**THE PATHOPHYSIOLOGY OF DECOMPRESSION SICKNESS AN OVERVIEW WITH EMPHASIS ON PLASMA AND LIPID CHANGES Final Report**

Abraham T K Cockett Stephen M Pauley, Donald N Zehl and Willia S Cockett 30 May 1975 17 p refs  
(Contract N00014-67-A-0398-0008, NR Proj 201-011)  
(AD-A011153, Rept-5-29192) Avail NTIS CSCL 06/19

Several significant findings or trends have been noted over the past 12 years Lipid emboli coexist with gaseous emboli in moderately severe decompression sickness Lipid emboli can be altered following early intravenous therapy Dextran (LMW or MMW) is effective as an antilipemic clearing agent An excellent colloidal expander dextran should be used in the treatment of severe decompression sickness particularly if a recompression chamber is miles away Human divers may manifest changes in hematocrit, platelet and selected coagulation factors These trends are of interest and can perhaps herald the onset of decompression sickness if the plasma changes are significantly altered beyond the levels shown by volunteer divers The lungs serve as a primary target organ for trapping emboli Disruption of alveoli at this site may lead to air embolism Careful monitoring of the brain and eyeground can be of assistance in following the more severely afflicted patient  
GRA

**N76-10712# Army Edgewood Arsenal Md  
RESPIRATORY RESISTANCE AND THE ENDURANCE OF  
MEN WORKING UNDER THERMAL STRESS Technical  
Report, Dec 1973 - Jul 1974**

Francis N Craig and Fred W Stemler May 1975 30 p refs  
(DA Proj 1W7-62710-AD-25)  
(AD-A011261 EB-TR-75025) Avail NTIS CSCL 05/5

The effect of the respiratory resistances of the M17A1 protective mask on endurance in hard work of five men wearing the two-layer permeable protective assembly was tested by comparing the standard mask with one whose inspiratory and expiratory resistances were 3 mm H<sub>2</sub>O at an airflow of 85 liters per minute. Four comparisons were made at 18C nine at 41C and three at 46C in walking at 3 mph or jogging at 4 mph both up a 10 percent grade. The 3-mph walks represented a workload of from one-third to one-half the measured maximal oxygen uptake. The physiological state at exhaustion was examined in terms of the heart rate, rectal temperature and the time devoted to the expiratory phase of the respiratory cycle. For men walking at 3 mph up a 10 percent grade the heat load of the permeable protective assembly restricts endurance at environmental temperatures of 18C and above. The respiratory stress of the M17A1 protective mask does not add significantly to the restriction on endurance under these conditions. GRA

**N76-10713# School of Aerospace Medicine Brooks AFB Tex  
INFLIGHT PATIENT MONITORING/BLOOD PRESSURE  
MEASUREMENT DEVICE Final Report, Jun 1970 - Jul  
1974**

Helen D Koczynski David L Stoner and George A Rex May  
1975 13 p  
(AF Proj 4054)  
(AD-A011608 SAM-TR-75-9) Avail NTIS CSCL 06/12

The blood pressure measurement device was designed to meet an urgent operational requirement for a method of monitoring vital signs of acutely ill patients while in flight. The high noise and vibration levels of most aircraft make the indirect measurement of blood pressure extremely difficult using the conventional approach. The Military Airlift Command (MAC) requested development of a device which would overcome these constraints. A method using an ultrasonic monitoring device that employs the Doppler shift principle to detect blood flow and arterial wall motion was developed by USAFSAM. The inflight blood pressure measurement device consists of a commercial ultrasonic Doppler shift monitor and a standard sphygmomanometer which has been modified by placing a transducer mount through the cuff and bladder. The device is employed similarly to an acoustic stethoscope and sphygmomanometer. GRA

**N76-10714# Maryland Univ College Park  
CELLULAR VIABILITY, METABOLISM AND GROWTH  
KINETICS DURING HYPERTHERMIA IN THE PHYSIOLOGI-  
CAL RANGE Final Report, 18 Jun 1973 - 31 Aug 1974**

Joshua R C Brown 23 May 1975 12 p refs  
(Grant DA-ARO(D)-31-124-73-G196)  
(AD-A011484 FR-3 ARO-115563-L) Avail NTIS CSCL  
06/19

The objectives of the project are to (1) establish a dose response curve to hyperthermia between normal incubation temperature and 40.5C (2) to investigate the mechanisms of thermal disruption of normal cellular activities and attempt to correlate temperature induced effects with changes in high energy nucleotide availability or with the levels of other metabolic regulators (3) to investigate the mechanisms of increased thermal stability in previously heat treated cell cultures. A brief outline of research findings is presented. GRA

**N76-10715# Maryland Univ College Park  
CELLULAR VIABILITY, METABOLISM AND GROWTH  
KINETICS DURING HYPERTHERMIA IN THE PHYSIOLOGI-  
CAL RANGE Final Report, 1 Feb 1972 - 31 Aug 1974**

Joshua R C Brown 23 May 1975 11 p refs  
(Grant DAHC19-72-G-0010)  
(AD-A011482 ARO-115562-L FR-2) Avail NTIS CSCL  
06/19

A study of the effect of a 12-hour incubation at 40.5C on population growth, mitotic index, cell viability and rate of incorporation of 3H-thymidine into DNA, 3H-leucine into protein and inorganic 32P into high energy nucleotides is presented. A summary of results of this investigation is given. GRA

**N76-10716# Turku Univ (Finland) Dept of Medical  
Chemistry**

**OXYGEN AND TRAUMA STUDIES ON PULMONARY  
OXYGEN POISONING AND THE ROLE OF OXYGEN IN  
REPAIR PROCESSES Final Technical Report, Dec 1973 -  
Dec 1974**

Juha Niinikoski Dec 1974 90 p refs  
(Grant DA-ERO-124-74-G-0011)  
(AD-A011408, ARDGE-R/D-2026) Avail NTIS CSCL 06/5

Contents: oxygen-induced changes in pulmonary phospholipids, collagen metabolism in rat lungs during chronic intermittent exposure to oxygen. Determinations of local O<sub>2</sub> and CO<sub>2</sub> tensions by means of implanted silastic tube, parenchymal gas tensions in dog lung, intraperitoneal O<sub>2</sub> and CO<sub>2</sub> tensions in experimental adhesion disease and peritonitis, energy metabolism of experimental wounds in various oxygen environments, effect of hyperbaric oxygenation and prolonged hypoxia on healing of open wounds, oxygen tensions in healing anastomosis of rabbit aorta. GRA

**N76-10717# Aerospace Medical Research Labs Wright-  
Patterson AFB Ohio**

**EFFECTS OF MONOMETHYLHYDRAZINE ON RED BLOOD  
CELL METABOLISM**

Marilyn E George Mar 1975 20 p refs  
(AF Proj 7163)  
(AD-A011548 AMRL-TR-74-87) Avail NTIS CSCL 06/20

Monomethylhydrazine is used in various Air Force propellant systems. Chronic exposure to low concentrations of this compound results in an anemia characterized by methemoglobinemia, decreased levels of reduced glutathione and Heinz body formation. The study reported here was designed to determine if Heinz body formation was the principal mechanism of the red cell destruction or if MMH also had effects on the glycolytic pathways and/or red cell membranes which would contribute to the hemolytic mechanism. Human red cells were exposed in vitro to three levels of MMH for two, four or six hours. Glucose utilization, lactate production and ATP levels were measured to determine effects on glucose metabolism and osmotic fragilities, red cell potassium concentration and malonyldialdehyde levels were measured to assess membrane effects. GRA

**N76-10718# California Univ Irvine  
TOXIC HAZARDS RESEARCH UNIT ANNUAL TECHNICAL  
REPORT, 1974 Final Report, Jun 1973 - May 1974**

J D MacEwen and E H Vernet Jul 1974 203 p refs  
(Contract F33615-73-C-4059 AF Proj 6302)  
(AD-A011559 AMRL-TR-74-78) Avail NTIS CSCL 06/20

Acute inhalation toxicity experiments were conducted on benzonitrile, deuterium fluoride and fluomine. Chronic toxicity studies were conducted with an aircraft fuel JP-4 and constituents of JP-9. Chronic studies of coal tar aerosols and hydrazine were also continued. Oral and percutaneous toxicity determination and skin irritation and sensitization studies were conducted on a number of fuel additives and photographic chemicals. GRA

**N76-10719# Undersea Medical Society Bethesda Md  
PROCEEDINGS OF THE UNDERSEA MEDICAL SOCIETY  
WORKSHOP (8TH) ON THE STRATEGY FOR FUTURE  
DIVING TO DEPTHS GREATER THAN 1,000 FEET**

M J Halsey W Settle and E B Smith 15 Jun 1975 104 p  
refs. Workshop held at Sea Ranch Calif 26-27 Feb 1975  
(Contract N00014-74-C-0319)  
(AD-A011456 WS-6-15-75) Avail NTIS CSCL 06/19

The report presents discussions dealing with all aspects of the subject problem. The following areas were stressed: Physico-chemical approaches, interaction of anaesthetics with proteins and bilayers, pressure and anaesthetics performance during saturation dives, hydrostatic pressure effects in liquid

## N76-10720

breathing mice sustained dives with mice up to depths of 8000 feet application of the critical volume hypothesis to problems of deep diving high pressure nervous syndrome--clinical and electrophysiological studies in man, practical limits to the use of man under pressure and a strategy for future diving GRA

**N76-10720#** School of Aerospace Medicine Brooks AFB, Tex  
**OCULAR HYPERTENSION AND CHRONIC OPEN-ANGLE GLAUCOMA IN USAF PILOTS AND NAVIGATORS Progress Report, 1958 - 1973**

James L Mims III and Thomas J Tredici Dec 1974 18 p refs

(AF Proj 7755)

(AD-A010588 SAM-TR-74-48) Avail NTIS CSCL 06/14

Records from the United States Air Force glaucoma screening and management program for flying personnel were surveyed to obtain long-term followup information and age-specific prevalences for this population Untreated ocular hypertensives with tensions of 22-29 with no visual field loss were labeled preglaucoma ocular hypertensives without field loss and treated with epinephrine (for tensions above 29 or for other reasons) were labeled glaucoma Those requiring other drugs and those with field loss were disqualified from flying Questionnaires to ophthalmologists caring for retired men indicated that 1 of the 39 preglaucomas followed 8 years and 2 of the 27 glaucomas followed 7 years had lost visual field Among ocular hypertensives screened from 15 804 men ages 40-54 in 1970 only 5 had visual field loss presumed glaucomatous GRA

**N76-10721\*#** McDonnell-Douglas Technical Services Co Inc Houston Tex

**ADVANCED CREW PROCEDURES DEVELOPMENT TECHNIQUES PROCEDURES AND PERFORMANCE PROGRAM TRAINING PLAN**

J D Arbet and R L Benbow 17 Oct 1975 13 p

(Contract NAS9-14354)

(NASA-CR-144526 ACPDT-DN-13) Avail NTIS HC \$3 25 CSCL 05I

A plan developed to support the training of PPP users in the operations associated with PPP usage is described This document contains an overview of the contents of each training session and a detailed outline to be used as the guideline for each session Author

**N76-10722#** Institute for Perception RVO-TNO Soesterberg (Netherlands)

**THE COMPROMISE BETWEEN VISUAL FIELD AND MAGNIFICATION FOR AN IMAGE INTENSIFIER WITH VARIABLE MAGNIFICATION**

F L van Os and R E van Leeuwen 1975 12 p ref In DUTCH ENGLISH summary

(Contract A74/KL/013)

(IZF-1975-6 TDCK-66456) Avail NTIS HC \$3 25

The optimal combination of magnification and visual field for an image intensifier with a zoom lens was determined This was done with an indoor simulation of the realistic target search task of finding on a slide a jeep near the edge of a forest The search time appeared to be the best yardstick to find an optimal magnification A tentative interpretation of the data was given Author (ESA)

**N76-10723#** Aerospace Medical Research Labs Wright-Patterson AFB Ohio

**SEEKVAL PROJECT IA1 EFFECTS OF TARGET NUMBER AND CLUTTER ON STATIC TARGET ACQUISITION Final Report**

Robert L Hilgendorf and John Milenski Jul 1974 50 p refs (AF Proj 7184)

(AD-A011546 AMRL-TR-74-14) Avail NTIS CSCL 05/10

The report covers an experiment to determine the effects of number of targets and background clutter on static, low altitude target detection performance by the unaided eye as would be experienced in a helicopter-type target acquisition environment The data consist mainly of whether or not single or groups of tank targets (3 or 9) within controlled clutter configurations were detected and the corresponding times to detect them

Statistical methods are employed to assess the effects of target and clutter factors on detection performance GRA

**N76-10724#** Aerospace Medical Research Labs Wright-Patterson AFB, Ohio

**SEEKVAL PROJECT IA1 EFFECTS OF COLOR AND BRIGHTNESS CONTRAST ON TARGET ACQUISITION Final Report**

Robert L Hilgendorf and John Milenski Jul 1974 75 p refs (AF Proj 7184)

(AD-A011547 AMRL-TR-74-55) Avail NTIS CSCL 05/10

The report covers an experiment to determine the effects of target color and brightness contrast on visual detection performance by means of the unaided human eye The data consist mainly of elapsed times between search initiation and correct detection of tank targets at a simulated slant range of about 1 mile Statistical methods are employed to assess the effects of color with three levels of contrast factor on detection performance Under the experimental conditions effects due to color and brightness contrast were each statistically rated with the observation that interaction effects between these two factors were not statistically significant The effect of color tended to account for more variance than the effect of brightness contrast GRA

**N76-10725#** School of Aerospace Medicine Brooks AFB Tex Aerospace Medical Div

**EVALUATION OF TWO LINK GAT-1 TRAINER TASKS BY EXPERIENCED PILOTS AT THREE ALCOHOL DOSE LEVELS Final Report, Mar 1973 - Jun 1974**

Peter H Henry Thomas Q Davis Edward J Engelken Richard C McNeer Harold N Keiser J H Triebwasser and M C Lancaster Dec 1974 156 p refs

(AF Proj 7930)

(AD-A011607 SAM-TR-74-53) Avail NTIS CSCL 05/10

To calibrate the performance measuring scales for two separate tasks developed around the Link GAT-1 flight trainer the degrading effects of ethyl alcohol were studied in 12 USAF instructor pilots The subjects were tested at three alcohol dose levels (0.3, 0.6 and 0.9 gm alcohol/kg body wt) which resulted in indirectly measured blood alcohol levels of approximately 30, 60 and 100 mg% respectively Statistically significant performance decrements were found for only the moderate and high alcohol dose levels The magnitudes of the decrements corresponded closely to those reported in previous experiments using the same test conditions but where the subjects had no previous flying experience GRA

**N76-10726#** Arizona State Univ Tempe Dept of Educational Technology

**PRACTICE AND INCENTIVE EFFECTS ON LEARNER PERFORMANCE AIRCRAFT INSTRUMENT COMPREHENSION TASK Final Report, Jun 1973 - Jul 1974**

Barbara G Tenpas and Norman C Higgins Dec 1974 30 p refs

(Contract F41609-71-C-0027 AF Proj 1123)

(AD-A011616, AFHRL-TR-74-104) Avail NTIS CSCL 05/9

AFROTC cadets learned an aircraft instrument comprehension task by reading self-instructional materials No significant changes in posttest scores occurred when practice items were added to the materials or when simulator rides were offered as incentives However cadets who practiced the task and cadets who were offered the incentive performed faster on the posttest than those who only read the materials GRA

**N76-10727#** Eastern Virginia Medical School Norfolk Dept of Physiology and Bioengineering

**MODULATION OF EVOKED RESPONSES DURING BEHAVIORAL MOTOR INHIBITION IN THE CAT Annual Summary Report, 1 Mar 1974 - 28 Feb 1975**

Richard C Howe 21 Mar 1975 8 p

(Grant DAMD17-74-G-9390)

(AD-A011457 ASR-1) Avail NTIS CSCL 06/16

The purpose of this study was to ascertain those brain systems directly associated with inhibition of motor activity Chronic

cats with implanted electrodes were operantly conditioned for an absence of phasic motor activity. Peripherally and centrally evoked responses are obtained from the implanted electrodes during movement non-movement and sleep periods. All electrode sites are verified using histological techniques. Standard computer signal averaging techniques are used in the data analysis. Amplitude changes of evoked responses from various brain structures will be compared between movement non-movement and sleep states. As the data collection phase is still in progress no results are presently available. Interpretation of the results will be made according to the structural and functional organization of those brain areas showing significant alterations during the behavioral conditions of this study. GRA

**N76-10728#** Assistant Secretary of Defense (Program Analysis and Evaluation) Washington D C  
**EFFECTS OF COLORED LENSES ON VISUAL PERFORMANCE** Final Report, 1 Feb 1973 - 30 Jan 1974

Robert S Hart Jul 1974 24 p refs  
 (Contract F33615-73-C-4105 AF Proj 7184)  
 (AD-A011572 AMRL-TR-74-38) Avail NTIS CSCL 17/8

This study compares operator target detection performance while wearing red, yellow and gray sunglass lenses and unaided viewing. A research task was performed outdoors using survival orange targets located at ranges of 1600 feet to 4500 feet from the subjects. No statistically significant performance differences were obtained although subjectively the operators preferred the yellow lenses over the gray sunglasses and unfiltered conditions. GRA

**N76-10729#** Aerospace Medical Research Labs Wright-Patterson AFB Ohio

**THE EFFECTS OF EXTENDED MISSIONS ON THE PERFORMANCE OF AIRBORNE COMMAND AND CONTROL TEAMS** Final Report

Robert D ODonnell Ralph Bollinger and Bryce O Hartman Jul 1974 32 p  
 (AF Proj 7184)  
 (AD-A011549 AMRL-TR-74-20) Avail NTIS CSCL 05/10

The report covers the effects of extended mission lengths on the performance of airborne command and control teams wherein complex cognitive components consisting primarily of information collection interpretation and communication constitute the bulk of the workload. The survey centers on investigating general categories of performance-related factors such as overall fatigue rather than specific task performances such as long-term memory sensory motor reaction time, or information processing. GRA

**N76-10730#** Illinois Univ Savoy Aviation Research Lab  
**THE TRANSITION OF EXPERIENCED PILOTS TO A FREQUENCY-SEPARATED AIRCRAFT ATTITUDE DISPLAY A FLIGHT EXPERIMENT** Final Report

Dennis B Beringer Robert C Williges, and Stanley N Roscoe Jul 1974 25 p refs  
 (Contract N00014-67-A-0305-0014 NR Proj 196-092)  
 (AD-A001808 ARL-74-8/ONR-74-1) Avail NTIS CSCL 05/5

Twenty-four experienced pilots were given one flight in a Link GAT-2 simulator and one flight in a Beechcraft C-45H using either the moving horizon moving airplane or frequency-separated attitude display. The flight tasks performed by the subjects included recovery from unknown attitudes disturbed attitude tracking and completion of an area navigation course. Data collected in the C-45H aircraft demonstrated superior performance of both the frequency-separated and moving horizon displays when compared to the moving airplane display during unknown attitude recoveries. The frequency-separated display was superior to all others during disturbed-attitude tracking. It was concluded that the flight performance of experienced pilots during their initial transition to a frequency-separated flight attitude presentation is at least comparable and possibly superior to their flight performance with the conventional moving horizon presentation. GRA

**N76-10731\*#** Honeywell Inc Minneapolis Minn  
**CABIN ATMOSPHERE MONITORING SYSTEM (CAMS), PRE-PROTOTYPE MODEL DEVELOPMENT CONTINUATION**

Summary Report, Aug 1974 - Jun 1975  
 W W Bursack and W A Harris Jun 1975 32 p  
 (Contract NAS8-30254)  
 (NASA-CR-144005 Honeywell-SR-F2107-1) Avail NTIS HC \$3 75 CSCL 06K

The development of the Cabin Atmosphere Monitoring System (CAMS) is described. Attention was directed toward improving stability and reliability of the design using flight application guidelines. Considerable effort was devoted to the development of a temperature-stable RF/DC generator used for excitation of the quadrupole mass filter. Minor design changes were made in the preprototype model. Specific gas measurement examples are included along with a discussion of the measurement rationale employed. Author

**N76-10732\*#** Aerotherm Acurex Corp Mountain View Calif  
**EV SPACE SUIT GLOVES (PASSIVE)** Final Report

F Glenn Tickner E G Fletcher J D Dodson and William Elkins Sep 1975 145 p refs  
 (Contract NAS9-14461 Aerotherm Proj 7122)  
 (NASA-CR-144527, Aerotherm-75-165) Avail NTIS HC \$5 75 CSCL 06K

A pair of pressure and thermal insulating overgloves to be used with an Extravehicular (EV) suit assembly was designed developed fabricated and tested. The design features extensive use of Nomex felt materials in lieu of the multiple layer insulation formerly used with the Apollo thermal glove. The glove theoretically satisfies all of the thermal requirements. The presence of the thermal glove does not degrade pressure glove tactility by more than the acceptable 10% value. On the other hand the thermal glove generally degrades pressure glove mobility by more than the acceptable 10% value primarily in the area of the fingers. Life cycling tests were completed with minimal problems. The thermal glove/pressure glove ensemble was also tested for comfort. The test subjects found no problems with the thermal glove although they did report difficulties with pressure points on the pressure glove which were independent of the thermal glove. Y J A

**N76-10733\*#** Life Systems Inc Cleveland Ohio  
**ELECTROCHEMICAL AIR REVITALIZATION SYSTEM OPTIMIZATION INVESTIGATION** Final Report

R R Woods F H Schubert and T M Hallick Oct 1975 93 p refs  
 (Contract NAS9-14301)  
 (NASA-CR-144521 LSI-ER-247-3) Avail NTIS HC \$4 75 CSCL 06K

A program to characterize a Breadboard of an Electrochemical Air Revitalization System (BEARS) was successfully completed. The BEARS is composed of three components: (1) a water vapor electrolysis module (WVEM) for O<sub>2</sub> production and partial humidity control; (2) an electrochemical depolarized carbon dioxide concentrator module (EDCM) for CO<sub>2</sub> control; and (3) a power-sharing controller designed to utilize the power produced by the EDCM to partially offset the WVEM power requirements. It is concluded from the results of this work that the concept of electrochemical air revitalization with power-sharing is a viable solution to the problem of providing a localized topping force for O<sub>2</sub> generation, CO<sub>2</sub> removal and partial humidity control aboard manned spacecraft. Continued development of the EARS concept is recommended applying the operational experience and limits identified during the BEARS program to testing of a one-man capacity system and toward the development of advanced system controls to optimize EARS operation for given interfaces and requirements. Successful completion of this development will produce timely technology necessary to plan future advanced environmental control and life support system programs and experiments. Author

**N76-10734\*#** McDonnell-Douglas Technical Services Co Inc  
Houston, Tex  
**ADVANCED CREW PROCEDURES DEVELOPMENT TECHNIQUES PROCEDURES AND PERFORMANCE PROGRAM DESCRIPTION**

J D Arbet and A A Mangiaracina 26 Sep 1975 110 p refs

(Contract NAS9-14354)

(NASA-CP-144517 ACPDT-DN-12) Avail NTIS HC \$5 25 CSCL 05H

The Procedures and Performance Program (PPP) for operation in conjunction with the Shuttle Procedures Simulator (SPS) is described. The PPP user interface the SPS/PPP interface and the PPP applications software are discussed. Author

**N76 10735\*#** Massachusetts Univ Amherst  
**DESIGN AND FABRICATION OF AN END EFFECTOR Final Report**

F R E Crossley and Franklin G Umholtz 21 May 1975 30 p refs

(Contract NAS8-29073)

(NASA-CR-144008) Avail NTIS HC \$3 75 CSCL 05H

The construction is described of a prototype mechanical hand or end effector for use on a remotely controlled robot but with possible application as a prosthetic device. An analysis of hand motions is reported from which it is concluded that the two most important manipulations (apart from grasps) are to be able to pick up a tool and draw it into a nested grip against the palm and to be able to hold a pistol-grip tool such as an electric drill and pull the trigger. A model was tested and found capable of both these operations. Author

**N76-10736#** Forschungsinstitut fuer Anthropotechnik Meckenheim (West Germany)

**AN INVESTIGATION OF SINGLE-AXIS MANUAL CONTROL PROCESSES AND COMPARATIVE EVALUATION OF HUMAN OPERATOR MODELS [VERGLEICHENDE UNTERSUCHUNG EINACHSIGER MANUELLER REGELVORGANGEN UND BEURTEILUNG IHRER LINEAREN MODELLIERUNG]**

W Stein Dec 1974 107 p refs In GERMAN ENGLISH summary

(FB-21) Avail NTIS HC \$5 25 Forschungsinst fuer Anthropotechnik Meckenheim West Ger DM 10

Tracking behavior of human operators was investigated for the purpose of describing and modelling that behavior. The independent variables were selected from signal parameters of the random forcing function and control system dynamics of a single-axis laboratory tracking task. The signal transfer and information transmission characteristics of the human operator and his control performance on the task as it varied with independent variables was discussed. Attention was given to intra and intersubject variability of the human operator. A criterion derived from experimental data to assess the efficiency of human operator models is proposed. After review of the literature this criterion was used to compare several selected human operator models including some relatively complex ones with the simple linear time-invariant type of model in terms of their deterministic aspects. It was found that the efficiency of all models was comparable. Author (ESA)

**N76-10737#** Aerospace Medical Research Labs Wright-Patterson AFB Ohio Aerospace Medical Div  
**DESIGNING FOR MUSCULAR STRENGTH OF VARIOUS POPULATIONS Final Report**

K H Eberhard Kroemer Dec 1974 58 p refs

(AF Proj 7184)

(AD-A011537 AMRL-TR-72-46) Avail NTIS CSCL 05/5

Hand- and foot-operated controls are the input devices through which the operator effects the performance of manned systems. Selection of the type of control and its location within the reach envelope depend to a large degree on biomechanical parameters of all user populations i.e. mainly on their body dimensions and on their strength characteristics including motion stereotypes and lateral preferences. Muscular strength for control operation can vary significantly with age sex cultural origin health training

motivation and other specific traits of the operator population. The paper discusses several of these variables and their biomechanical implications and describes techniques and a regimen to design new equipment or modify existing equipment to conform to the strength characteristics of the operator populations. GRA

**N76-10738#** Webb Associates Yellow Springs Ohio  
**THE EFFECTS OF PERSONAL PROTECTIVE EQUIPMENT UPON THE ARM REACH CAPABILITY OF USAF PILOTS**

Milton Alexander and Lloyd Laubach Jul 1973 11 p Submitted for Publication

(Contract F33615-72-C-1006 AF Proj 7184)

(AD-A011580 AMRL-TR-72-93) Avail NTIS CSCL 05/5

The lack of published arm-reach data on Air Force flight personnel in actual cockpit situations presents manifest difficulties to the cockpit layout specialist. This paper discusses the results of a study to determine the arm reach capabilities of aircrewmembers wearing heavy winter flight clothing survival equipment and restraint harnesses. The sample consisted of 16 male subjects (currently active Air Defense Command pilots). The subjects were (pilots) selected to approximate closely the various height-weight categories in the ADC flying population. A specially designed apparatus was constructed to measure arm-reach capability. Each subject was measured under four conditions. The results of the study indicate that there are significant differences in arm reach capability of pilots while in the shirt-sleeved and maximum flying assembly conditions throughout most of the spatial envelope. GRA

**N76-10739#** Aerospace Medical Research Labs Wright-Patterson AFB Ohio

**HUMAN FORCE CAPABILITIES FOR OPERATING AIRCRAFT CONTROLS AT 1, 3, AND 5 GZ Final Report**

K H Eberhard Kroemer Feb 1975 108 p refs

(AF Proj 7184)

(AD-A011545 AMRL-TR-73-54) Avail NTIS CSCL 05/8

The maximum isometric forces adult male subjects could exert at eight locations of hand-operated aircraft controls were measured at 1 +3 and +5g. Forces were measured in two vertical and four to eight horizontal directions. Selected anthropometric dimensions were obtained on the subjects and compared with those from the 1967 USAF anthropometric survey of flying personnel. Summary statistics including the mean standard deviation coefficient of variation symmetry kurtosis and selected percentiles are presented for each of the 60 force exertion measures. GRA

**N76-10740#** Naval Air Development Center Warminster Pa Crew Systems Dept

**LABORATORY ASSESSMENT OF THE AN/PVS-5 NIGHT VISION GOGGLE**

Gloria T Chisum and Phyllis E Morway 19 Mar 1975 23 p refs

(AD-A011053 NADC-75006-40) Avail NTIS CSCL 17/5

Laboratory assessment of the AN/PVS-5 Night Vision Goggle was conducted. Visual fields goggle infrared source useable range and detectability of targets with the goggle were measured. Illumination levels of 5.4 and -6.22 log foot candles were adequate for 90 percent detection of 0.14 and 0.07 acuity targets respectively. Calculations of distances at which various surface and airborne targets subtended comparable visual angles and tables of natural brightness conditions are presented to permit translation of laboratory values into field conditions. While further field evaluation is anticipated the laboratory assessment indicates that the goggle can significantly facilitate aircrew night visual performance. GRA

**N76-11310** Letterman Army Inst of Research San Francisco, Calif Non-Ionizing Radiation Div

**OCULAR EFFECTS OF LASER RADIATION CORNEA AND ANTERIOR CHAMBER**

Edwin S Beatrice and Bruce E Stuck In AGARD Laser Hazards and Safety in the Mil Environ Aug 1975 5 p refs

The effects of infrared laser radiation on the cornea and skin of humans were considered. Three areas were discussed: normal anatomy and physiology of both tissues, summary of those laser systems which may interact with these tissues and effects of these systems on tissues. It is pointed out that threshold damage to the eye from CO<sub>2</sub> laser radiation is confined to the more superficial areas of the cornea. At above threshold levels damage is observed to the entire thickness and some changes in the anterior chamber are observed. Y J A

**N76-11311** Letterman Army Inst of Research San Francisco Calif Non-Iodizing Radiation Div

**OCULAR EFFECTS OF RADIATION RETINA**

Edwin S Beatrice /in AGARD Laser Hazards and Safety in the Mil Environ Aug 1975 4 p refs

A discussion of threshold levels associated with injuries to the primate retina from exposure to visible and near infrared laser radiation was given. It is explained that, while the retina is subdivided into ten identifiable layers, the absorption site of the visible and near infrared laser sources is limited to the melanin granules of the retinal pigment epithelium. The mechanism of injury at the above threshold exposed site is thermal. The endpoint for the determination of threshold levels can be subdivided into three areas: grossly observable retinal opacity, level light microscopic cellular alteration at the distal photoreceptor and pigment epithelial level, and subcellular change at the magnification power of the electron microscopic level. Y J A

**N76-11312** Royal Air Force Inst of Aviation Medicine Farnborough (England)

**DETERMINATION OF SAFE EXPOSURE LEVELS ENERGY CORRELATES OF OCULAR DAMAGE**

R G Borland /in AGARD Laser Hazards and Safety in the Mil Environ Aug 1975 6 p refs

Three techniques were used to define practical but safe criteria for use with laser systems. These are inspection of the eye by optical means (ophthalmoscopy), fluorescein angiography and microscopy (light and electron). The detection of damage is a form of quantal response and the determination of the threshold level is normally based on the energy or power which will result in a given probability of damage being detected. The energy correlates of damage depend on wavelength, pulse width or exposure time, repetition rate, tissue type and pigmentation and ocular quality. This complex relationship necessarily limits experimental research to laser systems of special interest and so the interpolation of data to formulate overall safe exposure levels is necessary. Author

**N76-11315** Royal Air Force Inst of Aviation Medicine, Farnborough (England)

**OPHTHALMOLOGICAL EXAMINATION OF LASER WORKERS AND INVESTIGATION OF LASER ACCIDENTS**

D H Brennan /in AGARD Laser Hazards and Safety in the Mil Environ Aug 1975 11 p ref

Those aspects of ocular structure and function which are relevant to laser induced damage in man were discussed, including the transmission and absorption characteristics of ocular tissues and the natural protective mechanisms of the eye. A scheme for the ocular surveillance of laser workers was presented with an evaluation of the role of the field and other specialized examinations. The procedure to be followed in the event of a laser accident was discussed. It is recommended that this involves a biophysical assessment of the accident with particular reference to energy or power densities which may have been incident on the cornea as well as a detailed ocular examination. This may include fluorescein angiography which has been found to be a more sensitive technique for detection of damage than ophthalmoscopy in monkeys. Author

**N76-11316** Army Environmental Hygiene Agency, Aberdeen Proving Ground, Md Laser Microwave Div

**LASER PROTECTIVE DEVICES**

David H Sliney /in AGARD Laser Hazards and Safety in the Mil Environ 1975 11 p refs |

The ideal characteristics of laser eye protective devices were presented and the present filter materials and goggle designs were compared with the ideal. Although the skin requires protection from lasers emitting in the ultraviolet and far-infrared regions at comparable exposure levels that may cause eye injuries, protection of the eye remains paramount. Author

**N76-11647** World Meteorological Organization Geneva (Switzerland)

**HEAT STRESS IN INDIGENOUS CATTLE**

V A Finch /in *its Agroclimatology of the Highlands of Eastern Africa* 1974 p 48-55 refs

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The heat stress from solar radiation in zebu cattle (*Bos indicus*) in the highlands of East Africa was assessed by evaluating the absorption of radiant energy flux, the metabolic heat production and each mode of heat dissipation. The results suggest that heat stress in zebu cattle is minimal and that production is not hindered by solar radiation. ESA

**N76-11685\*#** Agnew Tech-Tran, Inc., Woodland Hills, Calif **EVALUATION OF THE ENERGY EXPENDED IN A LEARNING SITUATION (CONDITIONING BASED ON FOOD REINFORCEMENT) BY GOLDFISH (*CARRASIIUS AURATUS* L)**

Michel Anthouard Washington NASA Nov 1975 10 p refs Transl into ENGLISH from Bull of the Soc Zoologique de France (Paris) v 97 no 2 1972 p 205-210 (Contract NASw-2789)

(NASA-TT-F-16650) Avail NTIS HC \$3 50 CSCL 06C

The behavior of fish is studied when placed in a learning situation. It is demonstrated that fish work much more often by pushing than by pulling; moreover, the latter procedure was found to be less efficient. Individual variations observed within the group listed make it possible to envisage the possibility of comparative analysis on the behavior of fish subjected to conditioning, which may result in a characterological study. The results obtained here constitute a basis for evaluating the effect of environmental factors (social or non-social) on attainment. Author

**N76-11686\*#** Agnew Tech-Tran Inc Woodland Hills, Calif **FASTING AND RENOURISHMENT OF CARP (*CYPRINUS CARPIO* L), 3**

G Bouche J F Narbonne and A Serfaty Washington NASA Nov 1975 11 p refs Transl into ENGLISH from Arch Sci Physiol (Paris) v 26 1972 p 101-109 (Contract NASw-2789)

(NASA-TT-F-16651) Avail NTIS HC \$3 50 CSCL 06C

The effect of artificial complete fasting of carp on variations of their content of polysomal and ribosomal RNA, as well as of soluble RNA, was investigated. This effect was ascertained by separately weighing the specimens and their livers, as well as by chemical spectrophotometric analysis. A comparison was made of the results obtained for carp which were subjected to artificial fasting followed by renourishment with two separate diets, with those of a control group. Natural seasonal effects were simulated during these experiments. It was found that artificial complete fasting of carp results in major losses in polysomal and ribosomal RNA, while the losses in soluble RNA were less severe. The hepatocytes of renourished carp contained more ribosomal, polysomal and soluble RNA than normally nourished carp. The mortality rate of renourished carp depended on the type of diet. Author

**N76-11687\*#** Kanner (Leo) Associates, Redwood City, Calif  
**LOCALIZATION OF 3H-GAMMA-AMINOBUTYRIC ACID IN THE COCHLEA LIGHT AND ELECTRON MICROSCOPIC AUTORADIOGRAPHY**

W Richrath H Kraus and H G Fromme Washington NASA  
 Nov 1975 15 p refs Transl into ENGLISH from Arch  
 Oto-rhino-Laryng (West Ger) v 208, 1974 p 283-293  
 (Contract NASw-2790)  
 (NASA-TT-F-16661) Avail NTIS HC \$3 50 CSCL 06R

Autoradiograms of quinea pig cochleae and brains were examined microscopically after administration of 3H-GABA to determine its distribution from the grain density. A blood perilymph barrier in addition to the blood brain barrier was suggested by a lack of activity in brain and cochlea after intraarterial injection. Cochlear perfusion produced considerable labeling in the spiral ganglion. 3H-GABA activity was only indicated above glia cells but not above nerve cell bodies or axons. Light microscopy showed selective labeling at efferent nerve fibers in Corti's organ, only labeling of efferent synapses was found electron microscopically. Silver grains were predominantly above vesicles and mitochondria. Afferent synapses were unlabeled. It is concluded that the efferent system of Corti's organ contains a high degree of GABA but contradicting previous electrophysical results make it impossible to determine at this time that the substance is a transmitter. Author

**N76-11688\*#** Agnew Tech-Tran, Inc., Woodland Hills, Calif  
**CHLORPROMAZINE, PIRACETAM, AND THE METABOLISM OF BRAIN PHOSPHOLIPIDS IN THE RAT**

L Rochus and J J Reuse Washington NASA Nov 1975  
 6 p refs Transl into ENGLISH from Compt Rend Soc Biol  
 (Masson) v 166, no 6-7, 1972 p 975  
 (Contract NASw-2789)  
 (NASA-TT-F-16652) Avail NTIS HC \$3 50 CSCL 06C

The effects of chlorpromazine, piracetam and their possible interaction on the incorporation of radioactively labeled phosphate in the total phospholipids, as well as in various phospholipidic fractions of the cerebral cortex of the rat was investigated in vivo. Three different types of experiments were carried out. The first group of rats was injected intraperitoneally with chlorpromazine only, the second group with piracetam only and the third group with both. The corresponding effects on the incorporation of P-32 in the phospholipids of the cerebral cortex are presented quantitatively in tabular form. The results show that chlorpromazine decreases the incorporation of P-32. Moreover, while piracetam by itself has little effect, when used in combination with chlorpromazine it may significantly augment the depressive effect of the latter. Author

**N76-11689\*#** Agnew Tech-Tran, Inc., Woodland Hills, Calif  
**INFLUENCE OF Zsub 1210 CELL GROWTH OF CELLS STERILIZED BY IONIZING RADIATIONS**

E P Malaise, Z Detcheva-Ninova and M Tubiana Washington  
 NASA Nov 1975 6 p refs Transl into ENGLISH from  
 Compt Rend Acad Bulgare Sci (Sofia) v 28 no 3 1975  
 p 427-429  
 (Contract NASw-2789)  
 (NASA-TT-F-16538) Avail NTIS HC \$3 50 CSCL 06M

Experiments concerning the influence of sterilized cells on L sub 1210 cell growth were performed. Mice were injected either subcutaneously or intra-peritoneally with certain cells, some were also previously exposed to radiation. Tumor growth was monitored as well as the survival periods of the mice after injection. Author

**N76-11690\*#** Agnew Tech-Tran, Inc., Woodland Hills, Calif  
**MOLECULAR MEMORY?**

A Pfeiffer Washington NASA Nov 1975 9 p refs Transl into ENGLISH from Studia Biophysica (Berlin) v 46 no 2 1974 p 131-136  
 (Contract NASw-2789)  
 (NASA-TT-F-16654) Avail NTIS HC \$3 50 CSCL 06P

An explanation for the partially contradictory results of chemical examination of certain conditioned reflexes in animals is given, which rests on the assumption of a chemical specificity

of the connector substances within the synaptic terminals of axons of varying origin, and which are thought to be effective during the learning process, as opposed to the assumption of a chemical structure of these substances which would be dependent on a memory content requiring individual definition in each case. Author

**N76-11691\*#** Martin Marietta Corp., Houston, Tex Aerospace Group

**INTEGRATED LIFE SCIENCES TECHNOLOGY UTILIZATION DEVELOPMENT PROGRAM Final Report, 1 Jun 1974 - 10 Oct 1975**

Oct 1975 34 p  
 (Contract NAS9-14215)  
 (NASA-CR-144545) Avail NTIS HC \$4 00 CSCL 06B

The goal of the TU program was to maximize the development of operable hardware and systems which will be of substantial benefit to the public. Five working prototypes were developed and a meal system for the elderly is now undergoing evaluation. Manpower utilization is shown relative to the volume of requests in work for each month. The ASTP mobile laboratories and post Skylab bedrest study are also described. Author

**N76-11692\*#** Harvard Univ., Cambridge, Mass  
**M-071 CRITICAL DATA ANALYSIS Final Technical Report, 27 Jun 1973 - 31 Dec 1975.**

D M Hegsted 31 Dec 1975 122 p refs  
 (Contract NAS9-13370)  
 (NASA-CR-145692) Avail NTIS HC \$5 50 CSCL 06S

A prototype balance study was conducted on earth prior to the balance studies conducted in Skylab itself. Collected were daily dietary intake data of 6 minerals and nitrogen and fecal and urinary outputs on each of three astronauts. Essential statistical issues show what quantities need to be estimated and establish the scope of inference associated with alternative variance estimates. The procedures for obtaining the final variability due both to errors of measurement and total error (total = measurement and biological variability) are exhibited. Author

**N76-11693#** Advisory Group for Aerospace Research and Development Paris (France)  
**RADIATION HAZARDS**

Aug 1975 149 p refs Presented at a Lecture Series in The Netherlands, 22-23 Sep 1975 Germany, 25-26 Sep 1975 and Norway 29-30 Sep 1975 Sponsored by the Aerospace Med Panel and the Consultant and Exchange Programme of AGARD  
 (AGARD-LS-78) Avail NTIS HC \$6 00

There has been a remarkable development and increase in the number of processes and devices that utilize or emit non-ionizing radiation which includes ultra-violet, visible light, infrared, microwave, radiofrequency, ultrasound. This series provides a scientifically accurate, authoritative review and critical analysis of the available information and concepts to give a basis for informed judgements and judicious application of these energies for maximal benefit and minimum risk or hazard to man.

**N76-11694** Rochester Univ., NY School of Medicine and Dentistry  
**PATHOPHYSIOLOGIC ASPECTS OF EXPOSURE TO MICROWAVE**

Sol M Michaelson In AGARD Radiation Hazards Aug 1975 7 p refs

Body temperature increase during exposure to microwaves is explored. Awareness of microwave exposure is developed by several mechanisms, including cutaneous thermal sensation or pain. Cataracts were produced in some experimental animals primarily rabbits when the eyes were directly exposed to rather high power density of microwaves over periods ranging from several minutes to hours. Microwave effects on the tests was studied along with chromosome changes, hematopoiesis and cardiovascular effects. J A M

**N76-11696** Washington Univ Seattle Bioelectromagnetics Research Lab

**BIOPHYSICS - ENERGY ABSORPTION AND DISTRIBUTION**

Arthur W Guy *In* AGARD Radiation Hazards Aug 1975 14 p refs

The interpretation of the biological effects observed in tissues exposed to EM fields requires a complete quantitative description of the fields within the tissues. These fields are complex functions of the source configuration, shape and size of the exposed subject and the frequency. The average and maximum absorbed power density may vary over many orders of magnitude for the same applied field intensities. Depending on conditions, power absorption may be predominantly at the surface of the subject or may be affecting only superficial tissues in the interior of the subject affecting deep tissues. Author

**N76-11697** Air Force Systems Command Brooks AFB Tex Radiation Physics Branch

**ELECTROMAGNETIC RADIATION EFFECTS ON THE EYE**

John C Mitchell *In* AGARD Radiation Hazards Aug 1975 6 p refs

The purpose is to analyze collectively the EMR research studies on ocular effects and provide an overview of the practical aspects of this problem today. The principal conclusions from this effort are: (1) The acute thermal insult from high intensity EMR fields is cataractogenic if intraocular temperatures reach 45-55 C. (2) The EMR exposure threshold is about 100-150 mW/sq cm applied for about 60-100 minutes. (3) There does not appear to be a cumulative effect from EMR exposures unless each single exposure is sufficient to produce some irreparable degree of injury to the eyes. Author

**N76-11698** Rochester Univ NY Dept of Radiation Biology and Biophysics

**ENDOCRINE AND CENTRAL NERVOUS SYSTEM EFFECTS OF MICROWAVE EXPOSURE**

Sol M Michaelson *In* AGARD Radiation Hazards Aug 1975 8 p refs

Functional alterations in the neuroendocrine system of both animals and humans exposed to microwaves were reported. Findings include changes in the secretions of the pituitary gland, adrenal cortex, thyroid gland and the gonads. In most cases, the endocrine changes attributed to microwave exposure were not adequately documented. Findings of a large number of studies were used to overstate the conclusions or derive assumptions incompatible with the cybernetic model of the function of the neuroendocrine system. Author

**N76-11699** Washington Univ Seattle Bioelectromagnetics Research Lab

**MICROWAVE INDUCED ACOUSTIC EFFECTS IN MAMMALIAN AUDITORY SYSTEMS**

Arthur W Guy and Chung-Kwang Chou *In* AGARD Radiation Hazards Aug 1975 17 p refs

Pulsed microwave fields with incident energy densities of 20 to 40 micro Joule per sq cm per pulse will produce responses in the auditory system of man and animals similar to those produced by auditory stimuli. Recent studies indicate that the responses may be originated from high frequency vibrations induced in the head of the exposed subject by a transient thermal expansion of tissue due to the rapid absorption of the pulsed microwave energy. Author

**N76-11700** Royal Marsden Hospital Sutton (England) Physics Div

**BIOLOGICAL EFFECTS OF ULTRASOUND**

C R Hill *In* AGARD Radiation Hazards Aug 1975 4 p refs

Ultrasound comprises mechanical vibrations occurring in the frequency range above 20 kHz and extending in practice to above 10 Hz, correspondingly there is a very wide range of practical applications each with different possibilities for exposure

of human beings to ultrasonic energy. Three main areas that are necessary to understand the possible hazards from ultrasound use are discussed: (1) the actual physical exposures encountered by humans in various activities; (2) the nature of the biophysical interactions of ultrasound with human tissues; and (3) the evidence for and against significant changes being produced in living systems by the action of ultrasound. Author

**N76-11701** Washington Univ Seattle Bioelectromagnetics Research Lab

**ENGINEERING CONSIDERATIONS AND MEASUREMENTS**

Arthur W Guy *In* AGARD Radiation Hazards Aug 1975 36 p refs

Quantitation of the biological effects in subjects exposed to electromagnetic fields requires that both the fields in the environment and within the exposed tissues be measured. Fields in the environment can be measured by means of standard off-the-shelf field survey meter sensors consisting of small dipoles with diode or thermocouple-type transducers for converting microwaves or RF energy to proportional electrical signals. Fields and associated absorbed power density in the tissues can be measured by means of thermocouples, thermistors, fiber optic liquid crystal sensors and thermography. The quantitation of fields associated with exposure of test subjects can be significantly simplified by a judicious choice of exposure techniques. Author

**N76-11702** Air Force Systems Command Brooks AFB Tex School of Aerospace Medicine

**ELECTROMAGNETIC INTERFERENCE OF CARDIAC PACEMAKERS**

John C Mitchell *In* AGARD Radiation Hazards Aug 1975 10 p refs

The effect of electromagnetic radiation (EMR) on cardiac pacemakers is a unique bioeffects problem. Current test procedures including methods to simulate pacemaker implant conditions and the use of fiber optics instrumentation techniques for cardiac simulation and pacemaker interference evaluation, are presented. Test results and their clinical significance are discussed for different types of EMR emissions including microwave ovens, electrical appliances, gasoline engine ignition, radar and intense electromagnetic pulse generators. Threshold values for pacemaker electromagnetic interference (EMI) range from 10 V/m for the more sensitive devices to greater than 300 V/m for the less susceptible devices. Such EMI threshold values are further modified by the frequency and pulse width of the incident EMR signal. Maximum interference coupling appears to occur at frequencies between 100 and 500 MHz and the EMI threshold is inversely proportional to pulse width over the range from one microsecond to several milliseconds. The ultimate biological effect is dependent on the characteristics of the EMR source, the proximity of the pacemaker user to the source, the attenuation afforded by body shielding and orientation, and the state-of-health of the pacemaker user. The test results presented provide considerable evidence that many manufacturers have recognized EMI as a potential bioeffects problem and have taken the necessary corrective actions to build devices with good electromagnetic compatibility. Author

**N76-11705\*** Pennsylvania Univ Philadelphia Plant Centrifuge Lab

**CIRCADIAN RHYTHM OF LEAF MOVEMENT IN CAPSICUM ANNUUM OBSERVED DURING CENTRIFUGATION**

D K Chapman, A H Brown and A O Dahl 7 Nov 1975 24 p refs

(Grants NGR-39-010-104, NGR-39-010-149,

NGR-39-030-010)

(NASA-CR-145614, CIRCAD-1) Avail NTIS HC \$3.50 CSCL 06C

Plant circadian rhythms of leaf movement in seedlings of the pepper plant (*Capsicum annuum* L., var Yolo Wonder) were observed at different g-levels by means of a centrifuge. Except for the chronically imposed g-force, all environmental conditions to which the plants were exposed were held constant. The circadian period, rate of change of amplitude of successive

oscillations symmetry of the cycles and phase of the rhythm all were found not to be significantly correlated with the magnitude of the sustained g-force Author

**N76-11706** RAND Corp. Santa Monica Calif  
**FUTURE SPACE EXPLORATION AN EQUAL OPPORTUNITY EMPLOYER?**

Glenda G Callanen Aug 1975 10 p refs  
 (P-5492) Avail Issuing Activity

Although the traditional psychological impediments are diminishing, they have produced some scientific reasons why the U S has had no female astronauts Women's two major obstacles have been the lack of skills required for astronaut selection and a lack of data on the female's tolerances for space flight stresses The latter problem has been partially reduced by the 1973 tests conducted at the Ames Research Center in California Based on the test results of 12 Air Force nurses which indicated that females apparently tolerate space flight stresses as well as males NASA announced that women will not be excluded from the crews of the planned space shuttle flights Author

**N76-11708\*** Transemantics Inc. Washington, D C  
**REDUCTION OF THE BACTERIAL CONTAMINATION BY THE USE OF LAMINAR FLOW IN THE CONSTRUCTION OF CARDIAC VALVES**

A Juffe E J Perea, J L Castillo-Olivares and D Figear Washington NASA Nov 1975 9 p refs Transl into ENGLISH from Prensa Med Arg (Buenos Aires) v 62 no 5, May 1975 p 109-111

(Contract NASw-2792)  
 (NASA-TT-F-16643) Avail NTIS HC \$3 50 CSCL 06M

The effect of laminar flow on reducing microbial contamination during the construction of valves from fascia lata was studied It was found that there was a significant reduction (P less than 0 005) in the bacterial count in the group of valves constructed under conditions of laminar flow as compared with the test group constructed in an adjacent operating room not using conditions of laminar flow Author

**N76-11709\*** Scientific Translation Service Santa Barbara Calif  
**VISION FROM A MOVING CAR (NO 1)**

H OHara Washington NASA Oct 1975 26 p Transl into ENGLISH from Nippon Ganka Gakkei Zasshi (Tokyo) v 54, no 9 28 Sep 1950 p 320-322

(Contract NASw-2791)  
 (NASA-TT-F-16638) Avail NTIS HC \$4 00 CSCL 05E

The effects of motion on human cognitive abilities were studied by evaluating visual acuity while subjects were in moving trains automobiles, or locomotives Measurements on the distance of recognition while approaching a marker or while moving away from it showed a decreasing positive value as the rate of speed increased G G

**N76-11710\*** Kanner (Leo) Associates, Redwood City Calif  
**SOME HEMODYNAMIC INDICES AT HIGH ALTITUDE AT REST AND AFTER INTENSE PHYSICAL EXERCISE**

V G Mashkovskiy Washington NASA Oct 1975 13 p refs Transl into ENGLISH from Kardiologiya (Moscow) v 15 no 6, Jun 1975 p 61-67

(Contract NASw-2790)  
 (NASA-TT-F-16639) Avail NTIS HC \$3 50 CSCL 06S

For 5 years, 364 normal males aged 19-25, were studied at the altitude of 3800-4200 m along with local inhabitants of the mountain region Hemodynamic shifts and arterial blood oxygenation were studied with the base metabolism conditions preserved both at rest and after intensive physical exercises The exercises were performed according to the step-test method (cardiological motion test, WHO 1967) The maximum physical workload caused a distinct intensification of the circulatory reactions, especially in those living for considerable periods of time at high altitude Most of these subjects showed no ill effects from the exercise Hence they must have a considerable reserve of functional capacities of their cardiovascular system and be capable of hard muscle work at high altitudes There

was a noticeable difference in test results of persons who had been at high altitude for different time periods Author

**N76-11711\*** Kanner (Leo) Associates Redwood City Calif  
**AN EVALUATION OF RESULTS OF ERGOMETRIC STUDIES**

V P Pomerantsev V L Khomenko A G Ivashchuk and A I Mikheyev Washington NASA Oct 1975 10 p refs Transl into ENGLISH from Kardiologiya (USSR) v 15 no 6 Jun 1975 p 57-61

(Contract NASw-2790)  
 (NASA-TT-F-16641) Avail NTIS HC \$3 50 CSCL 16P

An evaluation of some standardized and relative indices of ergometry is presented heart rate and oxygen consumption as percentage of individual values indices of chromo-, inotropic, aerobic and coronary reserves The investigation is based on the study of 113 normal individuals 363 hypertonic patients and 100 patients with ischaemic heart disease The use of the relative values of the heart rate and oxygen consumption shows that the role of individual factors (sex age body weight) was negligible The determination of the relative augmentation of these indices as well as of the arterial pressure, permits making the state of functional reserves of the cardiopulmonary system more precise and can be used for the diagnosis and evaluation of therapeutic results Author

**N76-11712\*** McDonnell-Douglas Astronautics Co Huntington Beach Calif  
**Biotechnology and Space Sciences Dept  
 EVALUATION OF EARLY RECOGNITION OF VIRAL INFECTIONS IN MAN Final Report**

A A Kelton and M B Lawton Oct 1975 250 p refs  
 (Contract NAS9-13740)

(NASA-CR-144559) Avail NTIS HC \$8 00 CSCL 06E  
 The potential of Lymphocyte Specific Gravity Distribution (LSGD) as a non-specific procedure for early diagnosis of viral disease in astronauts is considered Results of experiments and a literature search show that several virus diseases result in distinctive changes in the specific gravity distribution of peripheral blood lymphocytes as a result of disease process and associated immune response A tentative model is proposed which relates the shape of LSGD to the identity of subpopulations of peripheral lymphocytes in a preclinical viral disease situation G G

**N76-11713\*** Missouri Univ Kansas City  
**APPLICATION OF CABIN ATMOSPHERE MONITORS TO RAPID SCREENING OF BREATH SAMPLES FOR THE EARLY DETECTION OF DISEASE STATES Final Report, 1 Oct 1974 - 30 Sep 1975**

Jimmie L Valentine and Paul J Bryant 30 Sep 1975 26 p refs

(Contract NAS9-14369)  
 (NASA-CR-144548) Avail NTIS HC \$4 00 CSCL 06B

Analysis of human breath is a noninvasive method to monitor both endogenous and exogenous chemicals found in the body Several technologies were investigated and developed which are applicable to monitoring some organic molecules important in both physiological and pathological states Two methods were developed for enriching the organic molecules exhaled in the breath of humans One device is based on a respiratory face mask fitted with a polyethylene foam wafer while the other device is a cryogenic trap utilizing an organic solvent Using laboratory workers as controls two organic molecules which occurred in the enriched breath of all subjects were tentatively identified as lactic acid and cortisol Both of these substances occurred in breath in sufficient amounts that the conventional method of gas-liquid chromatography was adequate for detection and quantification To detect and quantitate trace amounts of chemicals in breath, another type of technology was developed in which analysis was conducted using high pressure liquid chromatography and mass spectrometry Author

**N76-11714\*** Lecler (Michel) Inc. Harvey, La  
**REPORT ON COMPUTATION OF REPETITIVE HYPERBARIC-HYPOBARIC DECOMPRESSION TABLES**

Peter O Edel 15 May 1975 34 p refs  
(Contract NAS9-14352)

(NASA-CR-144560) Avail NTIS HC \$4.00 CSCL 06S

The tables were constructed specifically for NASA's simulated weightlessness training program, they provide for 8 depth ranges covering depths from 7 to 47 FSW with exposure times of 15 to 360 minutes. These tables were based up on an 8 compartment model using tissue half-time values of 5 to 360 minutes and Workmanline M-values for control of the decompression obligation resulting from hyperbaric exposures. Supersaturation ratios of 1.55 to 2.1 were used for control of ascents to altitude following such repetitive dives. Adequacy of the method and the resultant tables were determined in light of past experience with decompression involving hyperbaric-hypobaric interfaces in human exposures. Using these criteria the method showed conformity with empirically determined values. In areas where a discrepancy existed the tables would err in the direction of safety. Author

**N76-11715#** Aerospace Medical Research Labs, Wright-Patterson AFB Ohio

**A REVIEW OF THE TOXICOLOGY OF HALOGENATED FIRE EXTINGUISHING AGENTS Final Report**

E W VonStee Nov 1974 89 p refs

(AF Proj 6302)

(AD-A011538 AMRL-TR-74-143) Avail NTIS CSCL 06/20

Bromotrifluoromethane (Halon 1301), bromochlorodifluoromethane (Halon 1211) and chlorobromomethane (Halon 1011) were evaluated for toxicity and toxic hazards. The most important toxicological effects of these compounds are on the central nervous and cardiovascular systems. The neurological effects are manifested as alterations of perception and a reduction in reaction time and the ability to concentrate on complex intellectual tasks. The cardiovascular effects are manifested as changes in cardiovascular dynamics and the electrical activity of the heart. Clinically important central nervous system effects generally appear at lower levels of exposure than clinically important cardiovascular effects. Behavioral changes and performance decrements during exposure would undoubtedly have some effect on the interaction of the subject with his environment and such consequences of exposure could be life-threatening.

GRA

**N76-11716#** Texas Univ Austin Bio-Medical Engineering Research Lab

**SLEEP-WAKEFULNESS DETERMINATIONS FROM HEART RATE DATA Interim Report, 1 May 1974 - 30 Apr 1975**

Mike Lisenby R C Richardson, and A J Welch 15 Jun 1975 185 p refs

(Contract DAMD17-74-C-4081)

(AD-A012275 TR-173) Avail NTIS CSCL 06/16

In recent years a number of projects related to the automated classification of levels of alertness have been conducted in the Bio-Medical Engineering Program. All of these projects were designed with a common goal in mind: the development of a process by which rapid inexpensive determinations of levels of alertness could be performed accurately using an easily derived physiologic parameter such as beat-by-beat heart rate. By combining procedures and results of these previous studies a conglomerate algorithm can be developed which has all the necessary capabilities. One of the primary goals was achieved: the reduction of cost, volume and complexity in automated classification of levels of alertness. It was felt that improvements can be made which will provide substantial progress toward fulfilling the remainder of the goals.

GRA

**N76-11717#** Army Aeromedical Research Lab, Fort Rucker, Ala

**EFFECTS OF OXYGEN AND REDUCED GLUTATHIONE ON THE OXYGEN CONSUMPTION OF MOUSE LIVER Final Report**

Dennis A Baeyens and Mary J Meier May 1975 16 p refs

(AD-A012172, USAARL-75-20) Avail NTIS CSCL 06/19

The effects of hyperbaric oxygen tensions on the oxygen consumption of mouse liver homogenates was investigated.

Hyperbaric oxygen rapidly inhibits the oxidative metabolism of the mammalian liver. Mouse liver homogenate exposed to a PO<sub>2</sub> of 3837.8 mm Hg for 30 minutes showed a 50.6% reduction in oxygen consumption compared to controls exposed to nitrogen at ambient pressure. The effect of reduced glutathione (GSH) as a protective agent against hyperbaric oxygen toxicity was also examined. Liver homogenates pretreated with GSH and exposed to high oxygen tensions demonstrated greater activity than untreated controls. It is concluded that (1) GSH protects important enzymes of oxidative metabolism by keeping them in a reduced and viable state and (2) GSH can stimulate oxygen consumption by increasing succinate formation through a GSH-succinate shunt.

GRA

**N76-11718#** Human Engineering Labs Aberdeen Proving Ground Md

**A SIMULATION OF THE HUMAN SHOULDER Final Technical Memo**

Richard R Kramer May 1975 56 p refs

(AD-A012174 HEL-TM-15-75) Avail NTIS CSCL 05/5

A method is presented for estimating the recoil force at the interface between the firer's shoulder and his weapon. The method involves simultaneous second order differential equations whose coefficients have been determined by empirical fits. An example is given which shows how the initial pitch-up and the recoil forces of a rocket launcher can be estimated.

GRA

**N76-11719#** New Mexico Univ, Albuquerque Dept of Anatomy

**STUDIES OF ORIENTATIONAL AND POSTURAL MECHANISMS IN A MODEL NEURAL SYSTEM Final Report, 1 Feb 1973 - 1 Feb 1975**

Leo S Demski and Diana H Bauer Feb 1975 53 p refs

(Grant AF-AFOSR-2491-73, AF Proj 9777)

(AD-A012027 AFOSR-75-0829TR) Avail NTIS CSCL 06/16

Utilizing eye movements as a measure of vestibular activity regions of the brain involved in their control and in possible mediation of postural and orientational responses have been studied through electrical stimulation of the brain in anesthetized animals. A mapping of the brain has been accomplished. Experiments performed on chronically implanted animals indicate that stimulation of the brain in areas associated with eye movements in the anesthetized subject in most cases produces a postural change which could be predicted from the eye movements of the manually positioned animal. Therefore the areas of the brain related to movements identified in the earlier studies are probably also involved in more complex postural and orientational responses.

GRA

**N76-11720#** Massachusetts Inst of Tech Cambridge Artificial Intelligence Lab

**ON THE PURPOSE OF LOW-LEVEL VISION**

David Marr Dec 1974 31 p refs

(Contract N00014-70-A-0362-0005)

(AD-A012392 AI-M-324) Avail NTIS CSCL 06/4

The article advances the thesis that the purpose of low-level vision is to encode symbolically all of the useful information contained in an intensity array using a vocabulary of very low-level symbols. Subsequent processes should have access only to this symbolic description. The reason is one of computational expediency: it allows the low-level processes to run almost autonomously, and it greatly simplifies the application of criteria to an image whose representation in terms of conditions on the initial intensities, or on simple measurements made from them is very cumbersome.

GRA

**N76-11721#** Environmental Health Lab McClellan AFB, Calif

**HEALTH HAZARD POTENTIAL OF HYPOL (TRADEMARK) POLYURETHANE PREPOLYMERS Final Report**

Marlin L Sweigart and Philip Diamond May 1975 52 p refs

(AD-A011997 EHL-M-75M-9) Avail NTIS CSCL 06/10

This report presents the results of an evaluation of the potential hazards associated with the use of various formulations of foamable hydrophilic polyisocyanates containing one to two weight percent free toluene diisocyanate (TDI) in Air Force Pacer Foam.

operations TDI concentrations and generation rates are presented as well as recommended controls for the use of these prepolymers in foaming operations. Permissible dosage and analysis procedures are also discussed. GRA

**N76-11722\*#** Massachusetts Inst of Tech Cambridge Man-Vehicle Lab

**THE ANALYSIS OF THE PILOT'S COGNITIVE AND DECISION PROCESSES** Progress Report, 1 Mar - 31 Aug 1975

R E Curry 31 Aug 1975 85 p refs

(Grant NGR-22-009-733)

(NASA-CR-145739) Avail NTIS HC \$5 00 CSCL 05E

Articles are presented on pilot performance in zero-visibility precision approach, failure detection by pilots during automatic landing experiments in pilot decision-making during simulated low visibility approaches a multinomial maximum likelihood program and a random search algorithm for laboratory computers. Other topics discussed include detection of system failures in multi-axis tasks and changes in pilot workload during an instrument landing. MJS

**N76-11723#** Army Personnel Research Committee London (England)

**THE EFFECT OF A FILTERED CONTROL ON OPERATORS' HAND TREMOR**

M Waygood Apr 1974 15 p refs

(APRC-72/cs-7 BR47799) Avail NTIS HC \$3 50

The twelve operators compensated for errors they produced while holding a spot central in a stationary square target. Filtering their control movements obtained from strain gauges increased their proficiency compared with a condition in which the control movements were presented at a gain of 189. It is argued that filtering of the operator's control demands may improve his performance when the target is stationary. Author (ESA)

**N76-11724#** Michigan Univ Ann Arbor Human Performance Center

**THE EFFECT OF TIME SHARING ON THE PERFORMANCE OF INFORMATION PROCESSING TASKS A FEEDBACK CONTROL ANALYSIS**

Christopher Dow Wickens Aug 1974 167 p refs

(Contract F44620-72-C-0019)

(AD-A012023 TR-51 Rept-010588-21-T

AFOSR-75-0906TR) Avail NTIS CSCL 05/10

The limited nature of man's attentional processes is a fundamental principle that underlies any general theory of human performance or human information processing. However psychologists have been unable to settle upon a precise definition of the term attention. One approach that can be taken toward clarifying ambiguity in the meaning of attention is to study man's behavior in a time sharing paradigm, one in which attention must be shared between the performance of two or more tasks. The purpose of the current research was to examine these time-sharing effects in a manual tracking paradigm employing the fine-grained analysis provided by the techniques of feedback control theory. GRA

**N76-11725#** Aeronautical Research Labs, Melbourne (Australia) **DYNAMIC TESTS OF A YIELDING SEAT AND SEAT BELT SYSTEM FOR CRASH PROTECTION**

S R Sarrailhe and N D Hearn Mar 1975 43 p refs

(ARL/Struc-358) Avail NTIS HC \$4 00

Dynamic tests were carried out on standard and yielding seat belt restraint systems to evaluate and compare their performance. The seat belts were of the lap sash type with the lap straps attached to the seat. The yielding system had energy absorbers in the sash strap and seat anchorage. Test sled accelerations ranged from 120 to 240 m/sec/sec with the standard belt and to 300 m/sec/sec with the yielding system. Peak restraint loads increased progressively with increase in acceleration in the case of the standard system but the yielding system allowed an increase in the acceleration of approximately 85% without an increase in peak load. At a sled acceleration of 240 m/sec/sec the load in the yielding system was 70% of

that in the standard system. The work is applicable to restraints in both aircraft and motor vehicles. Author

**N76-11726\*#** Fairchild Republic Co., Farmingdale, N Y **SPACE SHUTTLE GALLEY WATER SYSTEM TEST PROGRAM Final Report**

Oct 1975 26 p

(Contract NAS9-14719)

(NASA-CR-144531, RD008V3201) Avail NTIS HC \$4 00 CSCL 06K

A water system for food rehydration was tested to determine the requirements for a space shuttle galley flight system. A new food package concept had been previously developed in which water was introduced into the sealed package by means of a needle and septum. The needle configuration was developed and the flow characteristics measured. The interface between the food package and the water system oven and food tray was determined. Author

**N76-11727\*#** National Aeronautics and Space Administration Lyndon B Johnson Space Center Houston Tex **SKYLAB EXPERIMENT M487 HABITABILITY/CREW QUARTERS**

Caldwell C Johnson Oct 1975 61 p refs

(NASA-TM-X-58163 JSC-09677) Avail NTIS HC \$4 50 CSCL 06K

Results of Skylab experiment M487 (habitability/crew quarters), which was designed to evaluate the habitability features of Skylab, were presented. General observations and conclusions drawn from the data obtained are presented in detail. The objectives of the experiment the manner in which data was acquired, and the instruments used to support the experiments are described. Illustrations and photographs of the living and work areas of Skylab and some of the habitability features are provided. Samples of the subjective evaluation questionnaires used by the crewmen are included. Habitability-related documents crewmen biographies, functional characteristics and photographs of the instruments used and details of Skylab compartment sizes and color schemes are included as appendices. Author

**N76-11728#** Dow Chemical Co Golden Colo Radiation Monitoring Group

**QUANTITATIVE RESPIRATOR MAN-TESTING AND ANTHROPOMETRIC SURVEY**

J D Leigh 22 May 1975 12 p ref

(Contract AT(29-1)-1106)

(RFP-2358, TID-4500-R62) Avail NTIS HC \$4 00

A recent anthropometric survey and test procedures are reported for the respiratory protection program to safeguard the health of personnel. Respiratory protection procedures involve the selection of face masks worn by plant personnel. The fitting, handling, and use of face masks through explicit instructions can assure optimum protection. Comparisons are made with the test panel selection parameters established by the Los Alamos Scientific Laboratory in Los Alamos, New Mexico and recommendations by Webb Associates of Yellow Springs, Ohio. Author (NSA)

**N76-11729#** Royal Aircraft Establishment, Farnborough (England)

**THE EFFECT OF A TRACKING TASK ON SPEECH INTELLIGIBILITY IN NOISE** Ph D Thesis - Southampton Univ., Engl., 1974

Mary E Johnston Mar 1975 48 p refs

(RAE-TR-75014, BR64915) Avail NTIS HC \$4 00

An investigation is described which was carried out to study the effect of noise and performance of a tracking task on speech intelligibility. The results indicate that for some subjects there is a significant detrimental effect of tracking on speech intelligibility, and that this effect may be offset by improving the signal/noise ratios of communication. These results suggest that it is inaccurate to use data based on classical single-stress intelligibility tests in the design and assessment of communication systems to be used in multi-activity real life situations. Author (ESA)

**N76-11730#** General Electric Co Lynn Mass Direct Energy Conversion Programs

**RESEARCH ON REVERSE OSMOSIS MEMBRANES FOR PURIFICATION OF WASH WATER AT STERILIZATION TEMPERATURE (165 DEGREES F) Research Report, Mar 1971 - Sep 1974**

M E Nolan and A B LaConti Jun 1975 58 p refs

(Contract DI-14-30-2752)

(PB-242521/3 W75-08575 Int-OSW-RDPR-75-1003 RR-2)

Avail NTIS HC \$4 50 CSCL 07A

The goal was to develop viable reverse osmosis (RO) modules and systems of tubular design of approximately 80 gpd capacity to recover wash water at sterilization temperatures An 80 gpd RO system was fabricated for recovering wash water at sterilization temperatures The performance characteristics of ancillary components including particulate filters gauges meters RO pump accumulator carbon polishing column were verified by integrating the components into a suitable subsystem containing the RO module and life testing with wash water The twenty tube module was used to define the total system and identify/correct some of the life limiting problems and was tested under simulated mission conditions with wash water GRA

**N76-11731#** Navy Clothing and Textile Research Unit, Natick Mass

**VISOR SYSTEM MATERIALS FOR ALUMINIZED FIREMEN'S HOODS REPORT NO 1 PROBLEM IDENTIFICATION**

Norman F Audet May 1975 28 p refs

(AD-A011420, TR-111) Avail NTIS CSCL 06/7

The study determined the durability of the gold-coated facepiece component of the crash-crew firefighters' visor system because field observations indicated that the gold coating wore off readily The study examined methods employed by fire station personnel in caring for the facepiece and in replacing it and the effect of various contaminants and abrasive materials on the quality of the gold coating and its subsequent heat resistance GRA

**N76-11732#** Synsis, Inc Los Angeles, Calif

**PROTOTYPE COLD WEATHER HEADWEAR Final Report, Oct 1973 - Oct 1974**

David Mangelsdorf Marvin Goldberg, and Heidi Santschi Oct 1974 73 p refs

(Contract DAAK03-74-C-0030 DA Proj 1T7-62713-DJ-40)

(AD-A012314 USA-NLABS-TR-75-42-CE, CE/MEL-137) Avail NTIS CSCL 06/17

Prototypes of an improved cold weather headgear ensemble have been developed which should provide protection from cold, wind blowing snow and frostbite in environments to -65F and 35 miles per hour wind velocities The ensemble provides physical compatibility with military clothing and equipment and does not occlude the field of vision The design covers the face, head and neck and is provided with features that permit achieving varying degrees of protection in response to varying severity of the environmental threat The ensemble and its elements are composed largely of a helanca/urethane foam/cotton jersey laminate which provides excellent insulating properties, sound transparency, and permeability GRA

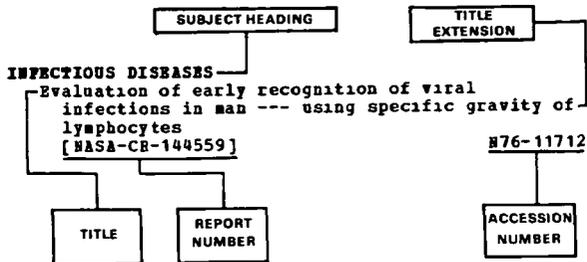
**N76-11924** Joint Publications Research Service, Arlington, Va  
**BIOMEDICAL RESEARCH**

*In its* Space Res Conducted in the USSR in 1974 COSPAR Rept, 18th Plenary Session (JPRS-65778) 29 Sep 1975 p 81-93 Transl into ENGLISH from the book Kosmicheskie Issledovaniya, Vypolnennyye v SSSR v 1974 Godu Doklad KOSPAR Vosemnadtsatyy Plenum Moscow, Izdatelstvo Nauka 23 Apr 1975 13 p

Physiological reactions experienced by cosmonauts aboard the Salyut 3 space station and the Soyuz 14, 15 and 16 flights are discussed Biological experiments conducted aboard Soyuz 16 and various Cosmos flights are also described D M L

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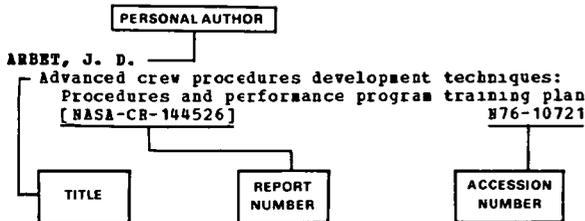
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