NASA SP-7011 (148)

AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY

WITH INDEXES

(Supplement 148)

DECEMBER 1975

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

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NASA SP-7011 (148)

AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES

(Supplement 148)

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 November 1975 in

- *Scientific and Technical Aerospace Reports (STAR)*
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INTRODUCTION

This Supplement to *Aerospace Medicine and Biology* (NASA SP-7011) lists 245 reports, articles and other documents announced during November 1975 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA)*. The first issue of the bibliography was published in July 1964, since that time, monthly supplements have been issued.

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

Each entry in the bibliography consists of a bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged in two major sections, *IAA Entries* and *STAR Entries*, in that order. The citations, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* or *STAR*, including the original accession numbers from the respective announcement journals. This procedure, which saves time and money, accounts for the slight variation in citation appearances.

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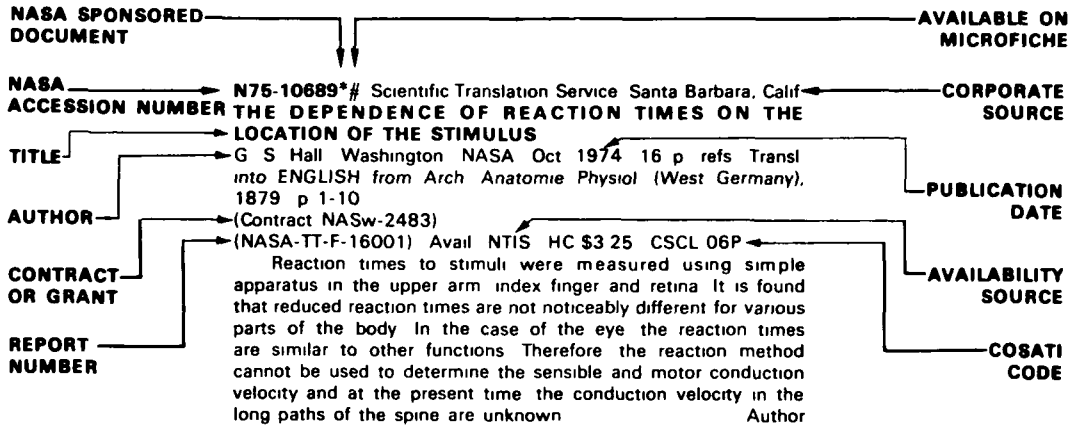

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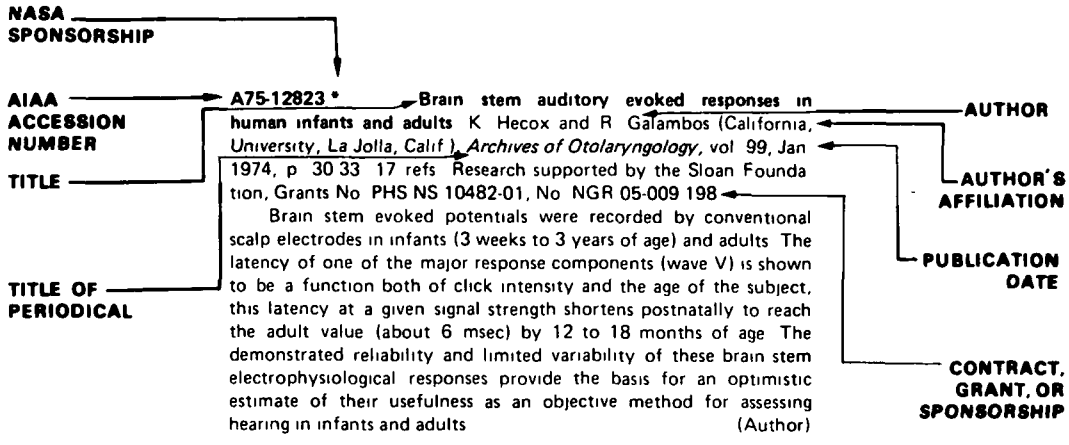

AEROSPACE MEDICINE AND BIOLOGY

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IAA ENTRIES

A75-41913 **Ventral midbrain stimulation, blood pressure responses and their relation to the dopaminergic nigro-striatal pathways.** A Spring and W Winkelmuller (Hannover, Medizinische Hochschule, Hanover, West Germany) *Pflugers Archiv*, vol 358, no 4, 1975, p 339-348 20 refs

A75-42052 **Reliability of life support systems as related to general space flight safety requirements** B A Adamovich and G G Ter-Minasian (Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR) *Journal of the Astronautical Sciences*, vol 22, Oct-Dec 1974, p 85-94 14 refs

An approach for increasing the reliability of the life support system of a spacecraft is discussed The approach is based on a selection of the system elements with the best reliability potential at the initiation of the system development In the absence of concrete empirical information regarding the reliability of the considered system components, a comparative reliability evaluation for given alternate possibilities has to be conducted G.R

A75-42192 **A numerical study of pulsatile flow through constricted arteries** B J Daly (California, University, Los Alamos, N Mex) In International Conference on Numerical Methods in Fluid Dynamics, 4th, Boulder, Colo, June 24-28, 1974, Proceedings New York, Springer-Verlag New York, Inc, 1975, p 117-124 5 refs

The current paper describes a numerical technique of examining flow phenomena associated with the formation, growth and detachment of plaque material at arterial walls The study concentrates on two aspects of blood flow in large arteries a nonisotropic and space-varying elastic model of distensible arteries, and an efficient procedure for calculating pulsatile flow The calculation procedure makes use of the arbitrary Lagrangian-Eulerian method for the computation of transient, multidimensional, viscous flow S J M

A75-42263 # **Study of the characteristics of decompressive gas formation with the aid of ultrasound (Issledovanie zakonomernostei dekompressionnogo gazoobrazovaniia s pomoshch'iu ul'trazvuka)** I A Sapov, L K Volkov, V V Men'shikov, and I P Iunkin (Voenno-Meditsinskaia Akademiia, Samostoiatel'noe Konstruktorsko-Tekhnologicheskoe Biuro Biofizpribor, Leningrad, USSR) *Akademiia Nauk SSSR, Doklady*, vol 222, May 11, 1975, p 508-511 10 refs In Russian

The paper describes experiments conducted on dogs, in which ultrasonic methods were used to determine the threshold level at which the tissues of a living organism can be saturated by an indifferent gas (N2) before the appearance of gas bubbles in the venous blood flow The dogs were subjected to increased pressures for various lengths of time and then returned to normal pressure in order that decompression effects might be observed The symptoms of decompression sickness were monitored while the appearance of gas bubbles in the blood flow was detected by Doppler reflected ultrasound Analysis of data on pressure and exposure, compression sickness symptoms, and the appearance of bubbles reveals a zone of latent decompression illness where bubbles are present without signs of decompression illness P T H

A75-42316 # **Sialoproteids of the liver and blood serum in rats exposed to small doses of ionizing radiation (Sialoproteidy pecheni i syvorotki krovi krys pri deistvii nebol'shikh doz ioniziruiushchei radiatsii)** E V Malashevich (Akademiia Nauk Belorusskoi SSR, Institut Fiziologii, Minsk, Belorussian SSR) *Akademiia Nauk BSSR, Doklady*, vol 19, July 1975, p 654-656 8 refs In Russian

A75-42320 **The electrical response of the human eye to sinusoidal light stimulation** A Troelstra (Rice University, Houston, Tex) and C A Garcia (Texas, University, Houston, Tex) *IEEE Transactions on Biomedical Engineering*, vol BME-22, Sept 1975, p 369-378 19 refs Grant No NIH-5-SO5-RR-07103

Experiments have been performed to study the exact nature of ERG response to sinusoidal light stimulation, to reveal the factors affecting the harmonic distortion in these responses, and to determine how this is related to stimulus parameters and clinical abnormalities Following a period of 15 min of initial dark adaptation, 10 normal human subjects and 40 clinical patients were tested to obtain flash ERG and ERB response to sinusoidal stimulation for a wide range of stimulus frequencies (0 5-24 Hz) and a modulation percentage of nearly 85% When sinusoidally modulated light is used to stimulate the retina, the resulting ERG potentials are generally not sinusoidal due to nonlinearities in the system However, the responses are found to be very reproducible and to be easily characterized by a few parameters on the basis of a Fourier analysis Amplitude and phase characteristics can be understood using a simple model for the scotopic B-wave system and additive interaction by the photopic system It is suggested that electroretinographic responses in patients with retinal abnormalities may be indicative of the character of these abnormalities S D

A75-42321 **Analysis of plethysmographic estimation of alveolar pressure** F P Primiano, Jr and I Greber (Case-Western-Reserve University, Cleveland, Ohio) *IEEE Transactions on Biomedical Engineering*, vol BME-22, Sept 1975, p 393-399 15 refs Research supported by the Cleveland Cystic Fibrosis Foundation and Health Fund of Greater Cleveland, Grant No NIH-HE-13885

Relationships between the change in a representative alveolar pressure in a pulmonary system which acts as a single mechanical compartment and changes in measurable variables are derived for several plethysmographic systems Derivations considering air as a one-component gas are presented for the pressure and flow-displacement plethysmographs in which the subject exchanges respired gas with air in the box, and for a plethysmograph from which the subject breathes gas from outside the box using a tube through the box wall A set of assumptions and approximations which can be invoked to develop the standard differential plethysmographic equations is explicitly stated The analysis is extended to include multicomponent gas mixtures and mass exchange between alveolar gas and blood for a generalized plethysmographic configuration Some practical requirements on experimental conditions arising from the derived relationships and the assumptions and approximations used in the derivations are considered (Author)

A75-42322 **Analog sample/hold circuit for physiological signal monitoring** A T Johnson (Maryland, University, College Park, Md) *IEEE Transactions on Biomedical Engineering*, vol BME-22, Sept 1975, p 420-423 8 refs Army supported research

A sample/hold circuit is proposed for holding calibration signal while adjustments are made with minimum test disruption The circuit employs analog methods, since infinite resolution, simpler and less expensive circuitry in combination with recent developments in FET operational amplifiers permit much longer hold times than previously possible The circuit block diagram is described, along with circuit schematic and operation The performance of the circuit presented is discussed as to fidelity of stored voltage and voltage drift It is shown that the circuit yields a performance which several years ago would have been unattainable at moderate cost S D

A75-42360 The sequence of normal recovery of excitability in the dog heart J A Abildskov (Utah, University, Salt Lake City, Utah) *Circulation,* vol 52, Sept 1975, p 442-446 18 refs Research supported by the Richard A and Nora Eccles Harrison Fund for Electrocardiographic Research, Grants No NIH-HL-13480, No NIH-NHLI-72-2988

The sequence with which 18 to 70 ventricular sites recovered excitability after normal excitation was determined in 15 dogs At the epicardial level the recovery sequence was similar to that of normal activation The sequence of excitation and recovery differed at the endocardium with some basal areas recovering excitability earlier than the apex despite later activation Evidence of a normal epicardial to endocardial recovery sequence was also obtained The findings are compatible with and provide a tentative explanation of some features of T waves in human body surface electrocardiograms (Author)

A75-42475 Geochemistry and the origin of life Edited by K A Kvenvolden (NASA, Ames Research Center, Moffett Field, Calif) Stroudsburg, Pa , Dowden, Hutchinson and Ross, Inc (Benchmark Papers in Geology Volume 14), 1974 436 p $26

The origin of life on earth is examined from a viewpoint stressing the validity of the concept of chemical evolution The different geological formations supporting the mechanisms of the theory are described, the stage of chemical evolution (preceding that of biological evolution) would have taken place from the time of the origin of the earth and meteorites, 4 6 billion years ago, to the early Precambrian period, about 3 2 billion years ago Specific aspects of the problem discussed include amino acids from spark discharges and their comparison with the Murchison meteorite amino acids, the properties and theory of genesis of the carbonaceous complex within the cold Bokevelt meteorite, ammonion ion concentration in the primitive ocean, the oxygen isotope chemistry of ancient charts, the origin and rise of oxygen concentration in the earth's atmosphere, Precambrian microorganisms and evolutionary events prior to the origin of vascular plants, and biogenicity and significance of the oldest known stromatolites S J M

A75-42578 High-speed holography of vibrating objects and rapid events T Uyemura and Y Yamamoto (Tokyo, University, Tokyo, Japan) In High speed photography, Proceedings of the Eleventh International Congress, London, England, September 15-21, 1974 London, Chapman and Hall, Ltd , 1975, p 271-276

Vibrations of ultra-sonic bonders and eardrums of frog, guinea-pig and human were studied by means of the time averaged holographic interferometry A new technique of mechanical chopping systems for stroboscopic holographic interferometry has been developed The fringes generated by real-time holographic interferometry were photographed by a high-speed cinecamera Ruby laser Q-switched by a few methods was improved to take high quality holograms (Author)

A75-42580 Microholography - Interferometric investigation of deformations of the eardrum of guinea pigs undergoing transient sound effects (Microholographie - Etude interférométrique des déformations du tympan du cobaye sous l'effet de bruits impulsionnels) P Smigielski, F Albe, H Fagot, A Dancer, and R Franke (Institut Franco-Allemand de Recherches, Saint-Louis, Haut-Rhin, France) In High speed photography, Proceedings of the Eleventh International Congress, London, England, September 15-21, 1974 London, Chapman and Hall, Ltd , 1975, p 289-294 In French Research supported by the Direction des Recherches et Moyens d'Essais

A75-42644 # The effect of decompression on the alimentary canal (Wplyw dekompresji na przewod pokarmowy) B Bembnowski and E Sokolowski (Wojskowy Institut Medycyny Lotniczej, Warsaw, Poland) *Postepy Astronautyki,* vol 8, no 1, 1975, p 27 35 11 refs In Polish

The results of X-ray examinations of the gastrointestinal track in men under hypobaric conditions are discussed X ray photographs reveal buildup of gases in the stomach pit during high-altitude flight The functional and anatomical status of the tract under low-pressure conditions is discussed P T H

A75-42645 # Acceleration tolerance level dependence on age and some morphotic features M Wojtkowiak (Wojskowy Instytut Medycyny Lotniczej, Warsaw, Poland) *Postepy Astronautyki,* vol 8, no 1, 1975, p 49-60 8 refs In Polish

Five hundred men in the age range of 20-45 years were tested on a centrifuge A linear acceleration increase program at the rate of 0,1 g/s was accepted An organism tolerance limit was set at the acceleration value corresponding to total loss of vision The age, height, and body weight of each person was recorded and indices of constitution according to Rohrer were calculated The results were compared with the acceleration tolerance level A dependence of acceleration tolerance level upon age and constitution was discovered It was proved that the highest accelerations were tolerated by men of strong and proportional constitution, of short stature and middle body weight The lowest tolerances were found in tall men with a low body weight A small weight excess in relation to height seems to favor acceleration tolerance (Author)

A75-42682 Stereoillusion based on visual persistence M Morgan (Cambridge University, Cambridge, England) *Nature,* vol 256, Aug 21, 1975, p 639, 640 6 refs

The question is considered of what is perceived when a stroboscopically moving target is viewed with a filter over one eye The experimental investigation was based on use of a haploscopic display in which the number of bars presented separately to the two eyes was controlled on an oscilloscope display by a digital computer The appearance of the fused display is described together with the display appearance to an observer with one eye covered It is shown that the fused display gave the impression of a picket fence in motion together with the impression of depth to the motion, while clear depth was seen in the latter case only when the Pulfrich and persistence effects reinforced each other It is noted that the reported effect cannot be explained by existing knowledge of static stereopsis or by the conventional explanation of the Pulfrich effect itself Some possible explanations are briefly discussed F G M

A75-42683 Spontaneous voltage fluctuations in retinal cones and bipolar cells E J Simon, T D Lamb, and A L Hodgkin (Cambridge University, Cambridge, England) *Nature,* vol 256, Aug 21, 1975, p 661, 662 12 refs

Based on the hypothesis that vertebrate rods and cones continuously release transmitter in the dark and that light suppresses this release, it is shown that the bipolar cells which receive information from the cones are electrically noisy in the dark because of random fluctuations in the release of cone transmitter It is also shown that these bipolar cells are relatively quiet in light, when transmitter release is suppressed An intracellular recording from a hyperpolarizing bipolar cell in the isolated eyecup of a turtle is presented to illustrate these effects The possible order of magnitude of the events underlying the dark noise of a bipolar cell is estimated to be 0 24 mV It is found that a steady light suppresses noise in

cones as well as in bipolar cells A possible source of dark noise in cones is shown to be random closure of the light-sensitive ionic channels F G M

A75-42707 * # **Noise in space** W P Rader, J Baratono (Martin Marietta Aerospace, Denver, Colo), H Bandgren, and R Erwin (NASA, Marshall Space Flight Center, Huntsville, Ala) *Acoustical Society of America, Meeting, 89th, Austin, Tex , Apr 7-11, 1975, Paper* 32 p

The Skylab program presented an excellent opportunity to investigate the effects of noise on man confined in limited space for long periods of time This paper summarizes the results of a 4 year study to achieve a habitable noise environment for the Skylab astronauts Noise control measures are described and noise measurements obtained during the Skylab missions are presented, as well as the astronauts' reactions to and evaluations of the noise environment (Author)

A75-42752 **Autonomic nervous system and adaptation to cold in man** J LeBlanc, S Dulac, J Côte, and B Girard (Universite Laval, Quebec, Canada) *Journal of Applied Physiology*, vol 39, Aug 1975, p 181 186 8 refs Defence Research Board of Canada Grant No 4310 140

The responses to a cold hand test (blood pressure increase and tachycardia) and to a cold face test (blood pressure increase and bradycardia) were used to study the role of the autonomic nervous system in cold adaptation in humans Results indicate that repeated exposures to severe cold in men activate some adaptive mechanisms characterized by a diminution of the sympathetic response and a concomitant enhancement of the vagal activation normally observed when the extremities and the face are exposed to cold (Author)

A75-42753 **Sleep patterns after graded exercise** C M Shapiro, R D Griesel, P R Bartel, and P L Jooste (Witwatersrand, University, South African Council for Scientific and Industrial Research, National Institute for Personnel Research, Chamber of Mines of South Africa, Human Sciences Laboratory, Johannesburg, Republic of South Africa). *Journal of Applied Physiology,* vol 39, Aug 1975, p 187-190 23 refs

The effects of six graded and measured exercise activities on sleep patterns were investigated in two healthy young men Electrophysiological recordings were made continuously throughout the night to distinguish sleep states This experiment was designed to test the hypothesis of a relation between physical activity and slow-wave sleep (SWS stages 3 and 4 of non-REM sleep) A progressive increase in SWS over the whole-night sleep record was found with progressively increasing physical fatigue A fall in rapid-eye movement (REM) sleep and at higher exercise levels, of stage 2 sleep, was found The results support the hypothesis that SWS is involved in the recovery process from fatigue (Author)

A75-42754 **Simulation of regional lung emptying during slow and forced expirations** J Pardaens, K P van de Woestijne, and J Clement (Akademisch Zeikenhuis St Rafael, Louvain, Belgium) *Journal of Applied Physiology,* vol 39, Aug 1975, p 191 198 33 refs Research supported by the Fonds voor Geneeskunding Wetenschappelijk Onderzoek

Regional lung emptying was simulated by means of a bialveolar lung model The influence of bronchial asymmetry and the vertical pleural pressure gradient was evaluated The model suggests that (1) in vivo the influence of the pleural pressure gradient prevails over that of the bronchial asymmetry, (2) in the presence of this gradient, the shape of phases III and IV of the single breath washout curves obtained following inspiration of a tracer gas bolus at residual volume is determined by the recoil pressure-volume curve of the lung, by the vertical displacements of the alveoli, and, at higher flow rates, by the elastic characteristics of the airways, (3) if the pleural pressure gradient is independent of lung volume and of flow rate, the factors mentioned in 2 suffice to produce single-breath washout curves (phases III and IV) and regional vs overall lung volume relationships corresponding to those observed in vivo (Author)

A75-42755 **Experimental cardiac necrosis in hypobaric and anemic hypoxia** J J McGrath, B Ostadal, J Prochazka, M Wachtlova, and V Rychterova (Illinois, University, Peoria, Ill , Ceskoslovenska Akademie Ved, Fysiologichky Ustav, Karlova Universita, Prague, Czechoslovakia) *Journal of Applied Physiology,* vol 39, Aug 1975, p 205-208 25 refs

Resistance to isoproterenol induced cardiac necrosis (IPRO) was compared in rats exposed to two types of hypoxia (i e , hypobaric and anemic) IPRO was induced by two consecutive, subcutaneous injections of isoproterenol (80 mg/kg) at 24-hr intervals The animals were killed on the third day and the severity of the lesion was evaluated on a 0 (no damage) to 4 (severely damaged) scale Hypobaric hypoxia affords some protection against IPRO which is not afforded by anemic hypoxia Similarities and differences in the two hypoxias are discussed (Author)

A75-42756 **Adaptation of brain monoamine synthesis to hypoxia in the rat** J N Davis (U S Veterans Administration Hospital, Duke University, Durham, N C) *Journal of Applied Physiology,* vol 39, Aug 1975, p 215-220 38 refs Grants No NIH-HLO-7896, No NIH-NS-06233

Oxygen is a substrate in the synthesis of the neurotransmitters, norepinephrine, dopamine, and serotonin Changes in environmental oxygen appear to cause corresponding alterations in brain monoamine synthesis in vivo The effect of chronic hypoxia was studied by exposing rats to 10% oxygen for up to 36 hr Brain monoamine synthesis, estimated in vivo, decreased initially and then returned to control levels, despite continued exposure to 10% oxygen During this apparent adaptation to hypoxia, there were no changes in the concentration of brain serotonin, norepinephrine, dopamine, or tryptophan, while brain tyrosine increased after 24 hr of exposure The adaptation of brain monoamine synthesis to hypoxia appeared to correlate with adaptive changes in brain tissue oxygen rather than any change in the intraneuronal regulation of amine synthesis (Author)

A75-42757 **Prediction of body composition in habitually active middle-aged men** S Lewis, W L Haskell, H Klein, J Halpern, and P D Wood (Stanford University, Stanford, Calif) *Journal of Applied Physiology,* vol 39, Aug 1975, p 221-225 32 refs

In 45 physically active men (ages 35-67 yr) who underwent hydrostatic weighing to determine body composition, multiple regression equations were developed for the prediction of body density, lean body weight (LBW), fat body weight, and % fat using selected anthropometric measurements The prediction accuracy for these parameters using several previously generated anthropometric regression equations was also determined Analysis of previous data indicated that in selected populations total body weight can account for a relatively large fraction of the variance in LBW LBW may be estimated quite accurately in physically active men with one of several regression equations which include total body weight as an independent variable (Author)

A75-42758 **Circadian variations in the sweating mechanism** J Timbal, J Colin, and C Boutelier (Centre d'Essais en Vol, Bretigny-sur-Orge, Essonne, France) *Journal of Applied Physiology,* vol 39, Aug 1975, p 226 230 24 refs Research supported by the Direction des Recherches et Moyens d'Essais

Sweat rates and body temperatures of human subjects were measured at 0200, 1000, and 1800 hr during a heat exposure of 90 min The latent period of sweating was not significantly altered in the evening but significantly shortened during the night Mean body temperature corresponding to the onset of sweating was nearer to the basal body temperature during the night, while during the day the difference between these two temperatures became larger This phenomenon seems related to the circadian cycle of vasomotor adjustment, since during the night body conductance was higher than

during the day and corresponded to a state of vasodilatation similar to that observed at the onset of sweating During the day, this situation was reversed (Author)

A75-42759 Turnover of free fatty acids during recovery from exercise L Hagenfeldt (Karolinska Hospital, Stockholm, Sweden) and J Wahren (Serafimer Hospital, Stockholm, Sweden) *Journal of Applied Physiology*, vol 39, Aug 1975, p 247-250 23 refs Swedish Medical Research Council Grant No 19X-722

The turnover of plasma free fatty acid (FFA) was studied during the recovery from exercise with the aid of a continuous infusion of C-14 labeled oleic acid It is concluded that the postexercise peak in arterial FFA is a consequence of augmented release of FFA into the plasma pool above the level during exercise, possibly related to the release of sympathetic vasoconstrictor tone As a consequence, the rate of removal of FFA rises at the end of exercise and remains augmented above the basal level for as long as the arterial concentration is increased (Author)

A75-42760 Effects of equivalent sea-level and altitude training on maximal oxygen uptake and running performance W C Adams, E M Bernauer, D B Dill, and J B Bomar, Jr (California, University, Davis, Calif , U S Air Force Academy, Colorado Springs, Colo) *Journal of Applied Physiology*, vol 39, Aug 1975, p 262-266 20 refs NSF Grant No 35281, Contract No F44620-72-C-0011, Grants No AF AFOSR-PO-72-0001, No PHS-HD-05625

Twelve middle-distance runners, each having recently completed a competitive track season, were divided into two groups matched for maximal oxygen uptake, 2-mile run time, and age Group 1 trained for 3 wk at Davis, Pb = 760 mm Hg, running 19 3 km/day at 75% of sea level (SL) maximal oxygen uptake, while group 2 trained an equivalent distance at the same relative intensity at the US Air Force Academy (AFA), Pb = 586 mm Hg The groups then exchanged sites and followed a training program of similar intensity to the group preceding it for an additional 3 wk It is concluded that there is no potentiating effect of hard endurance training at 2,300-m over equivalently severe SL training on SL maximal oxygen uptake or 2-mile performance time in already well conditioned middle-distance runners (Author)

A75-42761 Effects of hyperoxic gas mixtures on energy metabolism during prolonged work B A Wilson, H G Welch, and J N Liles (Tennessee, University, Knoxville, Tenn) *Journal of Applied Physiology*, vol 39, Aug 1975, p 267-271 27 refs

These experiments were designed to study selected respiratory and metabolic responses to exercise in hyperoxia Four subjects were examined during 30-min bicycle ergometer rides at both 40% and 80% of their aerobic maximum The oxygen uptake was significantly increased at both work levels breathing 60% O2 versus 21% O2, while oxygen uptake showed no significant change during the 40% exercise tests but was significantly decreased during the 80% intensity rides The average increase in the volume of O2 taken up during 30 min of hyperoxic exercise, compared with normoxia, was 3 3 liters at the 40% exercise level and 5 6 liters at the 80% level (Author)

A75-42762 Shunt dynamics in experimental atrial septal defects J A Alexander, J C Rembert, W C Sealy, and J C Greenfield, Jr (Duke University, U S Veterans Administration Hospital, Durham, N C) *Journal of Applied Physiology*, vol 39, Aug 1975, p 281-286 14 refs Grants No PHS-HL-09711, No PHS-HL-01782

In order to study the hemodynamic variables involving the magnitude, direction, and timing of phasic shunt flow, both the interatrial pressure gradient and blood flow along with other pertinent hemodynamic variables were measured instantaneously across a surgically created atrial septal defect (ASD) in seven awake dogs Atrial and ventricular pacing and infusion of phenylephrine and isoproterenol were used to alter hemodynamic conditions The wave form of phasic ASD flow was similar both in configuration and timing to the interatrial pressure gradient During the cardiac cycle, both left-to-right (L-R) and right-to-left (R L) shunting occurred atrial contraction augmented L R flow, the onset of ventricular contraction was associated with R-L flow, during the latter part of ventricular contraction, flow returned to L R with the maximum L-R shunting occurring in early diastole Tachycardia, infusion of phenylephrine and isoproterenol did not alter the phasic flow pattern (Author)

A75-42763 Ventilatory interaction between hypoxia and /H+/ at chemoreceptors of man R A Gabel and R B Weiskopf (U S Army, Research Institute of Environmental Medicine, Natick, Peter Bent Brigham Hospital, Harvard University, Boston, Mass) *Journal of Applied Physiology*, vol 39, Aug 1975, p 292-296 16 refs Grant No NIH-P01-GM-15904

An isocapnic progressive hypoxia test is used to evaluate peripheral chemoreceptor sensitivity to acute hypoxia in five normal young men under various prescribed conditions The subjects were first studied at sea level and, 2 days later, at a simulated altitude of 4,267 m (447 torr) in a hypobaric chamber after 24 hr of acclimatization Experimental results suggest that it is the H(+) and not CO2 that interacts with hypoxia in stimulating ventilation in man The intrinsic sensitivity of peripheral chemoreceptors to acute hypoxia is found to remain unchanged during 24 hr of acclimatization to high altitude S D

A75-42764 Circadian variations in concentrations of plasma thyroxine and triiodothyronine in man A Balsam, C R Dobbs, and L E Leppo (USAF, School of Aerospace Medicine, Brooks AFB, Tex) *Journal of Applied Physiology*, vol 39, Aug 1975, p 297-299 16 refs

The purpose of the present study is to evaluate whether periodic changes in the levels of thyroxine (T4) and triiodothyronine (T3) could be detected by assay techniques considered specific for these iodothyronines, to determine the interrelationships between circadian variations in plasma levels of T4 and T3, and to estimate the correlation between fluctuations in plasma levels of iodothyronines and plasma total protein concentration The study confirms the existence of a circadian rhythm of plasma T4 and demonstrates the presence of a parallel rhythm of plasma T3 It is suggested that fluctuations in hormonal binding by plasma proteins may be responsible for the observed variation in plasma total hormone measurements (Author)

A75-42765 A modified measurement of respiratory resistance by forced oscillation during normal breathing D C Stanescu, R Fesler, C Veriter, A Frans, and L Brasseur (Cliniques Universitaires Saint Pierre, Louvain, Belgium) *Journal of Applied Physiology*, vol 39, Aug 1975, p 305-311 18 refs

We have modified the measurement of the resistance of the respiratory system, Rrs, by the forced oscillation technique and we have developed equipment to automatically compute Rrs Flow rate and mouth pressure are treated by selective averaging filters that remove the influence of the subject's respiratory flow on the imposed oscillations The filtered mean Rrs represents a weighted ensemble average computed over both inspiration and expiration This method avoids aberrant Rrs values, decreases variability, and yields an unbiased mean Rrs Rrs may be measured during slow or rapid spontaneous breathing, in normal or obstructive patients, over a range of 3-9 Hz A good reproducibility of Rrs at several days' interval was demonstrated Frequency dependence of Rrs was found in patients with obstructive lung disease but not in healthy nonsmokers (Author)

A75-42766 Computerized method for analyzing maximum and partial expiratory flow-volume curves R J Soto, H V Forster, and B Rasmussen (Wisconsin, Medical College, Milwaukee, Wis) *Journal of Applied Physiology*, vol 39, Aug 1975, p 315-317 8 refs

Computerized instrumentation and software have been developed to obtain maximum expiratory flow-volume (MEFV) and

partial expiratory flow-volume (PEFV) curves The computerized system calculates and prints out the flow at 25% and 40% of control vital capacity (VC), the expiratory volume, peak expiratory flow rate, and expiratory volume at one second (FEV1) divided by VC, the latter expressed as a percent The flow-volume curves can be displayed on an oscilloscope or plotter and stored on magnetic tape A pilot study was completed to demonstrate the reliability and validity of the data obtained (Author)

A75-42767 * A multichannel implantable telemetry system for flow, pressure, and ECG measurements T B Fryer, H Sandler, W Freund, E P McCutcheon, and E L Carlson (NASA, Ames Research Center, Moffett Field, Calif) *Journal of Applied Physiology,* vol 39, Aug 1975, p 318-326 22 refs.

The design, principles of operation, and performance of an implantable miniaturized (48 cu cm in volume) multiplex telemetry system for simultaneous measurement of up to eight physiological parameters (including cardiovascular data) are described Integrated circuits are used to reduce the size, complexity, and cost of fabrication Power consumption is reduced using recently developed complementary MOS devices PWM technique is selected as it is relatively easy to implement, lends itself to ICs, and provides an accurate means of transmitting data The system is totally implantable within the chest of a test animal, with no wire penetrating through the skin It is shown that the described system permits repeated measurement of the physiological effects of a variety of interventions in awake unanesthetized animals S D

A75-42768 A high accuracy linear rate meter G R Wyss (Washington, University, Seattle, Wash) *Journal of Applied Physiology,* vol 39, Aug 1975, p 327 330 Grant No NIH-GM 00260

By implementing analog computer techniques using digital circuits, an instantaneous rate meter was built with approximately 100 times the accuracy of commercially available rate meters The circuit is accurate to within plus or minus 0 2 events/min over a range of rates of 0 2 900 epm Modifications can be made to provide a digital display of rate The circuit design techniques used in developing the rate meter may be used to generate a wide variety of functions of time with very high accuracy (Author)

A75-42769 Multichannel subcarrier ECG, respiration, and temperature biotelemetry system E N Smith and T J Salb, Jr (Texas Tech University, Lubbock, Tex) *Journal of Applied Physiology,* vol 39, Aug 1975, p 331-334 12 refs Research supported by the Texas Tech University

A three channel biotelemetry system measuring ECG, respiration, and body temperature is described The transmitter employs a 6-kHz subcarrier oscillator and is small enough for surgical implantation in animals the size of rats or larger The frequency modulated 6 kHz tone from the receiver can be demodulated directly or recorded on an inexpensive cassette tape recorder for future analysis The transmitter cost is approximately $35 00 and measures 3 x 1 cm A battery life of several weeks and transmitter range of 10 100 m is typical Transmission is on the FM broadcast band (88-108 MHz) and reception from an inexpensive FM portable receiver is possible (Author)

A75-42775 * Diagnostic accuracy of an ultrasonic multiple transducer cardiac imaging system R L Popp, O R Brown, and D C Harrison (Stanford University, Stanford, Calif) *American Heart Journal,* vol 90, Sept 1975, p 329-334 Grant No NGR-05-020-305

An ultrasonic multiple-transducer imaging system for intracardiac structure visualization is developed in order to simplify visualization of the human heart in vivo without radiation hazard or invasion of the body Results of the evaluation of the diagnostic accuracy of the devised system in a clinical setting for adult patients are presented and discussed Criteria are presented for recognition of mitral valva prolapse, mitral stenosis, pericardial effusion, atrial septal defect, and left ventricular dyssynergy The probable cause for false-positive and false-negative diagnoses is discussed However, hypertrophic myopathy and congestive myopathy were unable to be detected Since only qualitative criteria were used, it was not possible to differentiate patients with left ventricular volume overload from patients without cardiac pathology S D

A75-42793 # Visual masking and saccadic suppression N A Iakimov, L I Mitrani, and S M Mateev (B'lgarska Akademiia na Naukite, Institut po Fiziologiia, Sofia, Bulgaria) *Bolgarskaia Akademiia Nauk, Doklady,* vol 28, no 6, 1975, p 833-835 7 refs

Structured backgrounds were presented to subjects with normal vision during the course of saccadic eye movements, and the thresholds for detecting a visual test stimulus when the structured background disappeared just before or after the onset of saccade were compared The backgrounds consisted of a uniformly illuminated field crossed by a dark horizontal stripe or a grating of vertical black and white bars crossed by a dark horizontal stripe The test stimulus was a bright circle The results showed a significant enhancement of saccadic suppression when the background structure disappeared after the onset of saccade, as opposed to the case when it disappeared before saccade onset It is concluded that saccadic suppression is a kind of visual masking which occurs at the initial displacement of contours over the retina at the very beginning of saccade even when moving edges do not cross the locus of the stimulus retinal image P T H

A75-42799 * Quantitative relationship between airborne viable and total particles G S Oxborrow, N D Fields, J R Puleo, and C M Herring (U S Public Health Service, Center for Disease Control, Cape Canaveral, Fla) *Health Laboratory Science,* vol 12, Jan 1975, p 47-51 13 refs Contract No NAS7-100

The numbers of viable and total particles in a microbiological laboratory and in a class 100,000 clean room were examined for a predictable relationship to aid the monitoring of airborne microbial contamination Over 99% of the total particles present in both areas were less than 1 micron in size, however, only 1 in 10,000 of the particles this size were viable At the other end of the particle size scale, it was found that less than 0 1% of the total particles were greater than 5 4 microns in size, but only 4 5% of these particles were viable Viable particles make up only a very small portion of the total particles making any correlation undetectable An analysis of the combined data from both areas using only total and viable particles over 5 4 microns showed a positive correlation An analysis of the data from each area individually showed no correlation (Author)

A75-42801 # Specific and general mechanisms of brain support of psychic activity in man and prospects of this problem (Chastnye i obshchie mekhanizmy mozgovogo obespecheniia psikhicheskoi deiatel'nosti cheloveka i perspektivy problemy) N P Bekhtereva (Akademiia Meditsinskikh Nauk SSSR, Leningrad, USSR) *Fiziologiia Cheloveka,* vol 1, Jan -Feb 1975, p 6-17 74 refs In Russian

Results of investigations on the neurophysiological mechanisms underlying the psychic activity in man are reviewed and discussed Particular attention is given to the analysis of normal and pathological emotional responses and to the brain coding mechanism of verbal signals A number of theses are set forth regarding the problems of structural-functional support of psychic activity, the role of the long-term memory matrix in the stable fixation of a pathologic condition, the theory of emotions, and verbal memory S D

A75-42802 # Human physiology and the science of psychology /formulation of the problem/ (Fiziologiia cheloveka i psikhologicheskaia nauka /k postanovke problemy/) A R Luriia (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR) *Fiziologiia Cheloveka,* vol 1, Jan -Feb 1975, p 18-26 32 refs In Russian

The relation between psychology as the science of mind and the branch of physiology called higher nervous activity is reviewed The dualistic concepts of Bundt, Sherrington, and Eccles are critically analyzed Psychology-oriented prerevolutionary and Soviet physiology is examined Modern psychophysiology is confirmed by current investigations intended to determine the dependence of complex human psychological processes on the function of separate brain systems. S D.

A75-42803 # **Microelectrode investigation of the neuronal mechanisms of voluntary mnemic activity in man (Mikroelektrodnoe izuchenie neironal'nykh mekhanizmov proizvol'noi mnesticheskoi deiatel'nosti cheloveka).** S N Raeva and M N Livanov (Akademiia Nauk SSSR, Institut Biologicheskoi Fiziki, Pushchino-on-Oka, USSR) *Fiziologiia Cheloveka,* vol 1, Jan-Feb 1975, p 36-43 23 refs In Russian.

A75-42804 # **Organization principles of the neural code of individual psychic activity (Printsipy organizatsii nervnogo koda individual'no-psikhicheskoi deiatel'nosti)** N P Bekhtereva, P V Bundzen, Iu L Gogolitsyn, A S Kaplunovskii, and V N Malyshev (Akademiia Meditsinskikh Nauk SSSR, Leningrad, USSR) *Fiziologiia Cheloveka,* vol 1, Jan-Feb 1975, p 44-58 23 refs In Russian

Experiments are performed to study some aspects of neurophysiological coding of higher psychic functions Particular attention is given to the processes underlying the formation, reorganization, and interaction of the code forms of verbal signals as a function of the degree of the potential activity of the engrams for long-term verbal memory and the processes involved in their activation in performing associative logic operations Experimental findings suggest that engrams of long-term verbal memory have active information and control functions and that the patterns of the controlling neural code which ensure the formation and supervision of verbal responses are derived code forms related to the various realizations of the associative logic operations S D

A75-42805 # **Cooperative mechanisms for the sensitivity of brain tissue to external and internal electric fields (Kooperativnye mekhanizmy vospriimchivosti mozgovoi tkani k vneshnim i vnutrennim elektricheskim poliam)** W R Adey (California, University, Los Angeles, Calif.) *Fiziologiia Cheloveka,* vol 1, Jan-Feb 1975, p 59-68 38 refs In Russian (Translation)

The effect of weak electric and electromagnetic fields on the behavioral responses in man and animal is investigated The data collected are compared with changes in neurophysiological activity and with biochemical transformations occurring at the membrane level Major conclusions are that (1) there is an interaction between brain tissue components and electrical and electromagnetic fields, (2) calcium ions play an important part in the realization of cooperative processes on the membrane surface, and (3) internal electrical gradients, including EEG, may have a significant effect on neurochemical transformations at the membrane level Possible paths of information processing by brain tissues are identified S D

A75-42806 # **Fundamental differences in the informative significance and the physiological meaning of slow electrical processes in the human brain for different measurement ranges of the potential (O printsipial'nykh otlichiiakh informativnoi znachimosti i fiziologicheskogo smysla medlennykh elektricheskikh protsessov golovnogo mozga cheloveka v raznykh diapazonakh izmereniia velichiny potentsiala)** V A Iliukhina (Akademiia Meditsinskikh Nauk SSSR, Leningrad, USSR) *Fiziologiia Cheloveka,* vol 1, Jan-Feb 1975, p 69-89 57 refs In Russian

A75-42807 # **Functional changes in the deep structures of the human brain during long-term operative memory tests (Funktsional'nye sdvigi v glubokikh strukturakh golovnogo mozga cheloveka pri bol'shoi prodolzhitel'nosti testov na operativnuiu pamiat')** V B Grechin (Akademiia Meditsinskikh Nauk SSSR, Leningrad, USSR) *Fiziologiia Cheloveka,* vol 1, Jan-Feb 1975, p 90-97 10 refs In Russian

Experiments are performed to study the variation characteristics of nonelectric slow processes in the deep structures of the human brain during long-term retention with allowance for reproduction quality A given activity of the operative memory type with a retention duration up to 10 min is shown to cause distinct changes in the nonelectric slow processes involved A short-term reproducible change in the pO2 level is revealed in the region of subcortical nuclei A long retention in operative memory tests is shown to cause changes in the spectral composition of the spontaneous fluctuations of pO2 and in local blood flow, an increase in blood flow level and a decrease in impedance in the region of deep structures The dynamic trend of these processes is discussed S D

A75-42808 # **Effect of the functional state of the central nervous system on the formation of an elementary motor response /from EEG correlation analysis data/ (Vliianie funktsional'nogo sostoianiia tsentral'noi nervnoi sistemy na formirovanie prostoi dvigatel'noi reaktsii /po dannym korreliatsionnogo analiza EEG/)** T D Loskutova (Institut Ekspertizy Trudosposobnosti i Organizatsii Truda Invalidov, Leningrad, USSR) *Fiziologiia Cheloveka,* vol 1, Jan-Feb 1975, p 98-108 30 refs In Russian

A75-42809 # **Statistical properties of the random field of brain biopotentials in man (O statisticheskikh svoistvakh sluchainogo polia biopotentsialov mozga cheloveka)** M N Tsitseroshin (Akademiia Nauk SSSR, Institut Evoliutsionnoi Fiziologii i Biokhimii, Leningrad, USSR) *Fiziologiia Cheloveka,* vol 1, Jan-Feb 1975, p 118-125 18 refs In Russian

The statistical characteristics of brain biopotential field in 15 healthy subjects (aged 20-32 yr) are evaluated for various degrees of wakefulness It is shown that (1) the random field of brain biopotentials is statistically nonuniform with respect to relevant space coordinates, (2) the space correlation functions of a random EEG field are damped with increasing interelectrode distance, which suggests that the field is ergodic, (3) the different stages of sleep exhibit similar space spectra for the electrical activity of the brain, whereas an arousal state with a pronounced alpha rhythm is characterized by the most frequent fluctuations of the potentials in space, especially in the sagittal direction, and (4) the alpha waves propagate over the surface of the cerebral hemispheres faster than the delta waves S D

A75-42810 # **Bioelectrical activity of the human brain and subjective estimation of time during dreams of different structure (Bioelektricheskaia aktivnost' golovnogo mozga cheloveka i sub'ektivnaia otsenka vremeni v protsesse snovidenii razlichnoi struktury)** N I Moiseeva (Akademiia Meditsinskikh Nauk SSSR, Leningrad, USSR) *Fiziologiia Cheloveka,* vol 1, Jan-Feb 1975, p 142-151 10 refs In Russian

Time estimation in dreams evoked by various external stimuli is investigated, along with the dependence of the subjective estimation of dream duration and structure on the character of the brain electrical activity, using electroencephalographic and electromyographic techniques It is shown that the character of bioelectrical activity and time estimation are different for dreams of different structure Brain structural correlations are examined for the cases of unpatterned and logically patterned dreams REM-phase data indicate that a testee's negation of seeing a dream is due to his inability to recall the dream rather than to the actual absence of the dream S D

A75-42811 # **Mechanism of the adaptation of the auditory apparatus to an acoustic load (O mekhanizme adaptatsii slukhovogo pribora k zvukovoi nagruzke)** L Ia Balonov, V L Deglin, and D A Kaufman (Akademiia Nauk SSSR, Institut Evoliutsionnoi Fiziologii i Biokhimii, Leningrad, USSR) *Fiziologiia Cheloveka,* vol 1, Jan-Feb 1975, p 152-159 33 refs In Russian

Experiments are performed to study the characteristics of poststimulatory auditory adaptation (PSAA) after administration of neuropharmaceuticals electively affecting the activity of nonspecific brain systems and after bilateral and unilateral electroconvulsive seizures Experimental findings confirm that adaptability of the auditory system is regulated by the reticular structures of the brain stem and posterior hypothalamus, and that the reticular influences regulating PSAA are brought into play at a level not exceeding the second neuron of the auditory path and appear to be distinct for the right and left sides of the auditory system The magnitude of PSAA may serve as a quantitative measure of the nonspecific activation of each of the cerebellar hemispheres S D

A75-42812 # Correlation between evoked potentials and processes of sensory analysis in man (Korreliatsiia vyzvannykh potentsialov s protsessami sensornogo analiza v cheloveka) L M Puchinskaia (Akademiia Nauk SSSR, Institut Vysshei Nervnoi Deiatel'nosti i Neirofiziologii, Moscow, USSR) *Fiziologiia Cheloveka,* vol 1, Jan -Feb 1975, p 160-166 13 refs In Russian

Experiments are performed to study the effect of light flashes with two different intensities on the evoked potentials (EPs) the occipital and central regions in the brain of healthy adults Resulting EPs are compared with the subjective perception of any difference between the applied stimuli Two processes are investigated elementary perception and a more complex perception associated with discrimination of certain stimuli from a variety of stimuli in connection with their significance It is found that, as in psychology, these two processes exhibit distinct differences according to the electrographic response of the visual cortex Experimental findings suggest that both perception and recognition of stimuli are reflected in the behavior of EPs in the visual cortical zones, apparently the secondary and tertiary ones S D

A75-42813 # Relationship among the kinematic characteristics of human walking (O sviazi kinematicheskikh kharakteristik khod'by cheloveka). A L Karpovich (Akademiia Nauk SSSR, Institut Problem Upravleniia, Moscow, USSR) and V V Smolianinov (Akademiia Nauk SSSR, Institut Problem Peredachi Informatsii, Moscow, USSR) *Fiziologiia Cheloveka,* vol 1, Jan -Feb 1975, p 167-175 7 refs In Russian

Experimental relationships are obtained among the kinematic characteristics of human walking for a wide range of paces under the following locomotor regimes standard forward and backward walking, walking with constant duration of a locomotor cycle, and walking with constant stride length The results point to the possibility of a common representation of the various walking regimes on the basis of a certain hierarchy in the kinematic invariant correlations S D

A75-42814 # Quantitative regulation and information estimates for the systemic activity of the brain (Kolichestvennye reguliatsionnye i informatsionnye otsenki sistemnoi deiatel'nosti golovnogo mozga) B M Shishkin (Akademiia Meditsinskikh Nauk SSSR, Leningrad, USSR) *Fiziologiia Cheloveka,* vol 1, Jan -Feb 1975, p 176-182 13 refs In Russian

Methods of the theory of automatic control are used to obtain quantitative criteria for estimating the systemic activity of the human brain It is shown that the derived parameters for the regulatory, entropic, and structural stability of the discussed biological system adequately reflect the dynamics and quality of the self-regulatory processes involved in the central nervous system S D

A75-42815 # A structural method for investigation of slow fluctuations in the human brain (Strukturnyi metod issledovaniia medlennykh kolebanii v golovnom mozge cheloveka) Iu D Kropotov (Akademiia Meditsinskikh Nauk SSSR, Leningrad, USSR) *Fiziologiia Cheloveka,* vol 1, Jan -Feb 1975, p 183-187 15 refs In Russian

A structural technique is proposed for the analysis of the slow fluctuations of oxygen tension and electrical potential in the neuronal-glial cell populations of the human brain The proposed technique provides a representation of slow processes in the form of a discrete sequence of points characterized by structural parameters The parameters selected are the duration and amplitude of ascending and descending phases as well as the period and assymetry coefficient of the fluctuations A possible physiological interpretation of the involved structural parameters is given S D

A75-42827 * Autosomal recombination in males of Drosophila melanogaster caused by a transmissible factor F R Waddle (Fayetteville State College, Fayetteville, N C) and I I Oster (Bowling Green State University, Bowling Green, Ohio) *Journal of Genetics,* vol 61, June 1974, p 177 183 Research supported by the Bowling Green State University, NSF Grant No GB-29140, Grant No NGR-36-017-014

A75-42828 * Differential permeation of artemia cysts and cucumber seeds by alcohols C W Smith and S M Siegel (Hawaii, University, Honolulu, Hawaii) *Journal of Histochemistry and Cyto chemistry,* vol 23, no 1, 1975, p 80-83 10 refs Research supported by the University of Hawaii, Grant No NGL-12 001-042

The rate of penetration of the simpler alcohols into brine shrimp cysts and cucumber seeds was studied In solutions below 70% the rate of penetration is related to lipid solvent capacity of the alcohol In concentrations above 70%, particularly in absolute alcohols, methanol penetrates brine shrimp rapidly and ethanol penetrates slowly All the other alcohols tested did not penetrate the dormant structures Ethionine and deuteroxy-methanol did not affect the rate of penetration of methanol It is suggested that in dehydrated membranes the lipid moiety is protected by a continuous sheet of protein Methanol, which is fairly similar to water, is probably able to penetrate the membrane by initiating a conformation change in the protein, exposing the lipid which subsequently dissolves in the methanol thus destroying the membrane (Author)

A75-42830 * Metabolic studies of transient tyrosinemia in premature infants S A Fernbach, R E Summons, W E Pereira, and A M Duffield (Stanford University, Stanford, Calif) *Pediatric Research,* vol 9, 1975, p 172 176 32 refs Grant No NGR 05 020-632

The recently developed technique of gas chromatography-mass spectrometry supported by computer has considerably improved the analysis of physiologic fluids This study attempted to demonstrate the value of this system in the investigation of metabolite patterns in urine in two metabolic problems of prematurity, transient tyro sinemia and late metabolic acidosis Serial 24-hr urine specimens were analyzed in 9 infants Transient tyrosinemia, characterized by 5 10-fold increases over basal excretion of tyrosine, p-hydroxyphenyllactate, and p-hydroxyphenylpyruvate in urine, was noted in five of the infants Late metabolic acidosis was seen in four infants, but bore no relation to transient tyrosinemia (Author)

A75-42856 # A program-controlled device for operative man/minicomputer interaction (Programmno-upravliaemoe ustroistvo operativnoi dvustoronnei sviazi cheloveka s mini-elektronno-vychislitel'noi mashinoi) V M Griaznov and I Tomik (Ob'edinennyi Institut Iadernykh Issledovanii, Dubna, USSR) *Pribory i Tekhnika Eksperimenta,* May-June 1975, p 77-79 7 refs In Russian

A technique is proposed for realizing a program-controlled device which is a component part of an automated system for the accumulation and processing of spectrometric data and is used for the visual display of the experimental blocks in a form which is familiar to the investigator for an effective control of the course of the relevant experiment and subsequent processing of the experimental data The device is designed to be used in conjunction with the minicomputer TRA-1 (PDP 8E), thereby providing operative man/minicomputer interaction The factors justifying the use of the program channel are discussed The commands of the device are examined, stressing the possibility of the programmed combination

of these commands into larger ones Examples of programming the device are provided S D

A75-42902 The application of human operator describing functions to studies on the effects of alcohol and marijuana on human performance L D Reid and M F K Ibrahim (Toronto, University, Toronto, Canada) *IEEE Transactions on Systems, Man, and Cybernetics,* vol SMC-5, Sept 1975, p 506-519 12 refs Research supported by the Commission of Inquiry Into the Non-Medical Use of Drugs and Alcoholism and Drug Addiction Research Foundation

A75-42903 ROBNAV - A range-based robot navigation and obstacle avoidance algorithm D F Cahn and S R Phillips (California, University, Berkeley, Calif) *IEEE Transactions on Systems, Man, and Cybernetics,* vol SMC-5, Sept 1975, p 544-551 22 refs Grant No PHS-EY-00276

An algorithm has been developed that efficiently solves a large class of robot navigation and obstacle avoidance problems using range information as its sole input from the environment The system resides in a minicomputer and requires very small memory (1500 words) and computing time (1 35 s) allocations while solving simulated problems of broadly ranging spatial complexity and operational intricacy It is thus a prime candidate for use in mobile robots or manipulators where real-time operation is desired (Author)

A75-42997 # On differences in sensitivity of the thermoreceptors of the skin to radiative and convective thermal action (O razlichiiakh chuvstvitel'nosti termoretseptorov kozhi k luchistomu i konvektivnomu teplovomu vozdeistviiu) K P Ivanov (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR) and L M Melesova (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) *Akademiia Nauk SSSR, Doklady,* vol 222, June 21, 1975, p 1480-1483 6 refs In Russian

Qualitative analysis of the comparative sensitivity of the skin thermoreceptors to radiative and convective thermal effects was carried out by analyzing the biopotentials from skin nerves in rabbits It was found that both cold and heat thermoreceptors give sufficiently distinct reactions only to convective thermal stimuli Radiative heating in the same temperature limits as convective heating evoked a barely perceptible response The insufficiently developed thermo-regulatory reactions to radiative action is attributed to the low sensitivity of the skin thermoreceptors to infrared radiation P T H

A75-43004 Physiological effects of long time sitting F Formeller (U S Naval Material Command, Naval Air Development Center, Warminster, Pa) *SAFE Journal,* vol 5, Fall Quarter, 1975, p 16-19 5 refs

Following a summary of previous research concerning seat design influence on blood flow and related effects during long-term sitting, results of a new experiment in this field are reported The present study was conducted to establish techniques for measuring the physiological effects of sitting, as well as to determine the improvements associated with the Koch seat cushion stimulator assembly Dependent variables monitored during the 6-hour tests were skin blood flow, blood volume changes, human alertness, discomfort index, and nerve transmission time The test program showed that quantitative measurements can be made of blood flow changes by impedance plethysmography in the legs of seated subjects Pulsation of the Koch assembly increased knee area temperature 0 5 to 3 0 F and relieved subjective discomfort S J M.

A75-43249 # Computer simulation of robot-manipulator control (Modelirovanie na EVM upravlenia robotom-manipuliatorom). D E Okhotsimskii, V A Sarychev, E Iu Zueva, S A Mirer, Iu A Sadov, A Iu Shneider, and N I Iakovlev Moscow, Institut Prikladnoi Matematiki AN SSSR, 1974 42 p 15 refs In Russian

This preprint describes a complex computer simulation of a robot-manipulator which, in accordance with a task given in the form of a sketch, finds necessary parts on an assembly table and stacks them Discussion centers on simulation of the external environment, analysis of the sketch, and the necessary levels of manipulator control The simulated environment consists of multifaceted bodies and is perceived by the robot as a linear perspective image The three-dimensional shape of each part and the relative arrangement of the parts are reproduced from a three-projection sketch of the assembled design For achieving this task, a manipulator with seven degrees of freedom is simulated on a kinematic level Several algorithms for manipulator control are presented F G M

A75-43271 Long-wavelength electromagnetic power absorption in prolate spheroidal models of man and animals C C Johnson, C H Durney, and H Massoudi (Utah, University, Salt Lake City, Utah) *IEEE Transactions on Microwave Theory and Techniques,* vol MTT 23, Sept 1975, p 739-747 18 refs USAF-supported research

A75-43275 Myocardial calcium in experimental myocardial infarction A A Yunice, D J Baxter, S Kraikitpanitch, and R D Lindeman (U S Veterans Administration Hospital, Oklahoma, University, Oklahoma City, Okla) *Cardiology,* vol 59, no 6, 1974, p 367-375 16 refs Research supported by the U S Veterans Administration, Grant No NIH-HE-12882

Significant increases in myocardial calcium and sodium concentrations and decreases in magnesium and potassium concentrations were observed in infarcted myocardium 5 days after injury when compared against normal myocardium from the same animals Intermediate changes were observed in perinfarct tissues Even apparently normal myocardium from infarcted animals showed these same changes when compared against normal myocardium from animals without infarction Ca-45 uptake into intact myocardium and specifically the mitochondrial fraction were still increased more than threefold during the 24-hour period prior to sacrifice on the fifth postinfarction day Myocardial calcium appears to be in a readily exchangeable equilibrium with circulating serum calcium even in this late stage in the evolution of the infarction (Author)

A75-43350 Optokinetic nystagmus during selective retinal stimulation M Cheng and J S Outerbridge (Royal Victoria Hospital, Montreal, Canada) *Experimental Brain Research,* vol 23, Aug 14, 1975, p 129-139 13 refs Medical Research Council of Canada Grant No MA-3794

Nystagmic eye movements in response to selective optokinetic stimulation of different parts of the retina were studied in normal human subjects by two methods (1) a digital computer controlled by the eye movement signal was used to generate an optokinetic display which stimulated only the peripheral retina, in turn simulating a central scotoma, and (2) a single dot of 0 6 degrees in diameter was used as the stimulus during maintained forward gaze Results show that stimulation of the central or peripheral retina alone can produce optokinetic nystagmus in man, and that essentially the same type of nystagmus is produced in both cases The slow phase velocity of nystagmus evoked from the peripheral retina falls off rapidly with distance from the fovea but can be facilitated by attention Results are compared with other findings and a possible explanation is offered for the observed variation in slow phase speed which occurs during constant-velocity optokinetic stimulation (Author)

A75-43422 Increment spectral sensitivity and colour discrimination in the primate, studied by means of graded potentials from the striate cortex P Padmos and D V Norren (Instituut voor Zintuigfysiologie TNO, Soesterberg, Netherlands) *Vision Research,*

vol 15, Oct 1975, p 1103-1113 72 refs Research supported by the Nederlandse Organisatie voor Zuiverwetenschappelijk Onderzoek

A75-43423 **Reaction times in the detection of gratings by human observers - A probabilistic mechanism** D J Tolhurst (Physiological Laboratory, Cambridge, England) *Vision Research*, vol 15, Oct 1975, p 1143-1149 15 refs

Reaction times were measured for sinusoidal gratings which were flashed on with various temporal waveforms The contrast was close to threshold At low spatial-frequencies, the reaction times were grouped just after any sudden transient in the stimulus, even when this was at the end of the stimulus At higher spatial-frequencies, the reaction times were not related to the time of sudden changes in contrast but were distributed throughout the body of the stimulus, the longer the stimulus duration, the greater was the chance that the stimulus would be detected These results can be explained if a stimulus can be detected at any time when the visual system's response to it is moderately high and not simply at the time when the response is greatest At low spatial-frequencies, the channels have transient step-responses, at higher frequencies, the responses are sustained (Author)

A75-43424 **Sustained and transient channels in human vision** D J Tolhurst (Physiological Laboratory, Cambridge, England) *Vision Research*, vol 15, Oct 1975, p 1151-1155 12 refs

The sensitivity for 4 msec flashes of sinusoidal grating was determined at various times during and after a subthreshold 800 msec flash of grating of the same spatial-frequency At frequencies of 2 c/deg and below, the sensitivity to the short flash was transiently changed for about 100 msec after the onset and the offset of the long flash If the gratings in the long and short flashes were spatially in phase, the sensitivity to the short flash was increased at the onset of the long flash but was decreased at the offset A phase-shift of 180 deg caused an inversion of these effects At higher spatial-frequencies, the sensitivity to the short flash was increased to a new steady level for the duration of the long flash, when the gratings were in phase A phase-shift of 180 deg did not cause an inversion the sensitivity was changed transiently at the onset and offset of the long flash It is argued that the results can be explained by supposing the existence of two types of channel at these spatial-frequencies (Author)

A75-43425 **Saccadic suppression in the monkey** C W Mohler and R Cechner (Case-Western-Reserve University, Cleveland, Ohio) *Vision Research*, vol 15, Oct 1975, p 1157-1160 9 refs. Grants No NIH-RR-07113-03, No NIH-RR-07113-04

Three rhesus monkeys were trained to make a behavioral response to a short duration flash of light presented during the eye movements of optokinetic nystagmus This behavioral testing demonstrated a visual threshold elevation of 0 5-0 8 log units from 25 msec before until 50 msec after onset of the fast phase of optokinetic nystagmus in the monkey, similar to the phenomenon of saccadic suppression in the human Following behavioral testing, chronically implanted electrodes in the striate visual cortex of these monkeys measured the visual evoked response during suppression of the monkey's behavioral response The cortical response to light was decreased during the fast phase of optokinetic nystagmus, but this reduction in visual cortical response was not specifically related to the decrease in the monkey's perception of the light (Author)

A75-43434 **Anaerobic recovery in man** P Cerretelli, G Ambrosoli, and M Fumagalli (Milano, Università, CNR, Centro Studi di Fisiologia del Lavoro Muscolare, Milan, Italy) *European Journal of Applied Physiology*, vol 34, no 3, 1975, p 141-148 22 refs

The present study experimentally investigated the possible occurrence of anaerobic recovery in the human body Subjects were exercised for 20 sec at supramaximal level, then at maximal level for 3 min During both periods, blood lactate concentration was measured It was found to increase consistently during the 3-min period, after a sharp rise during the 20-sec period This finding is taken to be evidence for energy production in the muscle by anaerobic glycolysis S J M

A75-43435 **Experimental study of the performance of competition swimmers** J P Charbonnier, J R Lacour, J Riffat, and R Flandrois (CNRS, Laboratoire de Physiologie, Lyons, Saint-Etienne, Université, Saint-Etienne, France) *European Journal of Applied Physiology*, vol 34, no 3, 1975, p 157-167 29 refs

Experiments were conducted to determine the availability of power and the forces opposing forward motion in swimming A parameter designated VO2 max water showed a high correlation with competition performances of the swimmers tested This parameter equals VO2 max arm work plus one-sixth of the difference between VO2 max leg work and VO2 max arm work Leg and arm maximum oxygen uptake rates were measured in the laboratory, they were fairly close to each other for swimmers, but leg VO2 max was larger than arm VO2 max for nonswimmers S J M

A75-43436 **Ammonia production following maximal exercise - Treadmill vs bicycle testing** J E Wilkerson, D L Batterton, and S M Horvath (California, University, Santa Barbara, Calif). *European Journal of Applied Physiology*, vol 34, no 3, 1975, p 169-172 10 refs Grant No AF AFOSR-73-2455

Out of a population of 20 healthy male volunteers, half performed constant-speed incremental-load maximal aerobic-capacity tests on a motor-driven treadmill, while the other half performed similar tests on a bicycle ergometer The two groups, matched for size and age, showed no significant differences in maximal aerobic capacity, maximum heart rate, or post-exercise (4 min) peripheral venous-blood concentrations of lactate or pyruvate However, post-exercise peripheral venous-blood ammonia levels were significantly higher in the group tested on the bicycle ergometer than in the treadmill group (Author)

A75-43437 **Leg muscle metabolism during exercise in the heat and cold** W J Fink, D L Costill, and P J Van Handel (Ball State University, Muncie, Ind) *European Journal of Applied Physiology*, vol 34, no 3, 1975, p 183-190 12 refs Research supported by Ball State University, Grant No NIH-R01-AM-17083-01

Experiments are reported which demonstrate that the rate of glycolysis during exercise in man is enhanced in the heat as compared with in cold environments This conclusion is substantiated by greater blood lactate concentration and muscle glycogen utilization in the heat than in the cold The findings are compatible with earlier studies showing a decreased availability of muscle oxygen to muscle vasoconstriction in the heat These factors may in part account for the exhaustion frequently observed during prolonged heavy exercise in warm environments S J M

A75-43500 **Visual texture as a factor in the apparent velocity of objective motion and motion aftereffects** J T Walker (Missouri, University, St Louis, Mo) *Perception and Psychophysics*, vol 18, no 2, Aug 1975, p 175-180 18 refs Grant No PHS-1-R03 MH-18809-01

The apparent velocity of an objectively rotating visually textured disk is an increasing monotonic function of the coarseness (size) of visual texture The apparent velocity of a negative motion aftereffect increases with coarseness of moving induction texture but decreases with coarseness of stationary test texture, and there is an interaction between induction and test textures An explanation of these effects is based principally on the assumption of greater lateral inhibition between neighboring elements in finer textures (Author)

A75-43820 # **Acoustic Doppler echocardiograph (Ul'trazvukovoi Dopplerovskii ekhokardiograf)** V A Boltenkov and V N Pervushin (Odesskii Politekhnicheskii Institut, Odessa, Ukrainian

SSR) *Akustika i Ul'trazvukovaia Tekhnika,* no 10, 1975, p 42-46 In Russian

The design and principles of operation of an acoustic Doppler echocardiograph with improved measurement characteristics for evaluating the biomechanics of the cardiac cycle are described The possibility of developing a phase-meter acoustic Doppler system for measuring the distance from emitter to sounded object is examined The capability of the system to measure the velocity of the motion of the sounded object is discussed S D

A75-43844 Optimum uses of psychobiological, sensorimotor, and performance measurement strategies E A Alluisi (Old Dominion University, Norfolk, Va) *Human Factors,* vol 17, Aug 1975, p 309-320 26 refs Grant No DAHC19-74-G-0018, Contract No N00014-70-C-0350 ARPA Order 1595

The selection of a criterion, index, or output to measure, when an experiment is planned will influence not only the conduct of the study, but also the findings and the generalizations that can properly be made on the basis of the results Guidelines for making such selections among psychobiological, sensorimotor, and performance measurement domains are presented, based on the summary findings of research in four areas the behavioral effects of (1) occupational exposure to inorganic lead, (2) exposure to carbon monoxide, (3) sleep loss, and (4) infectious disease Three dimensions that must be considered in order to optimize the selection are (1) the purpose, immediate and distal, of the specific study, (2) the degree of specificity vs generality of the organismic changes involved, and (3) the desired area(s) of generalization of the results or findings of the study (Author)

A75-43845 Visual time compression - Spatial and temporal cues L A Scanlan (Illinois, University, Urbana, Ill) *Human Factors,* vol 17, Aug 1975, p 337 345 14 refs Contract No F44620-70-C-0105

An experiment was performed to compare target detection performance on a standard time-compressed display with performance on two displays that provided both spatial and temporal target cues A time-compressed display, which is one way to accentuate the coherent motion of targets relative to random noise on a radarscope, is obtained by storing several past image frames and playing them back in the order in which they were collected, but at a faster rate Tremendous improvements in target detection performance were indeed realized by the addition of spatial cues, eight stored frames was the optimum number for best performance S J M

A75-43846 The effect of target surround density on visual search performance T H Monk and B Brown (Nottingham University, Nottingham, England) *Human Factors,* vol 17, Aug 1975, p 356-360 21 refs Science Research Council Grant No B/SR/8627

Results of visual search tests are reported which show that increasing the target surround density in a display has a camouflaging, rather than an enhancing, effect Target surround density was measured by summing the number n of nontargets in the four cardinal positions of the target surround with the number c of nontargets in the four corners of the target surround This sum could be any integer from 0 to 8, and the desired number was programmed into the computer generating the display The least squares fit between geometric mean search time and this number produced a linear correlation, thus substantiating the above conclusion S J M

A75-43847 Pacing, product complexity, and task perception in simulated inspection L H McFarling (U S Army, Fort Sam Houston, Tex) and N W Heimstra (South Dakota, University, Vermillion, S Dak) *Human Factors,* vol 17, Aug 1975, p 361-367 8 refs Grant No PHS-5-T01-OH-00002

This investigation examined potential performance or motivational differences between self-paced and machine-paced inspection tasks, and measured subject perceptions of inspection tasks Twenty women served as inspectors in the investigation Subjects in both self-paced and machine-paced conditions inspected simulated printed circuits varying in circuit complexity Performance measures of defect detection rate, false alarm rate, and time required for decision were recorded Self-paced subjects performed better, but both groups suffered performance decrements on the more complex circuits Both groups found the task basically dull and uninteresting (Author)

A75-43848 Motion relationships in aircraft attitude and guidance displays - A flight experiment S N Roscoe and R C Williges (Illinois, University, Urbana, Ill) *Human Factors,* vol 17, Aug 1975, p 374-387 25 refs Navy-sponsored research

Sixteen nonpilot Naval ROTC students were tested on tasks involving conflicting visual and vestibular cues while flying with each of four basic aircraft attitude presentations (moving horizon, moving airplane, frequency-separated, and kinalog) in a Beechcraft C-45H airplane Flight-director versions of each display presenting either compensatory or pursuit steering guidance were also compared on a command flight path tracking task involving random heading changes For all attitude presentations, pursuit tracking was superior to compensatory tracking and the order of merit of the four attitude presentations in flight casts doubt upon the validity of previous simulator experiments It was concluded that the principle of display frequency separation provides at least equivalent pilot steering-performance to that obtained with the conventional moving horizon format, while the anticipatory cues it affords tends to reduce the incidence of control reversals under circumstances of subliminal angular acceleration by providing initial direction-of-motion compatibility (Author)

A75-43849 Aircraft simulator motion and the order of merit of flight attitude and steering guidance displays F Ince, R C Williges, and S N Roscoe (Illinois, University, Urbana, Ill) *Human Factors,* vol 17, Aug 1975, p 388-400 22 refs Navy-USAF-supported research

Nonpilot subjects were tested in various simulated flight tasks in order to provide information concerning both the frequency-separated display principle and the effects of simulated motion cues The frequency-separated display tested led to reductions in disturbed attitude tracking errors, in the incidence of control reversals, and in recovery times to level flight from unknown attitudes Two modes of simulator motion (steady bank angle and constant roll) were tested and both facilitated disturbed attitude tracking performance, but inappropriate gravitational forces created by sustained banking motion interfered with command flight path tracking 'Washout motion' (constant roll) gave results most closely approximating flight data The present study was based in format on the previous investigation by Roscoe and Williges (1975) It is concluded that caution must be exercised in generalizing experimental findings in simulators with no cockpit motion, or with inappropriate acceleration cues, to flight performance prediction S J M

A75-43850 The transition of experienced pilots to a frequency-separated aircraft attitude display D B Beringer, R C Williges, and S N Roscoe (Illinois, University, Urbana, Ill) *Human Factors,* vol 17, Aug 1975, p 401 414 19 refs Navy-sponsored research

Independent groups of eight professional pilots each were given one flight in a Link GAT-2 simulator and one flight in a Beechcraft C-45H using, respectively, the moving horizon, moving airplane, and frequency-separated attitude displays 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 for some tasks superior, to their flight performance with the conventional moving horizon presentation (Author)

A75-43888 **The origin of optical asymmetry on earth** T L V Ulbricht (Agricultural Research Council, London, England) *Origins of Life*, vol 6, July 1975, p 303 315 67 refs

The nature of optical isomerism, and the problem of the origin of optical asymmetry in relation to the origin of life are defined Developments in particle physics, such as the discovery of parity nonconservation in weak interactions and more recently, of neutral currents, are described Their significance is that there are a number of possible mechanisms whereby the fundamental asymmetry of matter could be reflected in a preference for one enantiomer over the other, and that, contrary to long-established views, optical isomers do not have identical energy contents the difference, however, is estimated to be very small Theories regarding the origin of optical asymmetry are classified in a two-dimensional matrix (origin by chance or due to already existing order, susceptible or not susceptible to experimental test) Recent experimental results and theoretical speculations are reviewed, and proposals are made for further experimental work (Author)

A75-43889 **Nonlinear mathematical models for the origin of asymmetry in biological molecules** A R Hochstim *Origins of Life*, vol 6, July 1975, p 317-366 45 refs

The theory of the origin of chirality via a difference in the initial concentrations of two separate populations of primeval organic molecules and possibly even two types of primeval organisms is discussed In this theory, chance factors would cause either L- or D-molecules to become extinct, and nonlinear kinetic processes would amplify the asymmetry between the rate constants of formation for the two types of molecules, leading to the death of one enanthiomorph Spatial diffusion could lead to spatial separation between the enanthiomorph populations The works of Frank (1953) and Calvin (1969) play an integral role in the analysis S J M

A75-43890 * **Asymmetric adsorption by quartz - A model for the prebiotic origin of optical activity** W M Bonner, P R Kavasmaneck, F S Martin (Stanford University, Stanford, Calif), and J J Flores (NASA, Ames Research Center, Planetary Biology Div , Moffett Field, Calif) *Origins of Life*, vol 6, July 1975, p 367-376 31 refs Grant No NGL-05-020-582

One mechanism previously proposed for the abiotic accumulation of molecules of one chirality in nature is asymmetric adsorption on the chiral surfaces of optically active quartz crystals Earlier literature in this field is reviewed, with the conclusion that previous investigations of this phenomenon, using optical rotation criteria, have afforded ambiguous results We now have studied the adsorption of radioactive D and L-alanine on powdered d and l-quartz, using change in radioactivity level as a criterion for both gross and differential adsorption, d-Quartz preferentially adsorbed D-alanine from anhydrous dimethyl-formamide solution, and l-quartz L-alanine The differential adsorption varied between 1 0 and 1 8% The implications of these observations are discussed from the viewpoint of early chemical evolution and the origin of optically active organic compounds in nature (Author)

A75-43891 **The temperature dependences of some types of gaseous ionic reactions of astrochemical interest** M Meot Ner and F H Field (Rockefeller University, New York, N Y) *Origins of Life*, vol 6, July 1975, p 377-393 23 refs NSF-supported research

The rate constants of ion-molecule reactions which are of potential significance in astrochemical systems are found to exhibit significant, and in many cases, negative temperature dependences The rate constants of fast ion-polar molecule reactions (e g , XH(+) + B yields BH(+) + X) may increase by a factor of 5-10 between 1000 and 10 K Slow reactions that proceed via reaction complexes (e g , H(-) transfer and association reactions) often exhibit temperature dependences of the form k = A(T to the -n power), n = 1-5 Both transition state theory considerations and the coupled-oscillator RRK-type model are seen to be able to account qualitatively for the behavior of slow ion-molecule reactions (Author)

A75-43892 * **Fluorescence detection of organic molecules in the Jovian atmosphere.** J S. Levine and R S Rogowski (NASA, Langley Research Center, Environmental and Space Sciences Div , Hampton, Va) *(Conference on the Chemical Evolution of the Giant Planets, University of Maryland, College Park, Md , Oct 23-26, 1974) Origins of Life*, vol 6, July 1975, p 395-399 21 refs

A search for fluorescent emission due to the presence of possible organic molecules in the Jovian atmosphere is described We first consider natural Jovian fluorescent emission excited by precipitating auroral particles Due to our lack of knowledge of the Jovian precipitating particle energies and fluxes we next consider fluorescent emission excited by a laser system aboard a Jupiter spacecraft Laser-induced fluorescence is routinely used to monitor trace constituents and pollutants in the terrestrial atmosphere Several spacecraft laser systems are currently under development Our calculations indicate that laser-induced fluorescent detection is approximately two orders of magnitude more sensitive than rocket ultraviolet measurements of possible Jovian absorption features at 2600 A that have been attributed to the presence of adenine or benzene (Author)

A75-43893 **Synthesis of biological molecules on molecular sieves** G Poncelet, A T Van Assche, and J J Fripiat (Laboratoire de Physico-Chimie Minerale, Louvain-la-Neuve, Belgium) *Origins of Life*, vol 6, July 1975, p 401-406 6 refs

Tests were conducted to determine whether zeolite catalysts (Ca Y, NH4-Y, and Fe-X sieves) would enable biological molecules to form from simple gaseous molecules commonly found in planetary atmospheres In the experiments, several amino acids were detected by an amino acid analyzer after heating CO and NH3 with the catalysts Radioactive tracers were used to determine whether such production was due to contamination, and the tracers ruled out this possibility S J M

A75-43894 **Polymerization of amino acid methyl esters via their copper complexes** A Brack, D Louembe, and G Spach (CNRS, *Centre de Biophysique Moléculaire, Orléans, Loiret, France*) *(International Conference on the Origin of Life, 4th, Barcelona, Spain, June 1973) Origins of Life*, vol 6, July 1975, p 407-411 11 refs

Polymerization of glycine methyl ester catalyzed by cupric ions in organic solvents yields oligoglycines with a degree of polymerization up to nine With a trifunctional amino acid, the yield and degree of polymerization were much lower Extension of this reaction to an aqueous medium was not successful even when copper ions were complexed with substances like montmorillonite or fatty acids The prebiotic significance of this reaction is discussed (Author)

A75-43895 **Primary catalytic systems of biogenesis and structure-functional evolution of biocatalysers** G Georgiev (Sofiiski D'rzhaven Universitet, Sofia, Bulgaria) and N Bak'rzhieva (Bulgarian Academy of Sciences, Institute of Plant Physiology, Sofia, Bulgaria) *Origins of Life*, vol 6, July 1975, p 413-421 60 refs

An important aspect of biological evolution is the development of biocatalyzers The connection between abiotic and biological catalyzers is discussed, and the role of metal ions as primary catalysts is considered The evolutionary demand for greater specificity and efficiency may have been fulfilled through the formation of metal-organic complexes and later through enzyme systems Metal ions are probably responsible for the formation of some of the isoenzymes found in contemporary organisms (Author)

A75-43896 **Speculations on the evolution of the genetic code** H Hartman (Tel Aviv University, Tel Aviv, Israel) *Origins of Life*, vol 6, July 1975, p 423-427 17 refs

An evolutionary scheme is postulated in which the bases enter the genetic code in a definite temporal sequence and the correlated amino acids are assigned definite functions in the evolving system The scheme requires a singlet code (guanine coding for glycine) evolving into a doublet code (guanine-cytosine doublet coding for gly (GG), ala (GC), arg (CG), and pro (CC)) The doublet code evolves into a triplet code Polymerization of nucleotides is thought to have been by block polymerization rather than by a template mechanism The proteins formed at first were simple structural peptides No

direct nucleotide-amino acid stereo-chemical interaction was required Rather an adaptor-type indirect mechanism is thought to have been functioning since the origin (Author)

A75-43897 * Exponential kinetics of formation of organic microstructures C L Fraser and C E Folsome (Hawaii, University, Honolulu, Hawaii) *Origins of Life,* vol 6, July 1975, p 429-433 5 refs Research supported by the University of Hawaii, Grant No NGR-12-001-109

Organic microstructure production in Miller-Urey spark discharge flasks is an energy-dependent, autocatalytic process which follows first order kinetics similar to microbial growth curves These relationships hold for all three major morphological types of microstructures observed The three types are assembled from smaller precursor subunits which associate according to a binomial distribution These structures could have formed bounded systems in which pre-biological processes might have occurred (Author)

A75-43898 On the evolution of the photosynthetic pigments V B Evstigneev (Academy of Sciences, Institute of Photosynthesis, Moscow, USSR) *Origins of Life,* vol 6, July 1975, p 435-439 11 refs

Some properties of tetrapyrroles with a closed porphyrin ring containing a metal ion in the center are discussed in connection with their relative evolutionary photosynthetic value It is concluded that the pigment composition of the photosynthetic apparatus of present-day organisms is the result of a long period of evolutionary selection of the most suitable major pigment and of the best relationship between this pigment and other pigments, some of which were later relegated to minor roles S J M

A75-43899 On the origin of plastids M S Odintsova and N P Iurina (Academy of Sciences, Institute of Biochemistry, Moscow, USSR) *Origins of Life,* vol 6, July 1975, p 441-446 9 refs

The buoyant density in CsCl of ribosomes from chloroplasts of the green alga Chlorella pyrenoidosa and two species of higher plants, Pisum sativum and Chenopodium album, has been studied From the relative protein content it was calculated that 70S ribosomes from chloroplasts are much smaller than 80S cytoplasmic ribosomes (3 0-3 1 million and 4 0 million daltons, respectively) and slightly larger than 70S ribosomes from bacteria (E coli 2 5 million daltons) Chloroplast ribosomes from pea seedlings were analyzed by two-dimensional polyacrylamide gel electrophoresis They appear to contain 71 proteins This indicates that chloroplast ribosomes contain a larger number of proteins than do the ribosomes from E coli and other species of Enterobacteriaceae Further study will permit a probable evaluation of the validity of Mereschkowsky's hypothesis that the photosynthetic plastids of eukaryotic plant cells are the evolutionary descendants of endosymbiotic blue-green algae (Author)

A75-43900 Stanford workshop on extraterrestrial civilization - Opening a new scientific dialog J B Carlson (Maryland, University, College Park, Md) and P A Sturrock (Stanford University, Stanford, Calif) *Origins of Life,* vol 6, July 1975, p 459-470 11 refs

The existence of extraterrestrial civilization (ETC), interstellar communication, human contact with ETC, unidentified flying object (UFO) evidence, the evaluation of UFO phenomena, and the assessment of our ignorance about the universe are discussed The organization of the Stanford workshop (August 29-30, 1974) convened to study these topics is also described There were two groups of scientists those considering physical, astronomical, and biological theoretical knowledge relative to ETC and searching for extraterrestrial radio signals, and those pursuing the UFO problem by analyzing eyewitness reports and photographs S J M

A75-43941 Coronary artery cyclic AMP content during adrenergic receptor stimulation C L Seidel, R L Schnarr, and H V Sparks (Michigan, University, Ann Arbor, Mich). *American Journal of Physiology,* vol 229, Aug 1975, p 265-269 14 refs

The hypothesis that changes in cyclic AMP content mediate mechanical response of coronary smooth muscle following adrenergic receptor stimulation is tested Tension changes in strips of coronary smooth muscle following addition of agonists or adrenergic blocking agents to the surrounding bath are measured, and the level of cyclic AMP in identically treated strips is determined by chromatography and radioimmunoassay Results indicate that while the contraction of coronary arteries associated with alpha-receptor stimulation is not mediated by changes in cyclic AMP content, an increase in cyclic AMP may mediate relaxation associated with beta-receptor stimulation C K D

A75-43942 Cardiac and respiratory effects of digitalis during chronic hypoxia in intact conscious dogs G A Beller, S R Glamber, S B Saltz, and T W Smith (U S Army, Research Institute of Environmental Medicine, Natick, Massachusetts General Hospital, Boston, Mass) *American Journal of Physiology,* vol 229, Aug 1975, p 270 274 37 refs

A75-43943 Effect of norepinephrine on myocardial intracellular hydrogen ion concentration K M Riegle and R L Clancy (Kansas, University, Kansas City, Kan) *American Journal of Physiology,* vol 229, Aug 1975, p 344-349 35 refs Grant No NIH-3-R01 HL 12888-0251

A75-43944 Effect of exercise on lipoprotein lipase activity in rat heart and skeletal muscle J Borensztajn, M S Rone, S P Babirak, J A McGarr, and L B Oscai (Chicago, University, Illinois, University, Chicago, Ill) *American Journal of Physiology,* vol 229, Aug 1975, p 394-397 28 refs Research supported by the Chicago and Illinois Heart Association, Grants No PHS AM-17357, No PHS-AM-16831

A75-43945 Cardiac glycogen in Long-Evans rats - Diurnal pattern and response to exercise L D Segel, A Chung, D T Mason, and E A Amsterdam (California, University, Davis, Calif) *American Journal of Physiology,* vol 229, Aug 1975, p 398 401 15 refs Grant No NIH-HL-14780

A75-43975 * Biogenic amines and acute thermal stress in the rat B A Williams (NASA, Ames Research Center, Biotechnology Div , Moffett Field, Calif) and G P Moberg (California, University, Davis, Calif) *Comparative Biochemistry and Physiology,* vol 51C, 1975, p 67-71 17 refs

A study is summarized which demonstrates that depletion of the biogenic amines 5 hydroxytryptamine (5-HT) or norepinephrine (NE) alters the normal thermoregulatory responses to acute temperature stress Specifically, NE depletion caused a significant depression in equilibrium rectal temperature at 22 C and a greater depression in rectal temperature than controls in response to cold (6 C) stress, NE depletion also resulted in a significantly higher rectal temperature response to acute heat (38 C) stress Depletion of 5-HT had less severe effects It remains unclear whether the primary site of action of these agents is central or peripheral S J M

A75-44049 # Effect of linear acceleration on nystagmic response induced by angular acceleration (Vliianie lineinogo uskoreniia na nistagmennuiu reaktsiiu, vyzvannuiu uglovym uskoreniem) F A Solodovnik *Fiziologiia Cheloveka,* vol 1, Mar -Apr 1975, p 271-275 20 refs In Russian

Experiments were conducted to study the effect of linear acceleration on the nystagmic response of healthy subjects (aged 20-32 yr) sitting in a rocker provided with a rotating seat The relation of the degree of nystagmus to the type of stimulation of the otolithic apparatus is identified It is shown that under linear acceleration, the nystagmic response caused by angular accelerations changes only under the action of negative angular acceleration There was no great difference in the degree of nystagmus for a linear acceleration in the sagittal and frontal planes Experimental results

suggest that stimulation of the otolithic apparatus may affect the nystagmus response only at the moment the apparatus is stimulated
S D

A75-44050 # **Characteristics of the regulation of cardiac rhythm during mental work (Osobennosti reguliatsii serdechnogo ritma pri umstvennoi rabote)** R M Baevskii and V I Kudriavtseva (Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR) *Fiziologiia Cheloveka*, vol 1, Mar-Apr 1975, p 296-301 25 refs In Russian

The characteristics of the regulation of cardiac rhythm are studied as a function of the degree of mental fatigue during prolonged monotonous work in a man/machine system It is shown that during a mental work associated with receiving and decoding of numerical and alphabetic information, changes in the statistical characteristics of cardiac rhythm are observed beginning with the 3rd to 4th hour of work, due to the regulatory activity of the autonomic nervous system and the subcortical centers Early signs of mental fatigue are found to be a decrease in the mode amplitude (number of cardiointervals whose magnitude corresponds to the mode), an increase in the variational range, a decrease in the stress index, and an increase in the amplitude of the slow waves of cardiac rhythm with a period of 30-70 sec
S D

A75-44051 # **Frequency characteristics of the regulatory systems of the heart (Chastotnye kharakteristiki reguliatornykh sistem serdtsa)** V L Karpman and M G Bershadskii (Tsentral'nyi Institut Fizicheskoi Kul'tury, Moscow, USSR) *Fiziologiia Cheloveka*, vol 1, Mar-Apr 1975, p 359-365 16 refs In Russian

This study is concerned with the frequency analysis of the functional effectiveness of the regulatory systems of the heart in well-trained athletes The input signals correspond to bicycle ergometric loads varying in accordance to a sinusoidal, while the output signals are represented by the variation of heart rate, the duration of isometric and isotonic contractions of the heart The frequency range of the input loads is split into three zones (1) frequency of load oscillations ranging from extremely low frequencies to nearly 0 04 rad/sec zone of optimal regulation of cardiac activity, where the amplitude and frequency distortions are small, (2) from 0 04 to 0 28 rad/sec zone characterized by disorders in the adaptation of the heart and its regulatory systems to varying loads, where the amplitude and frequency distortions are well pronounced, and (3) from 0 28 rad/sec on zone of insensitivity to the regulatory systems of the heart Athletes training for endurance are found to exhibit higher indices of regulation than those engaged in power types of physical activities
S D

A75-44106 # **Effects of aircraft simulator motion cue fidelity on pilot performance** R C Williges, C O Hopkins, and D J Rose (Illinois, University, Urbana, Ill) *Deutsche Gesellschaft fur Ortung und Navigation, Nationale Tagung uber Simulation im Dienste des Verkehrs, Bremen, West Germany, Apr 15-17, 1975, Paper 1 2* 11 p 18 refs

Studies were conducted to determine whether and how required simulator cue fidelity varies with desired application of a simulator When the simulator was used for equipment design research, high-fidelity washout motion (where rate of roll of the simulated airplane is the input to the simulator roll axis instead of bank angle) produced results most comparable to the aircraft When the simulator was used for pilot proficiency assessment, less realistic sustained motion (with the cockpit following a scaled-down linear analog of the bank angle of the simulated airplane after a certain time lag) provided simulator check-ride data of the highest predictive value When the simulator was used as a synthetic training device for instrument-referenced maneuvers, the no-motion condition yielded as much transfer as either of the other simulator motion modes
S J M

A75-44110 # **Design of a motion simulator with several degress of freedom for ergonomic studies (Konzeption eines Bewegungssimulators mit mehreren Freiheitsgraden fur ergonomische Untersuchungen)**. P Rühmann (Munchen, Technische Universitat, Munich, West Germany). *Deutsche Gesellschaft fur Ortung und Navigation, Nationale Tagung uber Simulation im Dienste des Verkehrs, Bremen, West Germany, Apr. 15-17, 1975, Paper 1 8* 14 p. In German.

A motion simulator has been developed to produce combined pitch, roll, yaw, and heave in order to determine the psychological and physiological effects of such motion, especially on tracking performance The mechanical, hydraulic, and electrical components of the new design are described, along with its control and surveillance systems Unlike the majority of previous simulators, the present device can investigate the influences of rotational motion and combined linear accelerations
S J M

A75-44126 **Life sciences and space research XIII, Proceedings of the Seventeenth Plenary Meeting, São Paulo, Brazil, June 17-July 1, 1974** Meeting sponsored by COSPAR Edited by P H A Sneath (Leicester, University, Leicester, England) Berlin, East Germany, Akademie-Verlag GmbH, 1975 202 p

Various studies on the biology of the stringent conditions encountered in space flight, such as weightlessness, greatly increased acceleration, and heavy particle and cosmic radiation, are presented Topics investigated include the response and adaptation of Beagle dogs to hypergravity, gravitational effects on body composition in birds, the influence of variable gravitational fields on the embryonic development of some ecaudate amphibians, otolith functions in weightlessness, new methodology for assessing the probability of contaminating Mars, the effects of solar ultraviolet radiation on Bacillus subtilis spores and T 7 bacteriophage, the effects of space balloon flights on reproductive activity in Paramecium aurelia, and peculiarities in the biological action of hadrons of space radiation
S J M

A75-44127 # **Human sensitivity to gravity - On the problem of gravipreferendum** E B Shulzhenko In Life sciences and space research XIII, Proceedings of the Seventeenth Plenary Meeting, São Paulo, Brazil, June 17-July 1, 1974 Berlin, East Germany, Akademie-Verlag GmbH, 1975, p 3-9 18 refs

The present investigation measured the level of gravity sensitivity in man, its threshold value, and its acceleration dependence, as well as determined the effect of repeated centrifugation on the active formation and strengthening of 'gravipreferendum,' or the skill of maintaining an optimal rate of acceleration increase Test subjects were able to control their own acceleration in a centrifuge, and they were found to assess the value of the acceleration with an accuracy of 0 1-0 12 g
S J M

A75-44128 * # **Response and adaptation of Beagle dogs to hypergravity** J Oyama (NASA, Ames Research Center, Biomedical Research Div , Moffett Field, Calif) In Life sciences and space research XIII, Proceedings of the Seventeenth Plenary Meeting, São Paulo, Brazil, June 17-July 1, 1974 Berlin, East Germany, Akademie-Verlag GmbH, 1975, p 11-17 9 refs

Eight male Beagle dogs, five months old, were centrifuged continuously for three months at progressively increasing loads Heart rate and deep body temperature were monitored continuously by implant biotelemetry Initially, centrifuged dogs showed transient decreases in heart rate and body temperature along with changes in their diurnal rhythm patterns Compared with normal gravity controls, exposed dogs showed a slower growth rate and a reduced amount of body fat Blood protein, total lipids, cholesterol, calcium, packed cell volume, red blood cell count, and hemoglobin were also decreased significantly Absolute weights of the leg bones of centrifuged dogs were significantly greater than controls Photon absorptiometry revealed significant density increases in selective regions of the femur and humerus of centrifuged dogs In spite of the various changes noted, results from this and other studies affirm the view that dogs can tolerate and adapt to sustained loads as high as

2 5 g without serious impairment of their body structure and function (Author)

A75-44129 * # **Gravitational effects on body composition in birds** A H Smith, O Sanchez, and R R Burton (California, University, Davis, Calif) In Life sciences and space research XIII, Proceedings of the Seventeenth Plenary Meeting, São Paulo, Brazil, June 17-July 1, 1974 Berlin, East Germany, Akademie-Verlag GmbH, 1975, p 21-27 11 refs Grant No NGR 05 004-008

Gallinaceous birds, presenting a wide range of body size, were adapted physiologically to hyperdynamic environments, provided by chronic centrifugation Chemical composition was measured directly on prepared carcasses, which were anatomically comparable, and more amenable to analysis than the intact body Body mass and body fat decreased arithmetically with increasing field strength and also with increasing body mass Water content of lean tissue increased in hyperdynamic environments, but irrespectively of body size (Author)

A75-44130 # **The influence of variable gravitational fields on the embryonic development of some ecaudate amphibians** V V Popov, L R Palmbakh, and E V Kuznetsov (Akademiia Nauk SSSR, Moscow, USSR) In Life sciences and space research XIII, Proceedings of the Seventeenth Plenary Meeting, São Paulo, Brazil, June 17-July 1, 1974 Berlin, East Germany, Akademie-Verlag GmbH, 1975, p 29 32 9 refs

The fertilized eggs of the frog Rana temporaria immediately after fertilization were rotated on a clinostat in the vertical plane at the rate of 0 66 rotations per minute with a radius of 20 mm for 2 5 hours A wide spectrum of developmental anomalies was found (33% in the experiment, 14% in the control) which, in the authors' opinion, result from abnormalities in the cortical reaction of symmetrization These abnormalities manifest themselves in the irregular distribution of cortical pigment and in eccentric division lines (Author)

A75-44131 # **Influence of simulated weightlessness on the rate of anomalies of the flour beetle Tribolium confusum** W Briegleb, J Neubert, A Schatz, and F Sinapius (Deutsche Forschungs- und Versuchsanstalt fur Luft- und Raumfahrt, Institut fur Flugmedizin, Bad Godesberg, West Germany) In Life sciences and space research XIII, Proceedings of the Seventeenth Plenary Meeting, São Paulo, Brazil, June 17-July 1, 1974 Berlin, East Germany, Akademie Verlag GmbH, 1975, p 49-52 11 refs

Experiments with Tribolium confusum showed that the morphological characteristics of the beetles are modified by simulated weightlessness (fast running clinostat) Because of possible side effects due to differences in fertility of inbred lines, the first experiments were made with a genetically heterogeneous stock Thereafter experiments were continued with inbred beetles For both stocks a rise of mainly wing anomalies resulted from rotation of whole cultures of beetles within horizontal tubes The extent to which these anomalies are teratogenetic or genetic has not yet been analysed in detail (Author)

A75-44132 # **The development of seedling shoots under space flight conditions** A J Merkys, A L Mashinskii, R S Laurinavichius, G S Nechitailo, A V Iaroshius, and E A Izupak (Lithuanian Academy of Sciences, Institute of Botany, Vilnyus, Lithuanian SSR) In Life sciences and space research XIII, Proceedings of the Seventeenth Plenary Meeting, São Paulo, Brazil, June 17-July 1, 1974 Berlin, East Germany, Akademie-Verlag GmbH, 1975, p 53 57 5 refs

Experiments were conducted to determine whether seeds could germinate in a weightless environment, and if so what would determine the direction they germinated in Germination was 100% under both experimental and control conditions, and it is concluded that germination, growth, and morphogenesis of a shoot in space flight takes place without significant change from normal Thus the first phases of growth are already determined in the embryo and do not need the action of gravity for successful morphogenesis of the seedling and root S J M

A75-44133 # **Is the detection of optical activity in extraterrestrial samples a safe indicator for life** W Thiemann (Kernforschungsanlage Julich GmbH, Julich, West Germany) In Life sciences and space research XIII, Proceedings of the Seventeenth Plenary Meeting, São Paulo, Brazil, June 17-July 1, 1974 Berlin, East Germany, Akademie-Verlag GmbH, 1975, p 63-69 30 refs

The validity of using optical activity testing of extraterrestrial samples to determine the existence of living matter is investigated It has been shown that spontaneous deracemization can occur without the aid of life, so such a method would not be foolproof Polarimetric measurements could be useful, however, if (1) they were performed at at least three wavelengths of the Hg spectrum to yield some information about the optical rotatory dispersion of the sample, (2) they were performed on many (between 10 and 100) independently collected samples, and (3) correlation of optical activity with definite chemical structures was achieved S J M

A75-44134 # **Radio-chemical synthesis of amino acids in aqueous media containing carbohydrates, hydrocarbons and nitrates** M A Khenokh, E A Kuzicheva, and E M Lapinskaia (Academy of Sciences, Institute of Cytology, Leningrad, USSR) In Life sciences and space research XIII, Proceedings of the Seventeenth Plenary Meeting, São Paulo, Brazil, June 17-July 1, 1974 Berlin, East Germany, Akademie-Verlag GmbH, 1975, p 71-74 8 refs

Experiments were performed to determine whether solutions of carbohydrates, hydrocarbons, and inorganic nitrate would form amino acids under ionizing irradiation It was found that this is so, and thus it is concluded that a similar process took place during prebiological chemical evolution on earth Since amino acids with long carbon chains were the most susceptible of the acids formed to radiolytic destruction, it is suggested that polypeptides first formed in the primary hydrosphere were composed mainly of amino acids with short carbon chains S J M

A75-44135 # **Some considerations of the theoretical limits for living organisms** P H A Sneath (Leicester, University, Leicester, England) In Life sciences and space research XIII, Proceedings of the Seventeenth Plenary Meeting, São Paulo, Brazil, June 17-July 1, 1974 Berlin, East Germany, Akademie-Verlag GmbH, 1975, p 75-82 53 refs

Extremes of conditions in which active growth and metabolism can occur, survival in a dormant state can be maintained, and metabolites and structural molecules can remain stable are explored Such adverse conditions as pH, temperature, dryness, metal ion concentration, and oxidizing or reducing environment extremes are considered For growth and metabolism the most sensitive parts of the organism involve labile metabolites, for dormancy the stability of covalent bonds is most important In this latter connection, C-C bonds are more significant than C-O and C-N bonds S J M

A75-44136 # **Membrane damage in dehydrated bacteria and its repair** M Frankenberg-Schwager, G Turcu, C Thomas, H Wollenhaupt, and H Bucker (Frankfurt, Universitat, Frankfurt am Main, West Germany) In Life sciences and space research XIII, Proceedings of the Seventeenth Plenary Meeting, São Paulo, Brazil, June 17-July 1, 1974 Berlin, East Germany, Akademie-Verlag GmbH, 1975, p 83-88 9 refs

The dehydration of bacteria by vacuum exposure results in damage to the cell membrane This membrane damage does not necessarily lead to cell death A part of the dehydrated bacteria is capable of eliminating the membrane damage by repair processes Repair can proceed rapidly under conditions that permit synthesizing activities The kinetics of this repair process were studied by means of the membrane-mediated biosynthesis of the cell wall as well as by

the recovery of resistance to small concentrations of lysozyme Repair is a precondition for cell proliferation At low temperature cells can conserve their membrane damage and the repair process can be initiated when conditions become favorable (Author)

A75-44138 # **New methodology for assessing the probability of contaminating Mars** D W North, B R Judd, and J P Pezier (Stanford Research Institute, Menlo Park, Calif) In Life sciences and space research XIII, Proceedings of the Seventeenth Plenary Meeting, São Paulo, Brazil, June 17 July 1, 1974
Berlin, East Germany, Akademie Verlag GmbH, 1975, p 103-109 8 refs

New methodology is proposed to assess the probability that the planet Mars will be contaminated by terrestrial microorganisms aboard a spacecraft Present NASA methods are based on the Sagan-Coleman formula, which states that the probability of contamination is the product of the expected microbial release and a probability of growth The proposed new methodology extends the Sagan Coleman approach to permit utilization of detailed information on microbial characteristics, the lethality of release and transport mechanisms, and of other information about the Martian environment Three different types of microbial release are distinguished, and for each release mechanism a probability of growth is computed Using this new methodology an assessment has been carried out for the 1975 Viking landings on Mars The resulting probability of contamination for each Viking lander, 0 000006, is based on expert judgment and is amenable to revision as additional information becomes available (Author)

A75-44139 * # **Consideration of probability of bacterial growth for Jovian planets and their satellites** D M Taylor, R M Berkman, and N Divine (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, Calif) In Life sciences and space research XIII, Proceedings of the Seventeenth Plenary Meeting, São Paulo, Brazil, June 17 July 1, 1974 Berlin, East Germany, Akademie Verlag GmbH, 1975, p 111-118 16 refs Contract No NAS7-100

Environmental parameters affecting growth of bacteria (e g , moisture, temperature, pH, and chemical composition) were compared with current atmospheric models for Jupiter and Saturn, and with the available physical data for their satellites Different zones of relative probability of growth were identified for Jupiter and Saturn, with the highest in pressure regions of 1 10 million N/sq m (10 to 100 atmospheres) and 3 30 million N/sq m (30 to 300 atmospheres), respectively Of the more than two dozen satellites, only the largest (Io, Europa, Ganymede, Callisto, and Titan) were found to be interesting biologically Titan's atmosphere may produce a substantial greenhouse effect providing increased surface temperatures Models predicting a dense atmosphere are compatible with microbial growth for a range of pressures at Titan's surface For Titan's surface the probability of growth would be enhanced if (1) the surface is entirely or partially liquid (water), (2) volcanism (in an ice water-steam system) is present, or (3) access to internal heat sources is significant (Author)

A75-44140 * # **Flux of high-LET cosmic-ray particles in manned space flight** E V Benton, R P Henke, D D Peterson (San Francisco, University, San Francisco, Calif), J V Bailey (NASA, Johnson Space Flight Center, Houston, Tex), and C A Tobias (California, University, Berkeley, Calif) In Life sciences and space research XIII, Proceedings of the Seventeenth Plenary Meeting, São Paulo, Brazil, June 17-July 1, 1974 Berlin, East Germany, Akademie-Verlag GmbH, 1975, p 121-128 17 refs

On the Apollo and Skylab missions the high-energy heavy ion (HZE) flux was measured by means of plastic nuclear track detectors Measurements involved the fluxes of high linear energy transfer (LET), particles with Z between 6 and 26 incident on astronauts and on several biological experiments Partial results of these measurements are presented, the effects of shielding and solar modulation are discussed (Author)

A75-44141 # **The study of the radiation environment in near-earth space.** V M Petrov, Y A Akatov, S B Kozlova, V V Markelov, V M Nesterov, V I Redko, L N Smirennyi, A V Khortsev, and I V Chernikh (Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR) In Life sciences and space research XIII, Proceedings of the Seventeenth Plenary Meeting, São Paulo, Brazil, June 17-July 1, 1974 Berlin, East Germany, Akademie-Verlag GmbH, 1975, p 129-134 10 refs

Results of daily radiation dose measurements in near-earth space are presented and analyzed It is concluded that (1) dose depends on apogee altitude and inclination, as well as solar activity cycle period (during solar minimum the doses increase by a factor of about two), (2) increasing the shield thickness does not greatly decrease the dose rate, (3) the major portion of the doses is contributed by the high energy protons of the galactic cosmic rays and radiation belt in the South Atlantic Anomaly, and (4) it is relatively safe to orbit with inclinations of less than 62 deg and apogees of less than 350 km, provided there are no strong solar flares S.J M

A75-44142 * # **Physical dosimetric evaluations in the Apollo 16 microbial response experiment** G R Taylor, J V Bailey (NASA, Johnson Space Center, Life Sciences Directorate, Houston, Tex), and E V Benton (San Francisco, University, San Francisco, Calif) In Life sciences and space research XIII, Proceedings of the Seventeenth Plenary Meeting, São Paulo, Brazil, June 17 July 1, 1974 Berlin, East Germany, Akademie-Verlag GmbH, 1975, p 135-141 9 refs

Texts of high-energy multicharged particle, ultraviolet light, and galactic irradiation fluxes on exposed biological specimens aboard Apollo 16 are described Passive nuclear track detectors, passive dosimeters, and thermoluminescent dosimeters, respectively, were used for the measurements Biological phenomena studied ranged from lipolytic alpha toxin production in Bacillus thuringiensis to animal tissue invasion (of human hair by Trichophyton terrestre) Fluxes observed were lower than those recorded by detectors located in the Biostack and in the passive personnel dosimeters worn by the astronauts, suggesting a greater average shielding in the latter two environments S J M

A75-44143 * # **Effects of solar ultraviolet radiations on Bacillus subtilis spores and T-7 bacteriophage** J Spizizen, J E Isherwood (Scripps Clinic and Research Foundation, La Jolla, Calif), and G R Taylor (NASA, Johnson Space Center, Houston, Tex) In Life sciences and space research XIII, Proceedings of the Seventeenth Plenary Meeting, São Paulo, Brazil, June 17-July 1, 1974 Berlin, East Germany, Akademie-Verlag GmbH, 1975, p 143-149

Spores of Bacillus subtilis HA 101 and the DNA polymerase I-defective mutant HA 101 (59)F were exposed to selected wavelengths of solar ultraviolet light and space vacuum during the return of Apollo 16 In addition, coliphage T-7 suspensions were exposed to solar ultraviolet radiation as part of the Microbial Response to Space Environment Experiment Optical filters were employed to provide different energy levels at wavelengths 254 nm and 280 nm Dose-response curves for lethal and mutagenic effects were compared with ground-based data A close parallel was observed between the results of solar radiation and ground tests with spores of the two strains. However, significantly greater inactivation of T-7 bacteriophage was observed after exposure to solar ultraviolet radiation (Author)

A75-44144 # **Radiobiological results of the Biostack experiment on board Apollo 16 and 17** E H Graul, W Ruther (Klinik und Poliklinik fur Nuklearmedizin, Marburg an der Lahn, West Germany), W Heinrich, O C Allkofer (Kiel, Neue Universitat, Kiel, West Germany), R Kaiser, R Pfohl (CNRS, Centre de Recherches Nucleaires de Strasbourg, Strasbourg, France), E Schopper, G Henig, J U Schott, and H Bucker (Frankfurt, Universitat, Frankfurt am Main, West Germany) In Life sciences and space research XIII, Proceedings of the Seventeenth Plenary Meeting, São Paulo, Brazil,

June 17-July 1, 1974 Berlin, East Germany, Akademie Verlag GmbH, 1975, p 153-159 9 refs

The most radiosensitive biological objects in the Biostack experiments have proved to be the shrimp eggs The development of 500 eggs hit by heavy cosmic ions was investigated This differed significantly from the flight controls (eggs flown in the Biostack but not hit by heavy ions) and from the ground controls From this it has been concluded that penetration on the part of a single heavy ion may injure the encysted blastula This damage was found to influence gastrula formation and even the hatching process of the nauplius Abnormalities (increased by a factor of 10) in the orthonauplius were observed during the development of the hit eggs, they consisted, for example, of shortened extremities or an abnormal thorax or abdomen In addition, eggs of Tribolium confusum and Carausius morosus, which were included in Biostack 2 (Apollo 17), have been investigated, and the influence of single heavy ions on the development process of these highly organized insects has been studied (Author)

A75-44145 # **Results of the Bacillus subtilis unit of the Biostack II experiment - Physical characteristics and biological effects of individual cosmic HZE particles** H Bucker, R Facius, D Hildebrand, and G Horneck (Frankfurt, Universitat, Frankfurt am Main, West Germany) In Life sciences and space research XIII, Proceedings of the Seventeenth Plenary Meeting, São Paulo, Brazil, June 17-July 1, 1974 Berlin, East Germany, Akademie-Verlag GmbH, 1975, p 161-166

The effectiveness of cosmic HZE-particles on unicellular procaryotic organisms was studied on Bacillus subtilis spores, which were accommodated in the Biostack I and II experiments on board Apollo 16 and 17 Identification of the spores that were hit was achieved by using the Biostack sandwich construction and by precise microscopical measurements of tracks of particles Germination, outgrowth and the rate of cellular elongation were investigated A method was developed to determine the charge of each individual HZE particle that penetrated a spore and its energy loss in the region of hit An attempt was made to establish a connection between these physical characteristics and the biological effects produced (Author)

A75-44146 # **Modifying effect of dynamic space flight factors on radiation damage of air-dry seeds of Crepis capillaris /L/ Wallr** E N Vaulina and L N Kostina (Akademiia Nauk SSSR, Moscow, USSR) In Life sciences and space research XIII, Proceedings of the Seventeenth Plenary Meeting, São Paulo, Brazil, June 17-July 1, 1974 Berlin, East Germany, Akademie-Verlag GmbH, 1975, p 167-172 9 refs

The influence of dynamic factors (vibration and linear acceleration) on the rate of chromosome aberrations in Crepis capillaris was studied The vibrational process simulated was similar in its characteristics to that occurring at the launch of spaceships In combination with linear acceleration it caused a statistically significant increase in the rate of chromosome aberrations compared with the control ($R = 7\ 70$) The dynamic factors modified the effect of radiation damage induced by acute gamma-irradiation (3 krad) Pre-radiation treatment with vibration and acceleration on the seeds caused a significant decrease ($R = 10\ 23$) in the effect of radiation damage, from 15 57% to 9 74% The post-radiation treatment of C capillaris seeds with the dynamic factors did not change the rate of chromosome aberrations significantly (from 15 57% to 15 90%) (Author)

A75-44147 # **Effects of space balloon flights on reproductive activity in Paramecium aurelia** H Planel, J P Soleilhavoup, and F Croute (Toulouse III, Universite, Toulouse, France) In Life sciences and space research XIII, Proceedings of the Seventeenth Plenary Meeting, São Paulo, Brazil, June 17-July 1, 1974 Berlin, East Germany, Akademie-Verlag GmbH, 1975, p 173-180 14 refs

Results of studies on the behavior of Paramecium cultures flown in stratospheric balloons and exposed to a high flux of energetic primary and secondary cosmic rays are reported A constant and significant increase in cellular growth rate was observed when the ceiling duration did not exceed about 6 hours A stimulating effect appears to occur only for radiation doses lower than 2 mrads It is likely that the cosmic radiation acts indirectly through the culture medium, control of factors such as temperature and pressure indicates that the effects observed are indeed due to cosmic radiation Thus cosmic rays have a stimulating effect in addition to their known higher-dose lethal effect S J M

A75-44148 # **The effect of ionizing radiations with different LET on survival and mutation in Chlorella** N P Dubinin, V A Shevchenko, A V Rubanovich, L K Vekshina, and I S Sakovich (Akademiia Nauk SSSR, Moscow, USSR) In Life sciences and space research XIII, Proceedings of the Seventeenth Plenary Meeting, São Paulo, Brazil, June 17-July 1, 1974 Berlin, East Germany, Akademie-Verlag GmbH, 1975, p 181-186 14 refs

Experiments were conducted on the relative biological efficiency (RBE) of ionizing radiations with varying linear energy transfer (LET) Survival curves were sigmoid for low LET radiations (such as gamma rays), but they were exponential in the case of high LET radiations (e g , multiply-charged ions of carbon, boron, and neon) Mutation rate was linear with dose for gamma rays, but it reached a maximum at certain prescribed doses for charged-particle irradiation The highest RBE occurred with multiply-charged carbon ions S J M

A75-44149 # **Peculiarities of biological action of hadrons of space radiation** I G Akoev and S S Iurov (Akademiia Nauk SSSR, Institut Biofiziki, Pushchino-on-Oka, USSR) In Life sciences and space research XIII, Proceedings of the Seventeenth Plenary Meeting, São Paulo, Brazil, June 17-July 1, 1974 Berlin, East Germany, Akademie-Verlag GmbH, 1975, p 187-193 18 refs

A review of experimental data on the somatic and genetic effects of high-energy hadrons is presented, based on data obtained in space and from high-energy accelerator studies, the physical and molecular principles behind these effects are discussed Data concern relative biological efficiency (RBE) and linear energy transfer (LET) In particular, the results of 70 GeV proton radiation on bacteriophage T4B and Vicia faba were studied It is concluded that the molecular mechanism of mutagenesis under the action of high-energy hadrons is due to multiple DNA changes caused by 'burning' a narrow cone of secondary particles and producing deletions of various dimensions Moreover, secondary radiation generated by high-energy hadrons upon their interaction with spaceships is likely to be the greatest hazard of radiation during space flights S J M

A75-44167 # **Experiment in the application of multivariate correlation-regression analysis in physiological studies (Dosvid zastosuvannia mnozhinnogo koreliatsiino-regresiinogo analizu u fiziologichnikh doslidzhenniakh)** A S Pavlov (Donets'kii Medichnii Institut, Donetsk, Ukrainian SSR) *Fiziologichnii Zhurnal,* vol 21, July Aug 1975, p 544-547 12 refs In Ukrainian

The dynamics of functional stress and the degree of disturbance of thermal homeostasis of an organism under the effect of a critical step probe were studied in four groups of human subjects (non-athletes, persons engaged in regular exercise, gymnasts, and boxers) Multivariate correlation regression analysis was applied in order to derive analytic interrelations between physiological functions and to ascertain the most decisive factors limiting performance in the step test P T H

A75-44191 **Models of hearing** M R Schroeder (Gottingen, Universitat, Gottingen, West Germany, Bell Telephone Laboratories, Inc , Murray Hill, N J) *IEEE, Proceedings,* vol 63, Sept 1975, p 1332-1350 81 refs

Current and past models of human hearing are discussed The bases of the approaches range from head diffraction and inner-ear mechanics to neural transduction and processing, they touch on physical and physiological measurement, as well as the psychoacoustic study of auditory perception Historical antecedents dating back to Lucretius and progressing through Tartini, Ohm, Seeback, and Helmholtz, the anatomy and basic capabilities of the ear,

including the pinnae and the outer ear canal, the perception of three-dimensionality, the middle ear, and the inner ear, a two-dimensional model of the basilar membrane, long- and short-wave models of the auditory process (e g , an electrical analog model), nonlinear models of inner-ear mechanics dealing with combination tones, nonlinear losses, and two-tone suppression, mechanical-neural transduction (including nervous firing in the inner ear, a sparse model for the transduction, and RC-circuit representation of the neural transduction model), and monaural phase sensitivity as conceived in the envelope hypothesis are considered S J M

A75-44212 **A family of models for measuring human reliability** A I Siegel, J J Wolf, and M R Lautman (Applied Psychological Services, Inc , Wayne, Pa) In Annual Reliability and Maintainability Symposium, Washington, D C , January 28-30, 1975, Proceedings New York, Institute of Electrical and Electronics Engineers, Inc , 1975, p 110-115 Navy-USAF-Army-supported research

A set of stochastic, digital simulation models for simulating the performance of the human component in man-machine systems is described The models emphasize human behavioral variables along with equipment, environmental, and crew composition considerations Emphasis is placed on (1) unique advances which permit simultaneous computer and physical simulation, and (2) integrated man-machine system reliability predictions One of the models (Model VIII) is held to be of special interest because of its capability to consider both equipment and human performance so as to yield a prediction of integrated system reliability (Author)

A75-44269 # **Techniques for avoiding biological contamination of the outer planets by atmospheric probes** R E DeFrees, J W Lanham, and W R McNeilly (McDonnell Douglas Astronautics Co , St Louis, Mo) *American Institute of Aeronautics and Astronautics and American Geophysical Union, Conference on the Exploration of the Outer Planets, St Louis, Mo , Sept 17-19, 1975, AIAA Paper 75-1164* 4 p

Contamination probabilities are qualitatively determined, considering planetary inhospitality, structural integrity, space-life incompatibility, clean fabricability, and fortuitous and undesirable events Microbes are more likely to lodge on internal or mating surfaces than on external surfaces, they are even more difficult to kill and monitor when they establish themselves in the materials that make up the instruments and support equipment The most influential factor on overall probability is the specified growth and replication probability value, which is about one-millionth It is concluded that the schedule and cost increments for planetary quarantine of the outer planets are smaller than those required for Mars Viking procedures S J M

A75-44323 **The man-machine interface** M A Hofmann (U S Army, Aeromedical Research Laboratory, Fort Rucker, Ala) *Vertiflite*, vol 21, May-June 1975, p 2, 3

The human role in aircraft safety and performance is evaluated, especially as regards rotary-wing craft It is emphasized that the cost of replacing the human component of the man-machine system can often be larger than the cost of replacing the hardware component. Cockpit environment (temperature, noise, vibration, visual input requirements, workspace, gaseous environment, life-support equipment, and crash survivability), displayed information, and operator-input control devices (manipulanda) are the three man-machine interface areas of major concern S J M

A75-44350 # **Eye movement response to simultaneous stimulation of the vestibular and visual receptors (Glazodvigatel'naia reaktsiia pri odnovremennom razdrazhenii vestibuliarnogo i zritel'nogo retseptorov).** E G Balashova (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) *Fiziologicheskii Zhurnal SSSR*, vol 61, July 1975, p 1072-1077 11 refs In Russian

A75-44351 **Human assay of antimotion sickness drugs.** A Graybiel, C D. Wood, J Knepton, J P Hoche, and G F Perkins (U S Navy, Naval Aerospace Medical Research Laboratory, Pensacola, Fla , Louisiana State University, Shreveport, La , Columbia-Presbyterian Hospital, Ridgewood, N J) *Aviation, Space, and Environmental Medicine*, vol 46, Sept 1975, p 1107-1118 13 refs. Navy Project MF51,524-005.

The present study was undertaken to improve previous testing procedures, involving the use of a slow rotation room, for assessing the efficacy of antimotion sickness drugs which had validity for groups of subjects but not for each individual in the groups The cardinal findings can be briefly summarized (1) group responses were similar to the data previously reported, (2) large individual variation in response to antimotion sickness drugs was revealed, implying that individual assessments must be made for maximal benefits, (3) the fixed-dose combination of promethazine hydrochloride and ephedrine sulfate (25 mg each) proved to be outstanding, as this combination of homergic drugs clearly exhibited a suprasummation effect, and (4) a few tests were conducted using larger than usual doses and the results supported previous findings that, for a maximal beneficial effect in response to a single dose, individuals may vary both with regard to the choice of drug and the amount administered (Author)

A75-44352 **Quantitative cyto- and histochemical studies of the Deiters' nucleus and nodular cortex of cerebellum in rats exposed to weightlessness** I B Krasnov (Institute of Biomedical Problems, Moscow, USSR) *Aviation, Space, and Environmental Medicine*, vol 46, Sept 1975, p 1119-1122 18 refs

Spaceflight aboard the 'Cosmos-605' artificial satellite during 22 d does not have a substantial effect upon the activity of enzymes involved in energy metabolism - lactate dehydrogenase and creatine kinase - in cytoplasm of the giant neurons of the dorsocaudal part of the Deiters' nucleus and cortex layers of the cerebellar nodulus in rats At the same time, on the second postflight day, in the molecular layer of cerebellar nodulus in rats flown for 22 d in space, some increase in lipid content was noted, probably connected with quantitative or qualitative changes in afferent impulses from the vestibular apparatus to the nodulus On the 27th postflight day, lipid content in the molecular layer returned to the level observed in rats during ground-based experiments (Author)

A75-44353 **Ethanol-induced lowering of arterial oxyhemoglobin saturation during hypoxia** J E Hansen and J R Claybaugh (U S Army, Tripler Army Medical Center, Honolulu, Hawaii) *Aviation, Space, and Environmental Medicine*, vol 46, Sept 1975, p 1123-1127 37 refs

Nine fasting, healthy, adult male volunteers were given oral carbohydrate before exposures to normoxia (inhaled partial O2 pressure = 149 torr) and mild hypoxia (inhaled partial O2 pressure = 98 torr) Following recovery, they were given oral ethanol before similar exposure to normoxia and mild hypoxia Repeated measures of arterial blood and expired gases were made Ethanol diminished respiratory gas exchange (R), causing lower alveolar and arterial oxygen pressures during normoxia and mild hypoxia and a reduction in arterial oxygen saturation from 89 9 to 87 4% during mild hypoxia It is suggested that carbohydrates are preferable to ethanol and fats as nutrients during limited oxygen transport situations, such as high-altitude, carbon monoxide exposure, or heavy exertion, and for patients with cardiovascular or pulmonary disease (Author)

A75-44354 **Infrasound - A short review of effects on man** J B Westin (Tel Hashomer Hospital, Israel) *Aviation, Space, and Environmental Medicine*, vol 46, Sept 1975, p 1135-1140 50 refs

The amount of natural and man-made infrasound that man is subjected to is larger than is generally realized The few studies that have concerned themselves uniquely with the physiologic effects of moderate-to-high levels of infrasound exposure (as opposed to audible sound or vibrational exposures) have failed to demonstrate significant effects on man other than those concerning the inner ear

and balance control But the existing studies indicate that inner ear symptomatology due to moderate-to-high levels of infrasound may be more common than is generally appreciated At very high sound pressure levels (exceeding 140 dB), ear pain and pressure become the limiting factors Ear muffs and ear plugs appear to offer slight protection from the effects of infrasound, but quantification of this is still lacking Direct evidence of adverse effects of exposure to low-intensity signals (below 90 dB) is lacking The need for further research in this field is clearly indicated (Author)

A75-44356 * Hematologic changes in mice during and after exposure to severe hypobaric hypoxia J E Huff (Oak Ridge National Laboratory, Oak Ridge, Tenn), G E Kaufman (Rochester, University, Rochester, N Y), and M Ingram (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, Calif) *Aviation, Space, and Environmental Medicine,* vol 46, Sept 1975, p 1147-1151 30 refs ERDA-supported research

Exposing mice to an atmospheric pressure of 300 mm Hg for 16 d caused a variety of hematologic effects Hematocrit increased rapidly in the first 8 d of exposure and slowly in the second 8 d Reticulocyte counts rose above normal, peaked on day 8, and then fell rapidly toward the control level Macrocytic erythrocytes, formed during exposure, remained macrocytic after the termination of exposure and after the loss of their reticulum The posthypoxic mice proved sensitive for erythropoietin bioassay Mice injected with normal dog serum showed a significantly higher incorporation of Fe-59 than control mice injected with physiologic saline A reduction of the duration of exposure to 10 d resulted in only a slight decrease in the sensitivity of the mouse bioassay system However, a 16-d exposure at a pressure of 360 mm Hg resulted in considerably less sensitive bioassay animals (Author)

A75-44357 Surveillance of some infectious diseases among aircrew personnel in Southeast Asia R Lee, J H Cross, G S Irving, C Lane, and R H Watten (Air America, U S Navy, Naval Medical Research Unit, Taipei, Nationalist China) *Aviation, Space, and Environmental Medicine,* vol 46, Sept 1975, p 1152-1154 5 refs Navy-supported research

A75-44358 Sensitivity of GABA synthesis in human brain to oxygen poisoning. J D Wood, S J Peesker, and B Rozdilsky (Saskatchewan, University, Saskatoon, Canada) *Aviation, Space, and Environmental Medicine,* vol 46, Sept 1975, p 1155, 1156 12 refs Research supported by the Defence Research Board of Canada

Homogenates were prepared from the basal ganglia and frontal cortex of human brain and incubated for 20 min at 25 C under either 1 ATA N2 or 3 ATA O2 (OHP) Exposure of the homogenates to OHP caused a significant inhibition in the activity of the gamma-aminobutyric acid (GABA) synthesizing enzyme, glutamic acid decarboxylase This finding, together with previously published data on animal experiments, suggests that a deranged GABA metabolism must be given serious consideration as a possible mechanism for OHP-induced seizures in man (Author)

A75-44359 Effects in rodents of a 1-month exposure to magnetic fields /200-1200 gauss/ G G Nahas, H Boccalon, P Berryer, and B Wagner (Columbia University, New York, N Y , Institut National de la Sante et de la Recherche Médicale, Paris, France) *Aviation, Space, and Environmental Medicine,* vol 46, Sept 1975, p 1161-1163 19 refs

Under the conditions of the present study, magnetic fields ranging from 200 to 1200 gauss strength have no toxic or histopathological effects on rats The in vivo study and the histopathological results show no alterations of the vascular tissues, except for a nonpathological congestion of the spleen, and no intravascular thrombosis related to the experimental conditions An unexpected observation was that the increase in body and organ weight of young rats was significantly greater in the groups exposed to magnetic fields Therefore, no undesirable effects should be expected when magnetic fields within the prescribed safety limits of 200 to 2000 gauss are applied to human subjects for several hours (Author)

A75-44360 * Cardiorespiratory responses to orthostasis and the effects of propranolol J A Loeppky (Lovelace Foundation for Medical Education and Research, Albuquerque, N Mex) *Aviation, Space, and Environmental Medicine,* vol 46, Sept 1975, p 1164-1169 25 refs Contract No NAS9-12572

Cardiac output and gas exchange were determined serially using the single-breath method of Kim et al before, during, and after orthostasis on six subjects after beta-adrenergic blockage and in duplicate controls In the latter, heart rate increased and pulse pressure dropped immediately on tilting to 60 deg and remained stable while cardiac output and stroke volume declined gradually over 21 min upright On propranolol, heart rate was 10 bpm lower supine and 20 bpm less at 60 deg but cardiac output was only slightly lower before and following tilt-up However, after 15 min upright, stroke volume and cardiac output recovered on propranolol exceeding the controls after 21 min without change in heart rate Returning to supine, heart rate dropped in all tests with a transitory increase in stroke volume, cardiac output and arteriovenous O2 difference At the same time, apparent O2 uptake increased temporarily, reflecting the return of pooled venous blood to the lungs Orthostatic tolerance did not appear to be affected by beta-adrenergic blockade (Author)

A75-44361 Cosmic radiation exposure in supersonic and subsonic flight *Aviation, Space, and Environmental Medicine,* vol 46, Sept 1975, p 1170-1185 10 refs

The main body of this document consists of four major sections (1) an introduction describing the scope of Committee operations and proving a brief exposition of the concepts of radiation protection, (2) a survey of experimental and theoretical data on cosmic radiations that have been obtained in individual research projects with emphasis on investigations that were performed under the sponsorship of the Committee The studies evaluate galactic and solar radiation as a function of altitude and magnetic latitude, (3) best current estimates of cosmic radiation levels in the atmosphere, and (4) radiation protection recommendations dealing with maximum permissible doses and operational aspects covering satellite warning systems, on-board instrumentation, and forecasting Nine annexes submitted by individual authors cover various of these subjects in greater detail (Author)

A75-44362 Central nervous system involvement following type I aviator's bends complicated by complacency F E Dully, Jr (U S Naval Aerospace Medical Center, Aerospace Medical Institute, Pensacola, Fla) *Aviation, Space, and Environmental Medicine,* vol 46, Sept 1975, p 1186, 1187 8 refs

A false sense of security surrounds the possibility of postflight complications resulting from 'aviator's bends' The accepted clinical clue that a patient is at risk for serious complications is the presence of some form of dysbarism at altitude This principle has been inappropriately extended to imply that serious postflight complications of the evolved gas syndrome only follow serious in-flight symptoms This paper, in addition to reporting the occurrence of postflight neurologic signs in a patient after Type I pain-only bends during an altitude chamber flight, also identifies a broader subtle complacency in the professional community that routinely deals with hypobarics (Author)

A75-44363 Soft hydrophilic contact lenses in civil and military aviation A Polishuk (Arkia Israel Inland Airlines, Ltd , Tel Aviv, Israel) and D Raz (Israel Air Force, Tel Aviv, Israel) *Aviation, Space, and Environmental Medicine,* vol 46, Sept 1975, p 1188-1190

A75-44364 Effects of Pyrobenzamine and Plimasin on fighter pilots flying a fighter intercept mission in the F4D flight simulator R P Maioriello (USAF, Medical Center, Andrews AFB,

Washington, D C) *Aviation, Space, and Environmental Medicine,* vol 46, Sept 1975, p 1191 1193 5 refs

There were 26 F4D crews from a Tactical Air Force Wing which participated in a difficult intercept mission in a F4D flight simulator They were divided into three groups, medicated with either Plimasin, Pyrobenzamine or placebo The groups medicated with either Plimasin or Pyrobenzamine alone demonstrated decreased effectiveness in completing this intercept as compared with the nonmedicated group These medications apparently caused impairment of mission performance and should be avoided while performing flying duties (Author)

A75-44434 * **Distribution effectiveness for space radiation dosimetry** J W Wilson (NASA, Langley Research Center, Hampton, Va) *Health Physics,* vol 28, June 1975, p 812, 813 9 refs

A simplified risk basis and a theory of hematological response are presented and applied to the problem of dosimetry in the manned space program Unlike previous studies, the current work incorporates radiation exposure distribution effects into its definition of dose equivalent The fractional cell lethality model for prediction of hematological response is integral in the analysis S J M

A75-44511 # **Influence of auditory fatigue on the perception of speech under conditions of intense low-frequency noise (Vliianie slukhovogo utomleniia na vospriiatie rechi v usloviiakh intensivnogo nizkochastotnogo shuma)** A G Antonov, B V Ovchinnikov, and A S Permiakov *Voenno-Meditsinskii Zhurnal,* June 1975, p 56, 57 In Russian

A75-44512 # **New methods and test batteries for the psychological selection of aircrews (Novye metody i kompleksy testov psikhologicheskogo otbora letnogo sostava)** B L Pokrovskii *Voenno-Meditsinskii Zhurnal,* June 1975, p 58-60 In Russian

Numerous investigational efforts are presently directed toward refining existing psychological tests of aircrew candidates, taking into account changes in pilot activity due to the advent of automatic control systems In this respect, the requirements for intellectual and perceptual spheres of activity are increased, whereas the demands for sensorimotor qualities are decreased Previous psychological tests are being superseded by prognostic test batteries which help determine the characteristics of a testee's higher nervous activity, which are indispensable both in acquiring initial flight skills and in conversion training on other types of aircraft A computer-aided automatic laboratory for psychophysiological evaluation of candidate pilots is described Adapted personality questionnaires are recommended for practical approval S D

A75-44513 # **The use of the 'reserves' technique in the psychological selection of aircrew students (Primenenie metodiki 'rezervy' v psikhologicheskom otbore letno-kursantskogo sostava)** S. D Baryshnikov *Voenno-Meditsinskii Zhurnal,* June 1975, p 60-62 In Russian

Experiments were performed to verify the information capacity and the prognostic effectiveness of a technique for evaluating the psychophysiological reserves of student pilots on a special pilot training simulator The term psychophysiological reserves is understood to mean the quantitative characterization of a trainee's capabilities to reprocess all additional visual information during the basic piloting activity without impairing the quality of his performance A percentage ratio is proposed for calculating the reserve capabilities to reprocess an additional visual information Test results confirm the reliability and differentiation power of the proposed 'reserves' technique S D

A75-44618 **Effect of inspiratory resistance on occlusion pressure in hypoxia and hypercapnia.** M H Kryger, O Yacoub, and N. R Anthonisen (Royal Victoria Hospital, McGill University, Montreal, Canada) *Respiration Physiology,* vol 24, Sept 1975, p 241-248 9 refs Research supported by the Medical Research Council and Defence Research Board of Canada

The authors measured ventilation and the mouth pressure developed during the first 0 1 sec of inspiratory effort against a closed airway (P0 1) in response to normoxic hypercapnia and normocapnic hypoxia, with and without added inspiratory resistance Hypercapneic responses were elicited by a steady-state technique, hypoxic responses by a nonsteady-state technique External resistances depressed the ventilatory response to CO2 but in general augmented the P0 1 response The degree of change of response was not predictable on the basis of the response in the absence of resistance Hypoxic ventilatory response was also diminished by resistance and P0 1 increased The authors concluded that in normal subjects added inspiratory resistance increased inspiratory drive as assessed by P0 1 (Author)

A75-44619 **Stimulus interaction in the responses of carotid body chemoreceptor single afferent fibers** S Lahiri and R. G DeLaney (Pennsylvania, University, Philadelphia, Pa) *Respiration Physiology,* vol 24, Sept 1975, p 249-266 36 refs Grant No PHS-HL-08805

The characteristics of steady-state responses of single afferent fibers of carotid chemoreceptors to independent changes in arterial PO2 and PCO2 were investigated in cats The arterial blood pressure was maintained within the normal limits (115-130 torr) Single chemoreceptor afferent fibers responded to changes both in arterial PO2 and PCO2 The relationship between the activity of chemoreceptors and changes in arterial PCO2 was linear at a constant arterial PO2 The two stimuli showed multiplicative interaction The activity approached zero (threshold) as arterial PCO2 was decreased at a constant arterial PO2, a decrease in arterial PO2 decreased the arterial PCO2 threshold These response characteristics of a single fiber suggest that the sensory receptor may be activated through a single mechanism by the two stimuli The data fit into an idea that the mechanism may involve a conformational change in the membrane-bound polymeric chromophore group which reacts with O2 reversibly and shows a Bohr-shift (Author)

A75-44620 **Relationship between carotid chemoreceptor activity and ventilation in the cat** S Lahiri and R G DeLaney (Pennsylvania, University, Philadelphia, Pa) *Respiration Physiology,* vol 24, Sept 1975, p 267-286 32 refs Grant No PHS-HL-08805

The steady-state stimulus-response relations between arterial PO2 and PCO2 and the mean activity of carotid chemoreceptors (single and multi-fiber) and ventilation were simultaneously recorded in 48 anesthetized cats The carotid chemoreceptor activity varied linearly with the increase of arterial PCO2, below and above the normal value, at any given level of arterial PO2 A decrease in arterial PO2 increased the activity of the carotid chemoreceptors and increased its sensitivity to changes in arterial PCO2, showing multiplicative stimulus interaction The response in ventilation during hypoxia to changes in arterial PCO2 below the normal value was smaller than that to changes above it, unlike the response of carotid chemoreceptors This arterial PCO2 quasi-threshold for ventilation was, therefore, not due to a corresponding threshold for the activity of the carotid chemoreceptors but to a central mechanism A multiplicative interaction between the activity of peripheral chemoreceptors and central CO2 excitation appears to play a role in the regulation of ventilation (Author)

A75-44621 **Nitrogen exchange across the lungs in resting man** P A Fennessy, M H Harrison, and C Davison (RAF, Institute of Aviation Medicine, Farnborough, Hants , England) *Respiration Physiology,* vol 24, Sept 1975, p 303-312 12 refs

A75-44650 **Invariant properties of the motion parallax field due to the movement of rigid bodies relative to an observer** J J Koenderink and A J van Doorn (Utrecht, Rijksuniversiteit, Utrecht, Netherlands) *Optica Acta,* vol 22, Sept 1975, p 773-791 12 refs

It is shown that the time-change of the natural perspective, due to the movement of rigid bodies relative to an observer, conveys

information about geometrical properties of the moving surfaces Certain differential properties of the dynamic perspective are shown to be conserved These properties are related to determinants of the shape of the surface elements of the moving bodies, as for instance the sign of the gaussian curvature, the asymptotic curves and the future contours A kinematic analysis of the motion parallax field shows that the type of parallax field is related to the slant of the surface relative to the observer The theory is of possible significance to visual kinesthesis (Author)

A75-45054 # **Concept of algorithmic control for a class of large systems (Poniatie algoritmicheskogo upravleniia dlia odnogo klassa bol'shikh sistem)** M Vukobratovic *Avtomatika i Telemekhanika,* July 1975, p 83-100 14 refs In Russian Research supported by the Matematicki Institut of Belgrade

An engineering approach to the synthesis of control mechanisms for a wide class of large systems is formalized The approach is based on a preliminary determination of the nominal operational modes, the hierarchical structure consists of a nominal dynamics level (algorithmic level) and an adaptation level (level of disturbed modes) Using this approach, a case of large disturbances can be reduced to a case of small disturbances, i e , to a linear control problem V P

A75-45071 # **Effect of thymus extract on granulocyte content in the peripheral blood (Vliianie ekstrakta timusa na soderzhanie granulotsitov v perifericheskoi krovi)** T V Todriia (Akademiia Nauk Gruzinskoi SSR, Institut Eksperimental'noi Morfologii, Tiflis, Georgian SSR) *Akademiia Nauk Gruzinskoi SSR, Soobshcheniia,* vol 79, July 1975, p 205-208 14 refs In Russian

The influence of a single administration of 0 3 and 0 6 ml of thymus extract on in vivo granulopoiesis in the peripheral blood of young and old male albino rats is studied It is shown that thymus extracts affects not only the lymphoid system but also myeloid elements In particular, thymus extract causes a marked increase in the number of segmented nuclear neutrophils in the peripheral blood of young rats, whereas old rats are characterized by enhancement of lymphocytes in the peripheral blood with inhibition of transfer of the remaining forms of leukocytes into the blood S D

A75-45123 **Ability of man to detect increases in his breathing** D W M West, C G Ellis, and E J M Campbell (St Joseph's Hospital, McMaster University, Hamilton, Ontario, Canada) *Journal of Applied Physiology,* vol 39, Sept 1975, p 372-376 8 refs

The ability of four normal subjects to detect increases in their ventilation was studied at rest and at two levels of exercise using a raised inspired PCO2 to further increase ventilation Subjects signaled when the increase in ventilation was recognized The average tidal volume at rest was 520 ml with a frequency of 14, these values increased to an average of 3300 ml and 21 at the highest work load There was no significant change in frequency with CO2 Detection occurred when the tidal volume increased by 700 ml The appreciation of increase is proportionately more sensitive at higher levels of ventilation Experiments in which the ventilation was increased by hypoxia or by following a visual demand, and observations of other sensations (oral, cerebral) indicate that the increase in ventilation is recognized through increased breathing rather than awareness of ventilatory stimuli (Author)

A75-45124 **Maximal oxygen uptake during treadmill walking and running at various speeds.** B A Stamford (Louisville, University, Louisville, Ky) *Journal of Applied Physiology,* vol 39, Sept 1975, p 386-389 10 refs

A75-45125 * **A new gas lesion syndrome in man, induced by 'isobaric gas counterdiffusion'** C J Lambertsen and J Idicula (Pennsylvania, University, Philadelphia, Pa) *Journal of Applied Physiology,* vol 39, Sept 1975, p 434-443 30 refs Grants No NIH-HL-08899-11, No NsG-9011, Contract No N00014-67-A-0216-0026

Normal men have been found to develop pruritis and gas bubble lesions in the skin, and disruption of vestibular function, when breathing nitrogen or neon with oxygen while surrounded by helium at increased ambient pressure This phenomenon, which occurs at stable ambient pressures, at 1 or many ATA, has been designated the isobaric gas counterdiffusion syndrome In a series of analyses and experiments in vivo and in vitro the cause of the syndrome has been established as due to gas accumulation and development of gas bubbles in tissues as a result of differences in selective diffusivities, for various respired and ambient gases, in the tissue substances between capillary blood and the surrounding atmosphere The phenomenon described in man is an initial stage of a process shown later in animals to progress to continuous, massive, lethal, intravascular gas embolization (Author)

A75-45126 **Ventricular function following acute carbon monoxide exposure** S H Cramlet, H H Erickson, and H A Gorman (USAF, School of Aerospace Medicine, Brooks AFB, Tex , Colorado State University, Fort Collins, Colo) *Journal of Applied Physiology,* vol 39, Sept 1975, p 482-486 23 refs

Cardiac output function curves were used to investigate the effects of carbon monoxide on the heart in the conscious dog Each dog was briefly exposed to 1500 ppm carbon monoxide through a permanent tracheostomy Immediately upon attaining either 10%, 20%, or 30% HbCO a rapid infusion of Ringer's lactate was given to test cardiac capabilities The combined effects of carbon monoxide and infusion produced significant increases in cardiac output, heart rate, mean left ventricular pressure, peak rate of rise in left ventricular pressure and ratio of peak rate of rise in left ventricular pressure to instantaneous left ventricular pressure Cardiac output was sufficient to prevent peripheral hypoxia at all HbCO levels, however, there was evidence of impending cardiac depression beginning at 20% HbCO (Author)

A75-45127 * **Use of dew-point detection for quantitative measurement of sweating rate** G L Brengelmann, M McKeag, and L B Rowell (Washington, University, Seattle, Wash) *Journal of Applied Physiology,* vol 39, Sept 1975, p 498-500 9 refs Grants No NIH-HL-16910, No NIH-HL-09773, No NIH-RR-37, No NGR-48-002-082

A method of measuring sweat rate (SR) based on detection of dew point (DP) is proposed which has advantages that may be attractive to other laboratories concerned with recording SR from selected areas of skin It is similar to other methods in that dry gas is passed through a capsule which isolates several square centimeters of skin surface The difference is in the means of determining how much gaseous water is carried off in the effluent moist gas The DP detector used is free of the drawbacks of previous devices DP is obtained through the fundamental technique of determining the temperature at which condensate forms on a mirror Variations in DP are tracked rapidly, and accurately (+ or - 0 8 C nominal, sensitivity + or - 0 05 C) over a wide range (-40 C to +50 C) without measurable hysteresis The detector asembly is rugged and readily opened for cleaning and inspection (Author)

STAR ENTRIES

N75-30767*# Scientific Translation Service Santa Barbara, Calif
THE INTRODUCTION OF MYCORRHIZAL FUNGI INTO FORESTED AREAS OF VERONEZH REGION (OBLAST)
V Ya Chastukhin Washington NASA Jul 1975 22 p refs Transl into ENGLISH from Tr Compleksnoy Vauchnoy Ekspeditsii po Voprosam Dolozashchitnogo Lesorazvedeniya (USSR) v 2 Issue 2, 1952 p 136-146
(Contract NASw-2483)
(NASA-TT-F-16481) Avail NTIS HC $3 25 CSCL 06M

An investigation was made of mycoflora of the forest-stepp zone in the Veronezh region for several years The practical results of mycorrhization of newly planted forest areas were discussed
Author

N75-30768*# Kanner (Leo) Associates, Redwood City Calif
SPECIES OF FUNGI OF THE HYGROPHORACEAE FAMILY ON THE VELKA HORKA HILL NEAR MNICHOVO HRADISTE
J Herink Washington NASA Sep 1975 49 p refs Transl into ENGLISH from Acta Musei et Horti Balamci Bohemia Borealis Sb Severoceskeho Musea Liberec Sb Severecesk Mus Prirodinivedy (Czechoslovakia), v 195 1958 p 53-86
(Contract NASw-2790)
(NASA-TT-F-16492) Avail NTIS HC $3 75 CSCL 06M

A detailed introduction is given providing the geographical geological and ecological characterization of a site chosen in Bohemia The main body of this article deals with the morphology and taxonomy of several fungi of the Hygrophoraceae family found in the given locale The author gives very full descriptive data on several species of Hygrophoraceae (i e , Hygrophorus Camarophyllus Camarophyllopsis Godfrinia Neohygrocybe Hygrocybe and Gliophorus) He also proposes a new systematic classification of the sections and subsections of Godfrinia R Maire Neohygrocybe (gen nov) Hygrocybe (Fr) P Karst , and Gliophorus (gen nov)
Author

N75-30769*# Joint Publications Research Service Arlington Va
SPACE GARDEN
N Mishina Washington NASA Aug 1975 5 p Transl into ENGLISH from Pravada (Moscow), 2 Apr 1975 p 6
(Contract NASA Order W-13183)
(NASA-TT-F-16421) Avail NTIS HC $3 25 CSCL 06C

Closed cycle life support systems are discussed followed by report on experiments already conducted in a vivarium
Author

N75-30770 British Library Lending Div Boston Spa (England)
EFFECT OF 50-Hz FIELDS ON MAN
R Hauf 19 May 1975 9 p Transl into ENGLISH from ETZ Ausg B (Berlin) v 26, no 12 1974 p 318-320
(BLL-CE-Trans-6689-(9022 09)) Avail British Library Lending Div , Boston Spa Engl 1 BLL photocopy coupon

The biological effects of electrical and electromagnetic fields on man were investigated Parameters considered include reaction time, blood pressure, pulse, ECG EEG blood count thrombocytes, reticulocytes clotting time and sedimentation rate Test results show that under the experimental conditions of a 50 Hz alternating field no harmful effects were noted Apart from slight non-specific stimulation phenomena in the physiological range, no pathological changes were observed which could be attributed to the influence of the field Both male and female subjects were studied
E H W

N75-30772*# General Electric Co , Houston Tex
SKYLAB IMSS CHECKLIST APPLICATION STUDY FOR EMERGENCY MEDICAL CARE Final Report
John G Carl and Shiro Furukawa 15 Aug 1975 95 p refs (Contract NAS9-14442)
(NASA-CR-144394) Avail NTIS HC $4 75 CSCL 06B

A manual is presented that provides basic technical documentation to support the operation and utilization of the Portable Ambulance Module (PAM) in the field The PAM is designed to be used for emergency resuscitation and victim monitoring The functions of all the controls, displays and stowed equipment of the unit are defined Supportive medical and physiological data in those areas directly related to the uses of the PAM unit are presented
J M S

N75-30773*# Scientific Translation Service Santa Barbara, Calif
COMPARATIVE ANATOMY OF THE AUDIO-VESTIBULAR ORGAN
H M DeBurlet Washington NASA Sep 1975 239 p refs Transl into ENGLISH from Handb der Vergleichenden Anat der Wirbeltiere herausgegeben von Weiland Lois Bolk (West Germany), v 2, 1934 p 1293-1432
(Contract NASw-2483)
(NASA-TT-F-16456) Avail NTIS HC $7 50 CSCL 06P

The comparative anatomy of the inner ear and middle ear regions of vertebrates is presented based on research during the eighteenth nineteenth and twentieth centuries up to 1934 by researchers all over the world Over 400 references are cited
Author

N75-30774*# California Univ Berkeley Research Station
IN VIVO MEASUREMENT OF HUMAN BODY COMPOSITION Semiannual Status Report, 1 Jul - 31 Dec 1974
Nello Pace 31 Dec 1974 76 p
(Grant NGR-05-003-470)
(NASA-CR-143375 SASR-5) Avail NTIS HC $4 75 CSCL 06P

The time course of physiological changes that occur during the first 21 days of continuous bed rest was examined The test involved a total of 14 men in the age range of 25 to 36 years The subjects were divided into groups and tested on a staggered schedule Results are presented
Author

N75-30775*# Scientific Translation Service, Santa Barbara Calif
MAPPING OF INDIVIDUAL CIRCADIAN RHYTHM
Oscar Oequist Washington NASA Aug 1975 160 p refs Transl into ENGLISH from Univ of Goeteborg (Sweden) Thesis Jul 1970 p 1-128
(Contract NASw-2483)
(NASA-TT-F-16502) Avail NTIS HC $6 25 CSCL 06P

Former models about the formation of the 24 hour rhythm in man animals and plants are reviewed according to which it is acquired established and maintained by exogenic periodicities The present investigation maps individual daily rhythms on the

basis of experience overt behavior and performance at various times of day A group of 85 individuals were tested by means of questionnaires, and several control groups were included The persons were divided into two extreme groups - the morning group and the evening group which were monitored for a month (diary) From each group five individuals were subjected to performance measurements at two times during the day It is concluded that individual daily rhythms are a fundamental characteristic which are affected only slightly by external life routine are associated with schizothymia cyclothymia are coupled with age and affect performance at different times of the day
Author

N75-30776*# Kanner (Leo) Associates Redwood City Calif
EFFECT OF EXOGENOUS CATECHOLAMINES ON HEART RATE AND THERMOREGULATION IN THE HIBERNATING HEDGEHOG (ERINACEOUS EUROPAEUS L)
Annette Faure and Maurice Fontaine Washington NASA Aug 1975 10 p refs Transl into ENGLISH from Compt Rend Acad des Sci (Paris) ser D v 280 9 Jun 1975 p 2559-2562
(Contract NASw-2790)
(NASA-TT-F-16533) Avail NTIS HC $3 25 CSCL 06P

Hibernating hedgehogs were awakened by intracarotid injection of increasing doses of norepinephrine or L-Dopa This awakening was prevented by inhibition of the peripheral effects of L-Dopa these effects would therefore be provoked by the supply of exogenous catecholamines to the peripheral region imitating the natural mobilization of catecholamine reserves
Author

N75-30777*# Joint Publications Research Service, Arlington Va
HIGHER NERVOUS ACTIVITY OF MAN MOTIVATIONAL-EMOTIONAL ASPECTS
P V Simonov Washington NASA Aug 1975 187 p refs Transl into ENGLISH of the book 'Vysshaya Nervnaya Deyatelnost Cheloveka Motivatsionno-Emotsionalnyye Aspekty Moscow Nauka Press 1975 p 1-175
(Contract NASA Order W-13183)
(NASA-TT-F-16453) Avail NTIS HC $7 00 CSCL 06P

Results of experimental research on various manifestations of human higher nervous activity are reported Principal attention is devoted to the motivational emotional aspect of higher nervous activity, including the applied significance of research in this area to efficient organization of labor, education the study of art and so on Data are used as the foundation for summarizing a great deal of factual information accummulated by physiologists and psychologists
Author

N75-30778*# Baylor Univ Houston Tex Dept of Ophthalmology
THE MARK 3 HAPLOSCOPE
Thomas A Decker Robert E Williams Christian L Kuether Noel D Logar and Diane Wyman-Cornsweet Washington NASA Sep 1975 81 p refs
(Grants NGR-44-012-099 NGR-44-003-057)
(NASA-CR-2584) Avail NTIS HC $4 75 CSCL 06B

A computer-operated binocular vision testing device was developed as one part of a system designed for NASA to evaluate the visual function of astronauts during spaceflight This particular device called the Mark 3 Haploscope, employs semi-automated psychophysical test procedures to measure visual acuity stereopsis phoria fixation disparity refractive state and accommodation/convergence relationships Test procedures are self-administered and can be used repeatedly without subject memorization The Haploscope was designed as one module of the complete NASA Vision Testing System However, it is capable of stand-alone operation Moreover the compactness and portability of the Haploscope make possible its use in a broad variety of testing environments
Author

N75-30779# Council for Scientific and Industrial Research, Pretoria (South Africa)
STRAIN OF HUMAN BODIES PROTECTED BY SAFETY BELTS IN SIMULATED FRONTAL CRASHES
D Kallieris and G Schmidt 1974 21 p refs Transl into ENGLISH from Z Rechtsmedizin (West Germany) no 74 1974 p 31-42
(CSIR-Trans-1196) Avail NTIS HC $3 25

Tolerance limits of the human body protected by safety belt systems to impact loads are studied in sled deceleration tests that simulate headon automobile collisions Scanning oscillographic recordings of sled deceleration blet strain and head velocity in relation to time and high speed camera impact phase photographs show that tested restrain systems need improvement in the areas of head movement, shoulder belt widths and knee protection
G G

N75-30780# Office of Naval Research London (England)
SYMPOSIUM ON TEMPERATURE REGULATION AND DRUG ACTION
A R Dawe and L M Libber 22 Jan 1975 18 p Symp held at Paris 16-18 Apr 1974
(AD-A006372, ONRL-C-2-75) Avail NTIS CSCL 06/15

The report discusses 42 papers presented under the following session titles General Aspects and Thermoregulation, Mechanisms of Fever, Monoamines and Thermoregulation Thermogenesis and Brown Adipose Tissue Adaptive Aspects of Thermoregulation, Pyrexia and Prostaglandins Drugs and Thermoregulation and Physico-Chemical Aspects of Thermoregulation
GRA

N75-30781# University of Southern Calif, Los Angeles Dept of Psysiology
BLOOD FLOW AND PRESSURE TELEMETRY Final Scientific Report
Christopher M Stevens and Roland D Radar 21 Feb 1975 29 p refs
(Grant AF-AFOSR-2190-72, AF Proj 9777)
(AD-A008885 AFOSR-75-0509TR) Avail NTIS CSCL 06/19

The past year s research concluded a two-year study of the renal hemodynamic adjustments of the military working dog in response to a variety of environmentally-induced stimuli chosen to produce both physical and emotional responses The vascular reactivity of the kidney was the indicator of the relative amount of psychophysiological stress inherent in a given situation Hemodynamic responses of the kidney were studied using an implanted blood pressure and flow telemetry system activated by a radio frequency-sensitive switch Renal blood flow was obtained by a pulsed ultrasonic flow detection system with the flow transducer cuff placed on the left renal artery and aortic blood pressure was obtained from an intravascular pressure transducer implanted immediately below the left renal artery bifurcation
GRA

N75-30782# Federation of American Societies for Experimental Biology, Bethesda Md *Life Sciences Research Office*
BIOLOGICAL INDIVIDUALITY OF MAN
C Jelleff Carr, Kenneth D Fisher and John M Talbot Dec 1974 29 p refs
(Grant F44620-74-C-0077 ARPA Order 2808 AF Proj 6110 AF Proj 6813)
(AD-A008888 AFOSR-75-0522TR) Avail NTIS CSCL 06/3

The report suggests that the concept of biological individuality is worthy of study as a means of identifying those persons who possess unique attributes or inadequacies for specific tasks or responsibilities Many biological factors related to individual differences are known and can be quantified objectively and thus may permit the prediction of some performance capability of an individual The background of work on biological individuality is reviewed three examples are cited and key investigators in these specific fields are identified However numerous other examples can be found to illustrate the effects of individual biological factors that impinge on human performance The suggestions for future research emphasize the basic concerns for performance in a military environment that may reflect the expression of biological individuality
GRA

N75-30783# University of Southern Calif Los Angeles Dept of Biological Sciences
ABSTRACTION AND ENCODING OF SENSORY INFORMATION Final Report
Lewis Bishop 25 Jan 1975 33 p refs
(Grant AF-AFOSR-2112-71 AF Proj 9777)
(AD-A008929 AFOSR-75-0510TR) Avail NTIS CSCL 06/16

The research program was designed toward the functional/anatomical description of the neural movement detection system with the end product an insight into how behavior can be described in the information processing of known anatomical nerve networks The research concentrated on the processes of reception by photoreceptors and the processing of visual information by interneurons in the optic lobe brain and thoracic ganglion For the first time a system of movement detectors has been identified There are possibly as few as 30 cells per animal which are command fibers for the control of flights The horizontal and vertical movement detection systems are distinct anatomically physiologically and behaviorally GRA

N75-30784# Air Force Inst of Tech Wright-Patterson AFB Ohio
THE DEVELOPMENT OF A REAL-TIME ELECTROCARDIOGRAM ANALYZING SYSTEM USING THE POP-15 COMPUTER M S Thesis
Edwin M Fujinaga and Dennis Majerski Dec 1974 110 p refs
(AD-A008672 GE/BE/74-43) Avail NTIS CSCL 06/5

The thesis describes the development and results of a real-time computer system for electrocardiographic analysis using the PDP-15 computer The system was developed using algorithms that were previously developed at the Air Force Institute of Technology and the Cox Heart Institute These algorithms use pattern recognition techniques in both the time domain and the spatial frequency domain Data (electrocardiograms) for this project was obtained from patients interned in a Coronary Care Unit Two hundred twelve 15 second electrocardiograms were analyzed GRA

N75-30785# School of Aerospace Medicine Brooks AFB Tex
EVALUATION OF RETINAL DAMAGE PRODUCED BY LONG-TERM EXPOSURE TO LASER RADIATION Interim Report, Apr - Dec 1974
William D Gibbons and Ralph G Allen Apr 1975 15 p refs (AF Proj 6301)
(AD-A008769 SAM-TR-75-11) Avail NTIS CSCL 06/18

The study reported here was designed with two objectives The first objective was to determine whether or not photopigments may be involved in the production of nonthermal lesions and the second objective was to extend argon ED50 measurements for nonthermal lesions to 1000-sec exposures To accomplish the first objective exposures were made for 120 seconds using a wavelength of 1060 nm This wavelength when absorbed at the retina can produce a temperature rise but is inefficient in bleaching photopigments Thus lesions produced by these exposures should stem primarily from thermal changes The results of these exposures were then compared to those obtained from exposure to a wavelength of 514 5 nm which readily interacts with photopigments GRA

N75-30786# School of Aerospace Medicine Brooks AFB Tex
ADVANCED SPATIAL DISORIENTATION TRAINING CONCEPTS Final Aeromedical Review, Jan - Jun 1974
Kent K Gillingham Dec 1974 35 p refs
(AD-A008768 SAM-Review-11-74 SAM-TR-74-58) Avail NTIS CSCL 06/19

Different approaches to the problem of training pilots to cope with spatial disorientation are analyzed with emphasis on those approaches using hardware (antivertigo trainers) specifically designed for such training Antivertigo trainers are categorized according to function i e , as (1) demonstrators of vestibular and visual illusions (2) demonstrators of spatial disorientation or (3) trainers to eliminate through practice erroneous responses to disorienting stimuli Simple control-system diagrams of various antivertigo trainers illustrate the critical concepts of identification of the controlled parameter degree of motion-control-loop closure, cross-sensory-modality coupling and relevance of vestibular stimulation to the control problem Opinions regarding probabilities of transfer of the various types of ground-based training to inflight situations are discussed GRA

N75-30787# National Academy of Sciences - National Research Council Washington D C Ad Hoc Committee on Electric Stimulation of the Brain
AN EVALUATION OF ELECTROANESTHESIA AND ELECTROSLEEP Final Report
14 Dec 1974 61 p refs
(Contract FDA-70-22)
(PB-241305/2) Avail NTIS HC $4 25 CSCL 06E

An assessment of information on the effectiveness and hazard of applying electric current to the skin of the head to produce general anesthesia and for therapeutic purposes exclusive of electroconvulsive therapy Review of the literature indicates that electricity should be considered a potentially useful adjunct in anesthesia and further investigation encouraged Conflicting evidence of morphologic changes in the brain after electroanesthesia needs investigation Subanesthetic or subconvulsive electric currents have not been scientifically demonstrated to induce sleep as a specific effector to produce other healthful effects in excess of those produced by placebo Ninety-four references are included GRA

N75-30788*# Massachusetts Inst of Tech Cambridge Dept of Aeronautics and Astronautics
PSYCHOPHYSICAL MODELS FOR SIGNAL DETECTION WITH TIME VARYING UNCERTAINTY Ph D Thesis
Eliezer Gai Jan 1975 286 p refs
(Grant NGR-22-009-733)
(NASA-CR-137734) Avail NTIS HC $8 75 CSCL 05J

Psychophysical models for the behavior of the human operator in detection tasks which include change in detectability correlation between observations and deferred decisions are developed Classical Signal Detection Theory (SDT) is discussed and its emphasis on the sensory processes is contrasted to decision strategies The analysis of decision strategies utilizes detection tasks with time varying signal strength The classical theory is modified to include such tasks and several optimal decision strategies are explored Two methods of classifying strategies are suggested The first method is similar to the analysis of ROC curves while the second is based on the relation between the criterion level (CL) and the detectability Experiments to verify the analysis of tasks with changes of signal strength are designed The results show that subjects are aware of changes in detectability and tend to use strategies that involve changes in the CL s Author

N75-30789# Illinois Univ Savoy Aviation Research Lab
BASIC ATTENTION MEASURES AS PREDICTORS OF SUCCESS IN FLIGHT TRAINING
Robert A North and Daniel Gopher Oct 1974 11 p refs
(Contract F44620-70-C-0105, AF Proj 9778)
(AD-A006385 ARL-74-14/AFOSR-74-9 AFOSR-75-0388TR) Avail NTIS CSCL 05/9

A two-stage study was conducted to assess the potential of a new methodological technique for measuring individual differences in basic attention capabilities and the validity of these differences in predicting success in flight training A performance testing system included a digit-processing reaction-time task and a one-dimensional compensatory tracking task Comparisons were made between separate and concurrent performances of these tasks and simultaneous performances also included comparisons involving changes in task priorities Results indicating consistent individual differences in basic attention capabilities suggest several dimensions for their description GRA

N75-30790# Human Resources Research Organization Alexandria Va
TRANSFER AND USE OF TRAINING TECHNOLOGY A MODEL FOR MATCHING TRAINING APPROACHES WITH TRAINING SETTINGS
Edgar M Haverland Oct 1974 77 p refs
(Contract F44620-74-C-0007 AF Proj 9778)
(AD-A005816, HUMRRO-TR-74-24, AFOSR-75-0330TR) Avail NTIS CSCL 05/9

A model for evaluating training approaches or innovations in relation to the requirements resources and constraints of specific training settings was developed The model consists of two parallel series of questions one concerning the characteristics of the training approach under consideration, and one concerning the corresponding characteristics of the training settings (including the abilities and other characteristics of trainees and the characteristics of the training content) The model has been evaluated by subjecting it to the criticism of training managers and curriculum designers in Air Force Technical Training Centers, and by applying it to a training approach and to a training setting GRA

N75-30791# Union Carbide Corp Tarrytown, N Y
COGNITIVE AND PSYCHOMOTOR PERFORMANCE DURING NOAA OPS 1 AND 2
T C Schmidt R W Hamilton, Jr G Moeller (Naval Submarine Med Research Lab), and C P Chattin (Naval Submarine Med Res Lab) 20 Dec 1974 27 p refs Prepared in cooperation with Ocean Systems Inc, Tarrytown N Y
(Contracts N00014-74-C-0424, N00014-69-C-0346)
(AD-A005643 CRL-T-799) Avail NTIS CSCL 06/19

The NOAA OPS project developed excursion procedures for shallow nitrogen habitats Operational verification of the concept was carried out in two laboratory saturation dives using three subjects each Cognitive and psychomotor performance was evaluated on the subjects under several conditions at sea level, during normoxic nitrogen saturation exposures of seven-day duration each at pressures equivalent to 30, 60 90 and 120 feet of sea water (fsw) on compressed air excursions from saturation to depths as great as 300 fsw, and on equivalent air dives as made from the surface in the unsaturated condition Results indicated that divers can live and work in normoxic nitrogen habitats--to depths as great as 120 fsw for at least one week duration--at performance levels comparable to sea level efficiency GRA

N75-30792# Office of Civilian Manpower Management Arlington, Va
AN INTEGRATED WORKLOAD AND MANPOWER PLANNING SYSTEM FOR THE NAVAL AIR REWORK FACILITY, NORTH ISLAND Research Report
E S Bres and R J Niehaus Nov 1974 46 p refs Sponsored by the Navy
(RF55521101)
(AD-A006293, OCMM-RR-21) Avail NTIS CSCL 05/9

The paper describes the application of a manpower management model to a large industrial facility within the Naval Shore Establishment the Naval Air Rework Facility North Island, San Diego California This test involved the use in the model of manpower requirements data developed from the NARF workload planning system The various input collection procedures are described and the outputs are analyzed in terms of management decisions GRA

N75-30793# Air Force Inst of Tech, Wright-Patterson AFB, Ohio School of Engineering
OPTIMAL MULTIMODAL PARAMETER IDENTIFICATION IN THE STATE SPACE MODEL OF THE HUMAN OPERATOR M S Thesis
Raymond H Faergeb, Jr Dec 1974 93 p refs
(AD-A008707 GE/EE/74-42) Avail NTIS CSCL 05/8

A technique is developed which can be used to identify the j-dimensional hypersurface of a multimodal human operator model The j is equivalent to the number of system parameters plus one for the parameters performance The technique uses a bounded random search to select the parameters which are used to calculate an output from the model Parameters which produce an output that meets the performance criterion are stored then they are used as an input to a clustering algorithm The clustering algorithm produces clusters or groupings of parameters which identify the model's hypersurface from which local maximums can be determined using existing techniques such as Newton-Raphson or gradient search The local maximum with the best performance is considered the global maximum and the parameters associated with the global maximum are referred to as the optimal set of system parameters One use of this technique is parameter tracking such as is required in human operator modeling over long periods of time or under changing tasks GRA

N75-30794# Joint Publications Research Service Arlington, Va
HABITABILITY OF SHIPS
S A Itsirelson and M A Razran 29 Jul 1975 237 p refs Transl into ENGLISH from the Book 'Obitayemost Sudov Leningrad 1963 p 2-223 265-268
(JPRS-65334) Avail NTIS HC $7 50

The fundamentals of ship habitability, an examination of the factors which determine the conditions of man s stay aboard ship, and the characteristics of the effect of the environment on the human organism during sailing, are given Author

N75-30795*# General Electric Co, Philadelphia Pa Space Div
URINE SAMPLING AND COLLECTION SYSTEM OPTIMIZATION AND TESTING Final Report
G L Fogal J A Geating and M G Koesterer Jun 1975 111 p
(Contract NAS9-13049)
(NASA-CR-144401 GE-75SDS4231) Avail NTIS HC $5 25 CSCL 06B

A Urine Sampling and Collection System (USCS) engineering model was developed to provide for the automatic collection, volume sensing and sampling of urine from each micturition The purpose of the engineering model was to demonstrate verification of the system concept The objective of the optimization and testing program was to update the engineering model, to provide additional performance features and to conduct system testing to determine operational problems Optimization tasks were defined as modifications to minimize system fluid residual and addition of thermoelectric cooling Author

N75-30796# Royal Aircraft Establishment Farnborough (England)
POSTURE AND SEAT DESIGN FOR THE CAR DRIVER
G Preuschen and H Dupuis May 1975 14 p refs Transl into ENGLISH from German Report Presented at the Proc of the Symp on Sitting Posture 1969
(RAE-Lib-Trans-1842 BR48208) Avail NTIS HC $3 25

Theoretical ideas on the practical design of automobile seats are illustrated Data cover work tasks and anthropometry data of drivers, sufficient adjustments of automobile seats to adapt to different body dimensions and changes in body position, and vibration isolation Author

N75-30797*# Transemantics Inc, Washington D C
LIFE SUPPORT SYSTEMS ABOARD THE SOYUZ-18-SALYUT-4 FLIGHT
A Ivakhnov Washington NASA Aug 1975 7 p Transl into ENGLISH from Izv (USSR) 7 Jun 1975 p 5
(Contract NASw-2792)
(NASA-TT-F-16500) Avail NTIS HC $3 25 CSCL 06K

The general review of the Soyuz 18 Salyut 4 program includes a discussion on the life support systems aboard the Salyut 4 that reprocesses the water stored aboard the station a special

device was used for this in which the water was refiltered and treated with silver The water supply is abundant the previous cosmonauts drank approximately 100 liters during their month-long stay Regenerated water is also being used Meals are planned to provide approximately 3000 calories per person per day Food products are all natural and preserved by means of sterilization they are stored in a refrigerator The air supply consists of 1000 thousand liters The crew is also supplied with several medical kits including disposable syringes with medication
Author

N75-30798*# Telecare Inc Houston, Tex
PORTABLE MEDICAL STATUS SYSTEM Final Report
Aug 1975 142 p
(Contract NAS9-14334)
(NASA-CR-144411) Avail NTIS HC $5 75 CSCL 06B

Electrical schematics and outline drawings of the portable medical status unit are presented along with recommendations for future units
M J S

N75-30799*# Stanford Research Inst Menlo Park Calif
MANIPULATION BASED ON SENSOR-DIRECTED CONTROL AN INTEGRATED END EFFECTOR AND TOUCH SENSING SYSTEM
J W Hill and A J Sword 1973 8 p refs Presented at 17th Ann Human Factors Soc Conv Washington D C 16-18 Oct 1973
(Contracts SNSN-63, NAS2-7507, Grant NSF GI-38100x)
(NASA-CR-143420) Avail NTIS HC $3 25 CSCL 05H

A hand/touch sensing system is described that when mounted on a position-controlled manipulator greatly expands the kinds of automated manipulation tasks that can be undertaken Because of the variety of coordinate conversions control equations and completion criteria control is necessarily dependent upon a small digital computer The sensing system is designed both to be rugged and to sense the necessary touch and force information required to execute a wide range of manipulation tasks The system consists of a six-axis wrist sensor, external touch sensors, and a pair of matrix jaw sensors Details of the construction of the particular sensors the integration of the end effector into the sensor system and the control algorithms for using the sensor outputs to perform manipulation tasks automatically are discussed
Author

N75-30800# School of Aerospace Medicine, Brooks AFB, Tex
CONTAMINANT EVALUATION OF HELICOPTER OXYGEN SYSTEM Progress Report, Mar 1974 - Aug 1974
Herman J Kilian and Richard L Miller Dec 1974 13 p refs
(AF Proj 7164)
(AD-A006139, SAM-TR-74-59) Avail NTIS CSCL 06/11

A new aircrew oxygen delivery system using multiple sodium chlorate oxygen generators was tested for contaminant offgassing to assure physiological compatibility under anticipated use conditions Measurements were made of oxygen flow temperature, pressure purity and contaminant analyses for chlorine, carbon monoxide carbon dioxide, total hydrocarbons and water vapor in the breathing oxygen The system met all specifications for oxygen purity and contaminant content under both normal and emergency use conditions
GRA

N75-31708*# Agnew Tech-Tran, Woodland Hills Calif
BIOCHEMISTRY INVESTIGATION OF THE POLYPHOSPHATE-SYNTHETASE OF SACCHAROMYCES CEREVISIAE
Simone Felter and Andre Stahl Washington NASA Aug 1975 9 p refs Transl into ENGLISH from C R Acad Sci (Paris) v 280 28 Apr 1975 p 1903-1906
(Contract NASw-2789)
(NASA-TT-F-16497) Avail NTIS HC $3 25 CSCL 06A

The enzyme polyphosphate-synthetase, isolated from the crushing of cells with low phosphate concentrations, was found capable of catalyzing the synthesis of polyphosphates from the orthophosphate The enzyme is localized in the sedimentary membranous fraction obtained between 400 and 1000 g, its optimal pH level is 7 1 its Km vis-a-vis the orthophosphate is 4 0x10-4M, ATP stimulates the reaction This enzyme synthesizes primarily short chain polyphosphates
Author

N75-31709# New Hampshire Univ, Durham Dept of Botany
PHYTOPLANKTON POPULATIONS IN RELATION TO DIFFERENT TROPHIC LEVELS AT WINNIPESAUKEE LAKE, NEW HAMPSHIRE, USA
Harry William Yeo and Arthur C Mathieson Feb 1973 161 p refs
(PB-240981/1, W75-06354) Avail NTIS HC $6 25 CSCL 06F

Composition, abundance and seasonal periodicity of phytoplankton at Lake Winnipesaukee were determined Trophic levels were evaluated for the entire lake and for eight individual stations The trophic levels of Lake Winnipesaukee were compared with Newfound and Winnisquam Lakes The response of phytoplankton to nutrient enrichments of nitrates, phosphates and silicates was evaluated The differences in phytoplankton numbers (cell/ml) and nutrient levels were compared with previous records at Winnisquam and Newfound Lakes The nutrient levels at Winnipesaukee were in excess of those previously found at Newfound and Winnisquam Lakes The species diversity at Winnipesaukee Lake was much greater than at either of the other two lakes
GRA

N75-31710# Environmental Protection Agency, Athens Ga Southeast Environmental Research Lab
MODELING THE DYNAMICS OF BIOLOGICAL AND CHEMICAL COMPONENTS OF AQUATIC ECOSYSTEMS
Ray R Lassiter May 1975 62 p refs
(PB-241987/7 EPA-660/3-75-012) Avail NTIS HC $4 25 CSCL 06F

To provide capability to model aquatic ecosystems or their subsystems as needed for particular research goals, a modeling strategy was developed Submodels of several processes common to aquatic ecosystems were developed or adapted from previously existing ones Submodels are included for photosynthesis as a function of light and depth biological growth rates as a function of temperature, dynamic chemical equilibrium, feeding and growth and various types of losses to biological populations These submodels may be used as modules in the construction of models of subsystems of ecosystems A preliminary model for the nitrogen cycle subsystem was developed using the modeling strategy and applicable submodels
GRA

N75-31711*# Joint Publications Research Service Arlington Va
ROLE OF THE HYPOTHALAMIC NEUROSECRETORY SYSTEM IN ADAPTIVE REACTIONS OF THE BODY CONTRIBUTION TO THE PROBLEM OF NEUROHORMONAL INTERACTIONS
N V Popovichenko Washington NASA Sep 1975 156 p refs Transl into ENGLISH of the book ' Rol gipotalamicheskoy Neyrosekretornoy Sistemy v Prisposobitel nykh Reaktsiyarh Organizma" Kiev Naukova Dumka Press 1973 p 1-125
(NASA Order W-13-183)
(NASA-TT-F-16329) Avail NTIS HC $6 25 CSCL 06P

A review is presented of current research by non-Soviet and Soviet scientists on the role of the hypothalamus in providing defensive and adaptational reactions of the body to stress Topics discussed include the elaboration and secretion of releasing factors, the neurosecretory system, adrenergic and cholinergic mechanisms and the interplay of the hypothalamus with extra-hypothalamic cerebral structures and endocrine glands
Author

N75-31712# Applied Physics Lab Johns Hopkins Univ Silver Spring Md
A LONG-LIVED, RELIABLE, RECHARGEABLE CARDIAC PACEMAKER
R E Fischell K B Lewis (Johns Hopkins Univ) and J W Love (Santa Barbara Medical Clinic) 31 Dec 1974 65 p refs Presented at Intern Symp on Advances in Pacemaker Technol Erlangen-Nuernberg West Germany, 26 Sep 1974 Revised
Avail NTIS HC $4 25

A rechargeable cell specifically adapted for use at body temperature was incorporated into a pacemaker system that has several advantages improved reliability, decreased thickness smaller volume, somewhat lower weight, insensitivity to electromagnetic interference, a long-life lead wire and essentially unlimited shelf life while awaiting implantation Low failure rate was achieved by applying space program reliability and quality control techniques to the design, fabrication and testing of the rechargeable pacemaker The design of the pacemaker is discussed in detail Author

N75-31713*# Stanford Univ Calif Dept of Psychiatry and Behavioral Sciences
INFLUENCE OF CHRONIC AND REPEATED STRESS ON THE PITUITARY-ADRENAL SYSTEM AND BEHAVIOR Final Technical Report
Seymour Levine Sep 1975 11 p refs
(Grant NGL-05-020-326)
(NASA-CR-143622) Avail NTIS HC $3 25 CSCL 06S

The role of adrenal glucocorticoids and ACTH in behavior and the influence of various behavioral situations on the neuroendocrine regulation of the pituitary-adrenal system were investigated Results are presented and discussed Author

N75-31714*# Colorado State Univ Fort Collins Dept of Mechanical Engineering and Physiology and Biophysics
DEVELOPMENT OF ULTRASONIC METHODS OF HEMODYNAMIC MEASUREMENTS
Michael B Histand, Francis D Mcleod and Charles W Miller 1 Aug 1975 37 p refs
(Grant NsG-2009)
(NASA-CR-143458) Avail NTIS HC $3 75 CSCL 06B

A pulsed ultrasonic Doppler velocity meter which can be used (by modifying transducers) as a flowmeter for blood circulation was experimentally studied Calculations and profiles of turbulent and laminar flow within blood vessels are shown Graphs and charts of transducers are included J R T

N75-31715*# Harvard Medical School Boston Mass
CONTROL MECHANISMS OF CIRCADIAN RHYTHMS IN BODY COMPOSITION IMPLICATIONS FOR MANNED SPACEFLIGHT Final Report
Martin C Moore Ede 30 Jun 1975 173 p ref
(Contract NAS9-14249)
(NASA-CR-144413) Avail NTIS HC $6 25 CSCL 06P

The mechanisms that underlie the circadian variations in electrolyte content in body fluid compartments were investigated, and the mechanisms that control the oscillations were studied in order to investigate what effects internal desynchronization in such a system would have during manned space flight The studies were performed using volunteer human subjects and squirrel monkeys The intercompartmental distribution of potassium was examined when dietary intake, activity and posture are held constant throughout each 24-hour day A net flux of potassium was observed out of the body cell mass during the day and a reverse flux from the extracellular fluid into the body cell mass during the night, counterbalanced by changes in urinary potassium excretion Experiments with monkeys provided evidence for the synchronization of renal potassium excretion by the rhythm of cortisol secretion with the light-dark cycle Three models of the circadian timing system were formalized Y J A

N75-31716# School of Aerospace Medicine, Brooks AFB Tex
EFFECTS OF THE ABNORMAL ACCELERATORY ENVIRONMENT OF FLIGHT Final Report, Jan - Jun 1974
Kent K Gillingham and Robert W Krutz Jr Dec 1974 94 p refs
(AD-A009593 SAM-Review-10-74 SAM-TR-74-57) Avail NTIS CSCL 06/19

A basic description of the physical nomenclature relating to the motional environment of flight is followed by discussions of the physiologic effects of that environment on the human cardiovascular and vestibular system The effects of -Gz stress and the various means of protecting aircrew against such stress are given special emphasis The mechanisms of spatial disorientation and motion sickness and the appropriate countermeasures are also presented GRA

N75-31717# Massachusetts General Hospital Boston
ELECTRONIC AUSCULTATION IN TELEMEDICINE Annual Report, 1 Jul 1974 - 30 Jun 1975
W Scott Andrus Arthur Miller and Kenneth T Bird May 1975 36 p refs
(Contracts EMI-72C-001-01, EMI-74C-011-03)
(PB-242009/9) Avail NTIS HC $3 75 CSCL 06L

The system used for remote auscultation in the Veterans Administration-Massachusetts General Hospital telemedicine link is described The results of a design study which produced a convenient and effective telestethoscope are summarized and a study of the accuracy of diagnosis based on transmitted auscultatory breath sounds is discussed Since visible display of auscultatory sounds may increase the objectivity of diagnosis a preliminary assessment of one technique was made Displays of several types of sound are presented GRA

N75-31718# School of Aerospace Medicine Brooks AFB Tex
RECENT ADVANCES IN AEROSPACE MEDICINE
Wayne F Kendall Jr Mar 1975 26 p refs
(AD-A009132, SAM-REVIEW-1-75) Avail NTIS CSCL 06/5

The review provides Air Force flight surgeons information regarding recent advances in operational aerospace medicine Material was selected for inclusion which deals with the more common problems confronting practicing flight surgeons The review discusses advances in the administrative, clinical research environmental health and education areas of aerospace medicine It represents one aspect of continuing education in aerospace medicine for the flight surgeon GRA

N75-31719# Michigan Univ Ann Arbor School of Public Health
OCULAR ABSORPTION OF LASER RADIATION FOR CALCULATING PERSONNEL HAZARDS Final Report, 1 Nov 1973 - 31 Oct 1974
Edward A Boettner and David Dankovic 30 Nov 1974 164 p refs
(Contract F41609-74-C-0008 AF Proj 62202F)
(AD-A009176) Avail NTIS CSCL 06/18

The transmissions of ultraviolet visible, and infrared radiation by the cornea lens and aqueous humor of rhesus monkeys were measured with spectrophotometers and from this the absorption coefficients were calculated over the spectral range from 200 nanometers in the ultraviolet through 15 micrometers in the infrared Similar transmission data from previous studies on both human and rhesus monkey eyes were also converted to absorption coefficients GRA

N75-31720# Army Materiel Command Texarkana, Tex Intern Training Center
EFFECTS OF HIGH TEMPERATURE ON MAINTENANCE PERFORMANCE Final Report
Denis M Balint Mar 1975 45 p refs
(AD-A009295 USAMC-ITC-02-08-75-108) Avail NTIS CSCL 06/19

The objective of the research was to determine whether or not there is a decrease in the efficiency of maintenance performance when conducted under heat stress conditions which

is detectable prior to the occurrence of visible physical deterioration Two groups of 10 male subjects were exposed to either a comfortable (72F dry-bulb) or a high temperature (110F dry-bulb) environment The time to complete a basic electronic maintenance task by each subject was measured and the mean task completion time of each experimental group was calculated for use in the statistical comparison Experimental results indicate a statistically significant decrease in maintenance performance efficiency because of the increase in temperature GRA

N75-31721# Air Force Weapons Lab Kirtland AFB N Mex Technology and Analysis Branch
LEAD BELT RADIATION SHIELD Final Report, Sep - Dec 1974
John J Burgio Mar 1975 20 p refs
(AF Proj 8809)
(AD-A009181 SAT-TN-75-1) Avail NTIS CSCL 18/6

Results are given of the effectiveness of a lead shielding belt in reducing the gamma dose to the center of a cylindrical tissue-equivalent phantom exposed to isotropic gamma radiation Three different shield designs were used The first was a lead belt 20-cm high (wide) of a thickness varying from 0 0 cm (no belt) to 5 08 cm The second design belt was 30-cm high (wide) of thickness varying from 0 0 cm (no belt) to 5 08 cm For the third case, the 20-cm high (wide) lead belt of a thickness varying from 0 0 cm (no belt) to 5 08 cm was used but with a lead seat and back The results demonstrate the feasibility of using a lead belt to reduce the gamma tissue dose to a tissue-equivalent phantom from an isotropic gamma source GRA

N75-31722# Armed Forces Inst of Pathology, Washington, D C
PROGRESS IN MEDICAL RESEARCH, INCLUDING COMMUNICABLE DISEASES, MILITARY DOG IMPROVEMENT, RADIATION INJURY, AND TROPICAL AND INTERNAL MEDICINE Annual Research Progress Report, 1 Jul 1973 - 30 Jun 1974
1 Jul 1974 87 p
(AD-A008984) Avail NTIS CSCL 06/5

A summary of research projects is presented Topics discussed include ethiology of viral hepatitis experimental filariasis ultrastructural studies of viral hepatitis dynamics of aircraft accident victims--computer simulation lesions in animals fed enzyme inactivated frozen and irradiated beef and effects of prolonged exposure of the retina to low intensity of continuous wave laser Author

N75-31723# Armed Forces Radiobiology Research Inst Bethesda, Md
RESEARCH PROGRESS IN RADIOBIOLOGY Annual Research Report, 1 Jul 1973 - 30 Jun 1974
30 Jun 1974 151 p refs
(AD-A009327, AFFRRI-ARR-8) Avail NTIS CSCL 06/18

Contributions in the area of biomedical research and radiobiology are summarized Biological data relevant to nuclear combat operations is provided with emphasis on use of nuclear weapons in tactical or theater nuclear warfare GRA

N75-31724# Oceanautics Inc Landover Md
EXPLORATORY ANALYSIS OF PREDICTORS OF DIVER PERFORMANCE DECREMENT DURING 3 HOUR COLD WATER EXPOSURES
W S Vaughan Jr and Michael B Strauss Mar 1975 50 p refs
(Contract N00014-72-C-0309, NR Proj 197-019)
(AD-A009359) Avail NTIS CSCL 06/19

Tasks involving perceptual/cognitive processes were performed by eight Navy divers either during or following 3-hour exposures to both 4 5C and 15 5C water Analysis of performance means had shown significant decrements in task performance as a function of exposure time but not as a function of water temperature differences The current analysis was designed to further explore potential relationships between task performance decrement and body cooling and between body cooling and physical characteristics of the test divers GRA

N75-31725# Aerospace Medical Research Labs, Wright-Patterson AFB Ohio
INVESTIGATION OF INERTIAL PROPERTIES OF THE HUMAN BODY Final Report, Apr 1972 - Dec 1974
R F Chandler, C E Clauser J T McConville H M Reynolds and J W Young Mar 1975 168 p refs Prepared in cooperation with Civil Aeromedical Inst Oklahoma City Okla and Webb Associates Inc Yellow Springs Ohio
(Contract DOT-HS-017-2-315-1A)
(PB-241566/9 AMRL-TR-74-137, DOT-HS-801-430) Avail NTIS HC $6 25 CSCL 05E

Knowledge of the anthropometric parameters of the human body is essential for understanding of human kinetics and particularly for the design and testing of impact protective systems Considerable information is available on the size weight and center of mass of the body and its segments The report supplements existing information with data regarding mass distribution characteristics of the human body as described by the principal moments of inertia and their orientation to body and segment anthropometry The weight center of mass location and principal moments of inertia of six cadavers were measured, the cadavers were then segmented and the mass, center of mass moments of inertia and volume were measured on the fourteen segment from each cadaver GRA

N75-31726# Office of Naval Research, Arlington Va
A USER ORIENTED REVIEW OF THE LITERATURE ON THE EFFECTS OF SLEEP LOSS, WORK-REST SCHEDULES, AND RECOVERY ON PERFORMANCE
Donald P Woodward and Paul D Nelson Dec 1974 41 p refs
(RR0410102)
(AD-A009778 ONR-ACR-206) Avail NTIS CSCL 06/19

The review provides a brief systematically organized account of the information from the scientific literature on the effects of sleep loss and work-rest schedules on performance The orientation is practical but consistent with the available data A brief narrative description and a series of summary statements about the effects of sleep loss and work-rest schedules on human performance as they apply to operational settings is presented Recovery from sleep loss effects as well as costs related to sleep loss effects are discussed briefly Suggestions for future research are presented GRA

N75-31727# Naval Aerospace Medical Research Lab Pensacola, Fla
HUMAN BIOASSAY OF ANTIMOTION SICKNESS DRUGS
Ashton Graybiel, Charles D Wood James Knepton, John P Hoche and Gene F Perkins 2 Apr 1975 28 p refs
(MF51524005)
(AD-A009799 NAMRL-1215) Avail NTIS CSCL 06/15

Great individual differences in response to antimotion sickness drugs administered in usual doses were revealed In one experiment (involving 11 subjects and 7 drugs) the single best therapeutic response implicated all seven drugs tested (three single drugs and four fixed-dose combinations) In terms of percentage of subjects demonstrating a substantial beneficial antimotion sickness drug effect, administration of a fixed-dose combination of promethazine hydrochloride and ephedrine sulfate (25 mg each) proved to be outstanding this combination of homergic drugs clearly exhibited a suprasummation effect A few tests were conducted using larger than usual doses and the results support previous findings that for a maximal beneficial effect in response to a single dose individuals may vary both with regard to the choice of drug and the amount administered GRA

N75-31728# Naval Aerospace Medical Research Lab Pensacola Fla
FREQUENCY RESPONSE OF THE OCULOVESTIBULAR SYSTEM DURING YAW OSCILLATION
W Carroll Hixson 8 Dec 1974 32 p refs
(MF51524005)
(AD-A009769 NAMRL-1212) Avail NTIS CSCL 06/19

The report describes the results of a system transfer function

type study of the oculovestibular response to sinusoidal yaw angular oscillations of the head Ten naval aviator candidates were exposed to earth-vertical rotation about the z head axis at nine different octave-separated stimulus frequencies covering the 0 005 to 1 28 Hz spectrum with peak velocity of the stimulus held constant at 50 deg/sec The frequency dependence of the oculovestibular system was interpreted in terms of phase and amplitude measures of the slow component eye velocity element of the resulting horizontal nystagmus Though the phase data collected at the lower stimulus frequencies deviated somewhat from those predicted by the conventional second-order model of cupula-endolymph response a theoretical account for the deviation was postulated by introducing an adaptation transfer function as developed by other investigators GRA

N75-31729# Air Force Inst of Tech Wright-Patterson AFB Ohio School of Engineering
DESIGN AND CONSTRUCTION OF A COMPUTER CONTROLLABLE MULTI-CHROMATIC STIMULUS FOR HUMAN VISUAL SYSTEM TESTING AND MODELING M S Thesis
Harold L Hannickel Dec 1974 97 p refs
(AD-A008678, GE/EE/74-46) Avail NTIS CSCL 05/10

The report describes the construction and operation of a computer controllable, sine wave grating stimulus for use in the investigation of human visual system modulation transfer functions The stimulus can be controlled in spatial frequency orientation and contrast by a digital computer through digital-to-analog converters The apparatus uses a commercial color television receiver to produce a 10 inch diameter stimulus capable of 50 foot-lamberts 30 cycles per degree of field when viewed at 25 feet and the color spectrum of P22A (tri-color blue green, red) phosphors The equipment described has been built tested and successfully demonstrated under computer control GRA

N75-31730# Joint Publications Research Service Arlington Va
ASSESSMENT OF THE EFFICIENCY OF HUMAN PERFORMANCE IN SPACE FLIGHT
G T Beregovoy N V Krylova I B Solovyeva and G P Shibanov 18 Aug 1975 9 p refs Transl into ENGLISH from Vop Psikhologii (Moscow), no 4 Jul - Aug 1974 p 3-9
(JPRS-65477) Avail NTIS HC $3 25

An assessment of the efficiency and the dynamics of human performance in space flight is given Author

N75-31731*# National Aeronautics and Space Administration Langley Research Center Langley Station, Va
NOISE AND SPEECH INTERFERENCE PROCEEDINGS OF MINISYMPOSIUM
William T Shepherd, ed Sep 1975 230 p refs
(NASA-TM-X-72696) Avail NTIS HC $7 50 CSCL 05E

Several papers are presented which deal with the psychophysical effects of interference with speech and listening activities by different forms of noise masking and filtering Special attention was given to the annoyance such interruptions cause particularly that due to aircraft flyover noises Activities such as telephone listening and television watching were studied A number of experimental investigations are described and the results are analyzed D M L

N75-31732*# National Aeronautics and Space Administration Ames Research Center Moffett Field, Calif
CONSPICUITY OF TARGET LIGHTS THE INFLUENCE OF FLASH RATE AND BRIGHTNESS
Mary M Connors Washington Sep 1975 17 p refs
(NASA-TN-D-7961 A-5792) Avail NTIS HC $3 25 CSCL 05E

The stimulus characteristics of lights that might aid a pilot to see and avoid by alerting him to a potential threat were studied The relative conspicuity of foveally equated, point-source, steady and flashing lights of several brightnesses, seen against a star background was examined From the subject's viewpoint, these target lights could appear anywhere within a large (40 deg horizontal by 35 deg vertical) field of view The lights appeared at random time intervals while the subject was periodically distracted by a simulated cockpit task The results indicate that correct target detection increases and reaction time decreases with increased target intensity Steady lights are missed more frequently and acquired more slowly than flashing lights, but no significant differences are found among the wide range of flash rates employed The intensity of the light has a greater effect on both detection and reaction time to steady lights than to flashing lights These results are compared with results of other researchers who used targets which appeared at fixed locations The longest reaction times were recorded to lights which appeared either at the extremes or at the very center of the visual field Author

N75-31733# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt Bad Godesberg (West Germany) Abteilung Luftfahrtpsychologie
THE VISUAL-MOTOR-ORIENTATION OF THE DIVER IN THE WORKING SPACE DEPENDING ON EXPERIENCE AND WATER TURBIDITY
Klaus-Martin Goeters 14 Apr 1975 22 p refs In GERMAN, ENGLISH summary
(DLR-FB-75-35) Avail NTIS HC $3 25, DFVLR Cologne DM 7 70

Whether the visual-motor-coordination of the professional diver is influenced by the well known visual distortions under water was tested It was found that the visual-motor-coordination of experienced divers (3,000-10 000 hours of diving) is well adapted to the under water conditions Less experienced divers (100-300 hours) showed clear distortions in their size and depth estimations Size estimations did not depend on water turbidity (1 m vs 10 m of visibility) but depth estimations did Author (ESRO)

N75-31734# Haskins Labs New Haven Conn
EXPLOITATION OF CENTRAL MECHANISMS IN LISTENING TO NOISY SPEECH Final Report
28 Feb 1975 21 p refs
(Contract N00014-67-A-0129-0001)
(AD-A009886) Avail NTIS CSCL 17/2

This report describes the results obtained from an experimental study of a form of dichotic listening applied to speech with the objective of avoiding the phenomenon known as upward spread of masking The study goes further to explore the effects of adjusting the relative time of arrival of the speech formant components at the two ears and the consequences of dichotic listening on the perception of speech in noise GRA

N75-31735# Rockwell International Corp , Anaheim Calif Autonetics Div
ALTERNATIVE APPROACHES TO MODELING VISUAL TARGET ACQUISITION Technical Publication, Jun - Aug 1974
Charles P Greening Sep 1974 32 p refs
(Contract N00123-74-C-0236)
(AD-B000465 NWC-TP-5698) Avail NTIS CSCL 17/8

A framework is developed which structures the variety of modeling approaches that might be taken in quantifying visual target acquisition Significant omissions in current modeling efforts are identified Past modeling approaches are described, including those emphasizing cognitive and subjective approaches It is concluded that mathematical modeling is so dependent upon (1) the objectives of the user, (2) the class of situation being modeled and (3) the methodological orientation of the modeler, that a single model cannot meet all requirements Author (GRA)

N75-31736# Air Force Inst of Tech , Wright-Patterson AFB Ohio School of Engineering
MODELING THE SATURATION LEVEL OF A HUMAN RADAR OPERATOR M S Thesis
Dahl B Metters Dec 1974 101 p refs
(AD-A009203 GE/EE/74-73) Avail NTIS CSCL 05/9

The United States Air Force is building a mathematical model of the air battle and needs, as an input, a model of the saturation level of the groundbased enemy radar operator Saturation level can be loosely defined as the number of targets that the human operator can effectively manage The concept of an ideal operator is introduced to allow the precise definition of saturation level An ideal operator is defined as an operator who can perform a certain amount of work per unit time perfectly The amount of work that the ideal operator can perform is termed the operator's saturation level The human operator is then modeled as an ideal operator who makes random errors The human operator s saturation level is then estimated from a series of measurements as a function of the human s maximum time-between-errors An experiment which was conducted to measure saturation level is described in detail and the results are presented The resulting data are then analyzed using the Kolmogorov-Smirnov and Likelihood Ratio tests GRA

N75-31737# Design Plus, St Louis Mo
BEHAVIORAL TAXONOMY OF UNDERGRADUATE PILOT TRAINING TASKS AND SKILLS EXECUTIVE SUMMARY ***Final Report, Jul 1973 - Sep 1974***
Robert P Meyer Jack I Laveson Neal S Weissman and Edward F Eddowes Dec 1974 26 p refs
(Contract F41609-73-C-0040 AF Proj 1123)
(AD-A008771 AFHRL-TR-74-33-1) Avail NTIS CSCL 05/9

The report summarizes the development and application of a behavioral taxonomy of undergraduate pilot training (UPT) tasks and skills The taxonomy specifies the fundamental flying abilities which comprise the training objectives of UPT Its purpose is to provide a broadly applicable conception of UPT that obviates the need to continually study each specific training task or aircraft to determine the requirements for training hardware and software in research on and the development of optimized flying training programs GRA

N75-31738# Design Plus St Louis Mo
BEHAVIORAL TAXONOMY OF UNDERGRADUATE PILOT TRAINING TASKS AND SKILLS GUIDELINES AND EXAMPLES FOR TAXONOMY APPLICATION IN FLYING TRAINING RESEARCH Final Report, Jul 1973 - Sep 1974
Robert P Meyer Jack I Laveson and Neal S Weissman Dec 1974 191 p refs
(Contract F41609-73-C-0040 AF Proj 1123)
(AD-A008897, AFHRL-TR-33-4) Avail NTIS CSCL 05/9

The report presents the results of the third phase of a research program to develop a behavioral taxonomy of undergraduate pilot training (UPT) tasks and skills The Phase III effort consisted of the continued development of surface analyses to include instrument flight maneuvers the classification of the resulting surface analysis information and its integration within the taxonomic data system, an analysis of future UPT objectives in terms of present and future flying training requirements and the development of four applications of the taxonomic data system to flying training research problems The illustrative examples dealt with skill comparisons among different tasks the determination of skill difficulty within and between tasks developing standard training tasks and generating new training tasks to teach specific flying skills GRA

N75-31739# Air Force Human Resources Lab Brooks AFB Tex
TRANSFER OF TRAINING WITH FORMATION FLIGHT TRAINER Interim Report
Gary B Reid and Michael L Cyrus Dec 1974 14 p refs
(AF Proj 1123)
(AD-A009638, AFHRL-TR-74-102) Avail NTIS CSCL 05/9

The present research was conducted to determine transfer of practice 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 with five simulator sorties with two aircraft sorties in an effort to quickly establish a training cost/transfer comparison GRA

N75-31740# Cornell Univ , Ithaca N Y
THE IMPLICATIONS OF EXPERIMENTS ON THE PERCEPTION OF SPACE AND MOTION Final Report
James J Gibson 1975 63 p refs
(Contract N00014-67-A-0077-0005)
(AD-A009399) Avail NTIS CSCL 05/10

Research on space perception and the perception of motion in space is discussed Topics discussed include evidence for the direct perception of surface layout the discovery of visual kinesthesis experiments on the perception of changing surface layout and the apprehension of hidden surfaces Author

N75-31741# Naval Postgraduate School Monterey Calif
EVALUATION OF SLIDE-TAPE LECTURE PROGRAMS USED IN AERO LABORATORIES M S Thesis
Frank Donald Schwikert Mar 1975 50 p refs
(AD-A009571) Avail NTIS CSCL 05/9

Overcrowded conditions unavoidable absence and the lack of standardization in a course can detract from the learning experience In an attempt to solve these problems fully automatic slide-tape programs have been developed for use in the *gasdynamics laboratory course In order to improve these* lecture packages, the students have been asked to evaluate them A significant portion of this research is devoted to the development of a detailed questionnaire to sample student reaction to the slide-tape lecture format GRA

N75-31742# Applied Psychological Services, Wayne Pa Science Center
IDENTIFICATION AND MEASUREMENT OF INTELLECTIVE LOAD CARRYING THRESHOLDS Final Report
Arthur I Siegel and Allan R Williams Jr Dec 1974 113 p refs
(Contract F44620-73-C-0040 ARPA Order 2374)
(AD-A009159, AFOSR-75-0593TR) Avail NTIS

The conjecture was investigated that the intellective load carrying capability for selected intellective functions is identifiable and measurable Intellective load carrying failure was defined as the point at which a change in transfer function components occurs as a tracking and a scaled intellective function were concomitantly performed The scaled intellective functions were *drawn from the Guilford Structure-of-Intellect model The transfer* function components included amplitude ratio and phase lag as defined by the frequency-response analytic method GRA

N75-31743*# ILC Industries Inc Dover Del
ON DEVELOPMENT OF A SEALED BEARING FOR SPACE SUITS Final Report
J Rayfield [1975] 15 p
(Contract NAS9-14399)
(NASA-CR-144435) Avail NTIS HC $3 25 CSCL 06K

The work to correct several design deficiencies present in the bearings used in the orbital extravehicular spacesuit is reported These deficiencies included difficult stitch-on interface between fabric and outer race a tendency for the clamping threads to seize and most importantly the failure of the sealing surfaces (Teflon seat Delrin seal) to maintain integrity with cycling The first problem was corrected by raising the stitch-on holes so as to be more accessible The seizing was eliminated by changing to a coarser thread from 32/inch to 24/inch The solution to the sealing problem required a materials evaluation candidate material selection and adhesive evaluation (for bonding the seat material to the outer race) and bench-cycling of candidate seal/seat combinations The final configuration successfully bench-cycled and delivered to NASA is shown Author

N75-31744*# Technology Inc Houston Tex Life Sciences Div
SPECIAL REPORT OCCLUSIVE CUFF CONTROLLER
Joseph T Baker 1 Oct 1975 36 p refs
(Contract NAS9-13291)
(NASA-CR-144430) Avail NTIS HC $3 75 CSCL 06B

A mechanical occlusive cuff controller suitable for blood flow experiments in space shuttle flights is described The device requires 115 volt ac power and a pressurized gas source Two occluding cuff pressures (30 and 50 mmHg) are selectable by a

switch on the front panel A screw driver adjustment allows accurate cuff pressurization levels for under or oversized limbs Two pressurization cycles (20 second and 2 minutes) can be selected by a front panel switch Adjustment of the timing cycles is also available through the front panel A pushbutton hand switch allows remote start of the cuff inflation cycle A stop/reset switch permits early termination of the cycle and disabling of the controller to prevent inadvertent reactivation Pressure in the cuff is monitored by a differential aneroid barometer In addition, an electrocardiogram trigger circuit permits the initiation of the pressurization cycle by an externally supplied ECG cycle
Author

N75-31745*# ILC Industries Inc Dover Del
ON DEVELOPMENT OF AN INEXPENSIVE, LIGHTWEIGHT THERMAL MICROMETEROID GARMENT FOR SPACE SUITS Final Report
16 Jul 1975 156 p
(Contract NAS9-14199)
(NASA-CR-144428) Avail NTIS HC $6 25 CSCL 06K

A lightweight and inexpensive coverlayer developed for space suits is described Material selection procurement and testing pattern design and prototype fabrication are discussed By using the minimum required cross section necessary for earth orbital mission by utilizing the lightest weight materials possible, and by decreasing the use of weight costly taping a lightweight and economical thermal micrometeroid garment was developed Simplification of manufacturing techniques and use of off-the-shelf materials helped to reduce costs
J M S

N75-31746*# Hamilton Standard Windsor Locks Conn
THERMAL CONTROL EXTRAVEHICULAR LIFE SUPPORT SYSTEM Final Report, Jun 1973 - Aug 1975
Aug 1975 371 p refs
(Contract NAS9-13574)
(NASA-CR-144425 SPO-3T75) Avail NTIS HC $10 00 CSCL 06K

The results of a comprehensive study which defined an Extravehicular Life Support System Thermal Control System (TCS) are presented The design of the prototype hardware and a detail summary of the prototype TCS fabrication and test effort are given Several heat rejection subsystems, water management subsystems humidity control subsystems pressure control schemes and temperature control schemes were evaluated Alternative integrated TCS systems were studied and an optimum system was selected based on quantitative weighing of weight volume cost complexity and other factors The selected subsystem contains a sublimator for heat rejection bubble expansion tank for water management a slurper and rotary separator for humidity control and a pump a temperature control valve a gas separator and a vehicle umbilical connector for water transport The prototype hardware complied with program objectives
Author

N75-31747*# Chemtric Inc Rosemont Ill
VAPOR COMPRESSION DISTILLATION MODULE
P P Nuccio Jun 1975 197 p refs
(Contracts NAS9-13714 NAS9-14234 NAS9-10273)
(NASA-CR-144424 Rept-3110) Avail NTIS HC $7 00 CSCL 06K

A Vapor Compression Distillation (VCD) module was developed and evaluated as part of a Space Station Prototype (SSP) environmental control and life support system The VCD module includes the waste tankage pumps post-treatment cells automatic controls and fault detection instrumentation Development problems were encountered with two components the liquid pumps, and the waste tank and quantity gauge Peristaltic pumps were selected instead of gear pumps, and a sub-program of materials and design optimization was undertaken leading to a projected life greater than 10,000 hours of continuous operation A bladder tank was designed and built to contain the waste liquids and deliver it to the processor A detrimental pressure pattern imposed upon the bladder by a force-operated quantity gauge was corrected by rearranging the force application and design goals were achieved System testing has demonstrated that all performance goals have been fulfilled
Author

N75-31748# Human Engineering Labs Aberdeen Proving Ground, Md
HELMET-MOUNTED DISPLAY IMPLICATIONS FOR ARMY AVIATION Final Report
Alan M Poston and William B DeBellis Mar 1975 28 p refs
(AD-A009507, HEL-TN-7-75) Avail NTIS CSCL 05/8

This report contains a compilation of information pertaining to helmet-mounted displays (HMDs) The topics discussed include methods of mounting the HMD methods of resolving the line of sight, methods of presenting information, fields of view and weight considerations Comparisons are made between HMD display techniques and other display methods Various ramifications of implementing an HMD into U S Army helicopters are considered
GRA

N75-31749# School of Aerospace Medicine Brooks AFB Tex
A GRAPHICAL SUMMARY OF OXYGEN REGULATOR PERFORMANCE Interim Report, Apr - Sep 1974
Paul J Zalesky and Ronald D Holden Apr 1975 30 p refs (AF Proj 7164)
(AD-A009134 SAM-TR-75-12) Avail NTIS CSCL 14/2

The static performance characteristics of USAF oxygen regulators were evaluated utilizing the regulator test stand at USAFSAM Outlet suction pressures flows positive pressures and delivered oxygen dilutions were observed and plotted as functions of operational altitudes General findings indicated that (1) excessive oxygen addition occurs in all models especially at low cabin altitudes (2) positive pressure schedules generally conform to specifications (3) negative suction pressures for most regulators are less than -1 0 in H2O The validity of static evaluation is discussed and data interpretation is considered with respect to biomedical compatibility that emphasizes maintenance of crewmember physiological sufficiency
GRA

N75-31750# Army Materiel Command Texarkana Tex Intern Training Center
A STUDY OF PROPOSED EAR PROTECTION DEVICES FOR LOW FREQUENCY NOISE ATTENUATION Final Report
Patrick Michael Dallosta Apr 1975 143 p refs
(AD-A009274 USAMC-ITC-02-08-75-004) Avail NTIS CSCL 06/17

The investigation was undertaken to evaluate several methods of ambient noise attenuation proposed by Columbia Broadcasting Systems and Bolt Beranek and Newman It also explores the new developments in the area of active noise supression The end result of the attenuation method was the employment of the selected device in the SPH-4 helmet Both companies proposed new models and suggestions for not only active, but also passive systems The results of the study indicate that the best form of attenuation lies with the passive methods
GRA

N75-31751# Army Materiel Command, Texarkana Tex Intern Training Center
COMPUTER MODEL TO DETERMINE CENTER OF GRAVITY AND MOMENTS OF INERTIA FOR PROTECTIVE HELMETS Final Report
Don Allan Slaymaker Apr 1975 55 p refs
(AD-A009285 USAMC-ITC-02-08-75-001) Avail NTIS CSCL 06/17

The purpose of the study is to describe a computer model that will provide the parameters center of gravity moments of inertia and perceived protective area for combat helmets The model is intended to be a design tool for use in the development of new helmets it will also provide data on helmets already in use The helmet is approximated by a series of flat triangular plates The above parameters for each triangular increment are available in geometry text books The perceived area is the actual area of the triangle times the dot product of a unit vector normal to the flat plate A hollow hemisphere is used to test the accuracy of the model Model accuracy is proved to be quite good
GRA

N75-31752# Army Materiel Command Texarkana, Tex Intern Training Center
SYSTEM SAFETY EVALUATION OF LIFE SUPPORT SYSTEMS FOR CHEMICAL AND BIOLOGICAL PROTECTIVE SUITS Final Report
Richard B Belmonte Apr 1975 84 p refs
(AD-A009312, USAMC-ITC-02-08-75-401) Avail NTIS CSCL 06/17

The paper presents a system safety analysis of two air supply sub-systems which are to be used with a chemical and biological protective suit system The backpack assembly sub-system has been developed and tested already, whereas the remote air supply apparatus has not yet been developed The system safety analysis of each air supply sub-system includes mission analysis, preliminary hazard analysis, failure mode and effect analysis, flow analysis and fault tree analysis A reliability model and block diagram of each sub-system is also included The results of these analyses indicate that with proper maintenance and trained personnel the safety provided by these sub-systems should be acceptable GRA

N75-31753# Bureau of Radiological Health, Rockville, Md
PRELIMINARY EVALUATION OF COMMERCIALLY AVAILABLE LASER PROTECTIVE EYEWEAR Technical Report, 1971-1975
Kenneth R Envall Marshall Coakley Richard W Peterson and Robert J Landry Mar 1975 42 p refs
(PB-241903/4 DHEW/FDA-75-8026) Avail NTIS HC $3 75 CSCL 06Q

Preliminary data are presented for 17 laser protective eyewear types eight were intended to provide protection against argon-ion laser radiation, and nine were intended to provide protection against neodymium-yttrium-aluminum garnet laser radiation Both lens and frame materials were exposed to the direct laser beam at increasing power density values up to 12 W/sq cm The eyewear test systems, structural changes in the materials and observations on eyewear labeling are described GRA

N75-31754*# Transemantics Inc Washington, D C
LIFE IN THE UNIVERSE AND MAN IN SPACE
N Dubinin and O Gazenko Washington Sep 1975 13 p Transl into ENGLISH from Izv (USSR) 6 Jul 1975 and Knizhoye Obozreniye (USSR), no 1, Jan 1975
(Contract NASw-2792)
(NASA-TT-F-16563) Avail NTIS HC $3 25 CSCL 06F

The book Foundations of Space Biology and Medicine, coauthored by Soviet and American scientists is reviewed D M L

N75-31755*# Joint Publications Research Service, Arlington Va
EXOBIOLOGY OF THE MOON
G P Vdovykin Washington NASA Aug 1975 104 p refs Transl into ENGLISH from Izd-vo Nauka (Moscow) 1975 119 p
(NASA Order W-13183)
(NASA-TT-F-16378) Avail NTIS HC $5 25 CSCL 03B

Some fundamental problems involved in the exobiology (space biology) of the moon have been clarified through investigations of the moon and the materials of which it consists samples of which have been brought to the earth by automatic and manned space stations These problems include the possible presence of lunar forms of life, the conditions for man s presence on the moon, the presence of organogenic (entering into the composition of living matter) chemical elements and their compounds and the search for some idea concerning the sources of carbon in lunar surface material Numerous results obtained recently are generalized Author

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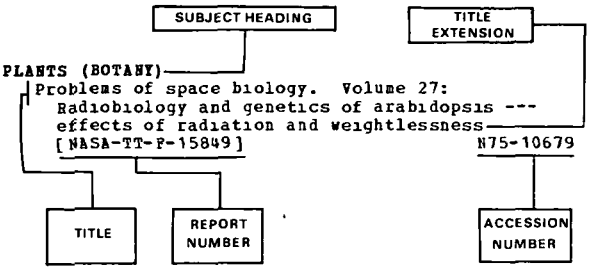

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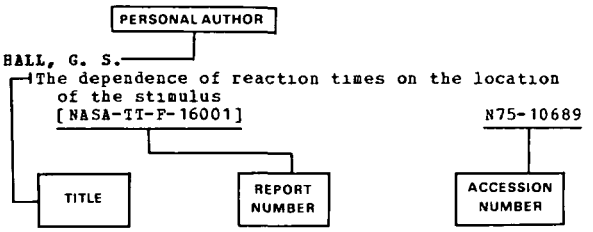

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15 Supplementary Notes

16 * Abstract

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