NASA SP-7011 (141)

AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY

WITH INDEXES

(Supplement 141)

MAY 1975

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

ACCESSION NUMBER RANGES

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

STAR (N-10000 Series)	N75-15601—N75-17292
IAA (A-10000 Series)	A75-19577—A75-22789

This bibliography was prepared by the NASA Scientific and Technical Information Facility operated for the National Aeronautics and Space Administration by Informatics Information Systems Company

The Administrator of the National Aeronautics and Space Administration has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this Agency. Use of funds for printing this periodical has been approved by the Director of the Office of Management and Budget through July 1, 1974

NASA SP-7011 (141)

AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES

(Supplement 141)

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 April 1975 in

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

Scientific and Technical Information Office MAY 1975
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INTRODUCTION

This Supplement to *Aerospace Medicine and Biology* (NASA SP-7011) lists 267 reports, articles and other documents announced during April 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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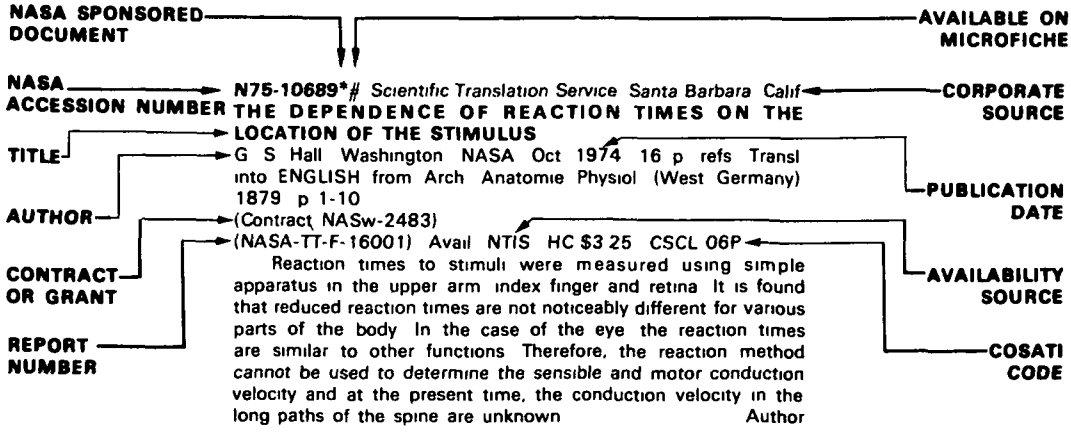

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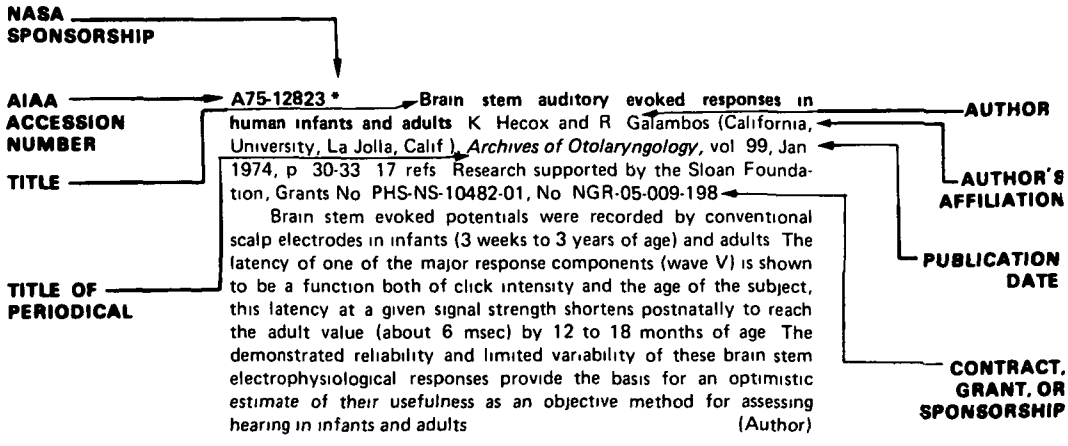

AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 141) MAY 1975

IAA ENTRIES

A75-19676 **Human Factors Society, Annual Meeting, 18th, Huntsville, Ala., October 15-17, 1974, Proceedings** Edited by E. L. Saenger and M. Kirkpatrick, III (Essex Corp., Huntsville, Ala.) Santa Monica, Calif., Human Factors Society, 1974. 657 p. Members, $10.00, nonmembers, $15.

Topics discussed include the use of aircraft simulators in man-machine interface research and crew training, a new methodological technique for measuring individual differences in basic attention capabilities, the disturbed-attitude tracking performance of experienced pilots using a frequency-separated display, the use of pattern and motion cues for the enhancement of detection rates in a visual search for linear target patterns embedded in static noise, the effect of scene rotation on the target acquisition performance of an airborne observer, the development of boarding-gate and in-flight defenses against aircraft hijacking, a model for predicting an individual's cardiac response to a series of fixed-intensity tasks, an evaluation of the efficiency of manually controlled helicopter control-display systems, an integrated control and display station configuration concept for operating a remote teleoperator spacecraft, the use of spectral power density shifts on electromyograms to measure muscle fatigue, and a description of the simultaneous paths of movement of a large number of body landmarks of a pilot performing upper-limb motions.

A.B.K.

A75-19677 **How much should you pay for that box.** C. O. Hopkins. In: Human Factors Society, Annual Meeting, 18th, Huntsville, Ala., October 15-17, 1974. Santa Monica, Calif., Human Factors Society, 1974, p. I-VI. 33 refs.

The issue of prices for simulators is reported. How much should be paid depends on the purpose in and method of using the simulator, these factors establish the necessary features which in turn determine cost and training effectiveness. Cost effectiveness has not been demonstrated for all the standard trimmings on current simulators, and a simulator should not cost several times as much as its counterpart airplane. The uses of simulators most directly related to human factors are man-machine interface research and crew training. The cost, safety, efficiency and effectiveness advantages of simulators are briefly presented. Two other important applications of simulators are predicting future success in training (selection) and evaluating current effects of past training (proficiency assessment). Topics treated under cost effectiveness of simulators are effectiveness as a function of training procedures, physical stimulation vs. psychological stimulation, simulator fidelity and motivation, and simulator fidelity and pilot acceptance. The incremental transfer effectiveness ratio is employed as a measure of cost effectiveness. Motion and visual systems are the areas in which the most extensive engineering development is being done to increase the fidelity of physical stimulation.

S.J.M.

A75-19678 **Basic attention measures as predictors of success in flight training.** R. A. North and D. Gopher (Illinois, University, Urbana, Ill.) In: Human Factors Society, Annual Meeting, 18th, Huntsville, Ala., October 15-17, 1974. Santa Monica, Calif., Human Factors Society, 1974, p. 50-56. 9 refs. Contract No. F44620-70-C-0105.

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 seaprate 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. A preliminary validation study compared scores for a group of 11 flight instructors and with a group of 32 student pilots. In addition, the student sample was dichotomized based on performance in training. There were reliable differences for both groups on combined task performance efficiency. (Author)

A75-19679 **Development of a training model for naval flight students.** R. H. Shannon (U.S. Navy, Naval Aerospace Medical Research Laboratory, Pensacola, Fla.) In: Human Factors Society, Annual Meeting, 18th, Huntsville, Ala., October 15-17, 1974. Santa Monica, Calif., Human Factors Society, 1974, p. 57-60. 9 refs.

A model is outlined that separates complex or total task maneuvers into simple or component parts. The method consists of maneuver descriptions, critical error isolation, commonality analyses, and inflight/simulator scenarios. Results indicate that the scenarios involving continuous aircraft control during climbs, descents, turns, and straight and level flight and the two discrete task sequences during dirty configuration entry and preparation for break/break turn are highly effective training techniques.

S.J.M.

A75-19680 **The transition of experienced pilots to a frequency-separated aircraft attitude display - A flight experiment.** D. B. Beringer, C. Williges, and S. N. Roscoe (Illinois, University, Urbana, Ill.) In: Human Factors Society, Annual Meeting, 18th, Huntsville, Ala., October 15-17, 1974. Santa Monica, Calif., Human Factors Society, 1974, p. 62-70. 14 refs. Navy-sponsored research.

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

A75-19681 **Pattern and motion characteristics of visually time-compressed target detection in static noise.** J. D. Moll and R. C. Williges (Illinois, University, Urbana, Ill.) In: Human Factors

Society, Annual Meeting, 18th, Huntsville, Ala , October 15-17, 1974 Santa Monica, Calif , Human Factors Society, 1974, p 139-145 12 refs Contract No F44620-70-C-0105

An experiment was performed testing different pattern and motion cues for enhancement of detection rates in visual search for linear target patterns imbedded in heavy static noise Eight subjects participated in a factorial, within-subject design which included the number of spots in the target pattern, the rate of advancement of the target pattern on the display, the successive spot duration in the target patterns, and the interspot distance for successive spots in the target pattern Time required to detect and designate targets was used as the dependent variable Displays were presented via a computer-controlled plasma panel equipped with a touch-sensing device for target pattern designation Analyses of the data revealed that both the rate of advancement of the target pattern and the spot duration were important factors for facilitating rapid detection of targets when spatial definition was poor, but such cues were less critical when spatial definition of the targets was enhanced Results were discussed in terms of the relationship among pattern and motion cues in the target detection task (Author)

A75-19682 The effect of scene rotation on target acquisition M Freitag (Martin Marietta Aerospace, Orlando, Fla) and S MacLeod (USAF, Aerospace Medical Research Laboratory, Wright-Patterson AFB, Ohio) In Human Factors Society, Annual Meeting, 18th, Huntsville, Ala , October 15-17, 1974 Santa Monica, Calif , Human Factors Society, 1974, p 146-152 6 refs.

Studies were performed to determine the effects of scene rotation on target acquisition performance Video tapes of simulated straight approaches to surface vehicular targets were made at constant offset, altitude, and speed using a terrain table (600 1) and a gimbal mounted TV camera Detection and (separate) recognition tests were then made under load (button-pushing) and no-load conditions No differences in detection slant range and erroneous detections were found between the rotated (roll-pitch) and non-rotated (yaw-pitch gimbal order) conditions or between the load/no-load conditions Statistically significant differences were found between the recognition ranges and error scores for gimbal order but again not between load/no-load conditions It was concluded that the sensor line of sight should be stabilized or derolled if maximum recognition performance is to be realized using airborne electro-optical systems in ground target acquisition (Author)

A75-19683 The effects of certain gimbal orders and workloads on target acquisition. D L. Price (Virginia Polytechnic Institute and State University, Blacksburg, Va) In Human Factors Society, Annual Meeting, 18th, Huntsville, Ala , October 15-17, 1974 Santa Monica, Calif , Human Factors Society, 1974, p. 153-157 7 refs

Eighteen experienced pilots were tested on target detection, recognition and identification performance with respect to the relative influences of roll-pitch, yaw-pitch and pitch-yaw gimbal orders on this performance Tests consisted of a target task, words task, numbers task, and words and targets task Pitch-yaw gimbal order was found to have a favorable effect by reducing target task workload and improving target task performance score S J M

A75-19684 Color and texture differences in embedded target visual search situations. J R Bloomfield (Honeywell Systems and Research Center, Minneapolis, Minn), H H Marmurek, and B. G Traub (Ohio State University, Columbus, Ohio) In Human Factors Society, Annual Meeting, 18th, Huntsville, Ala , October 15-17, 1974 Santa Monica, Calif , Human Factors Society, 1974, p 158-170 12 refs Army-supported research.

Experimental study of the effectiveness of visual searches for targets of various textures embedded in color and monochrome displays Simple equations developed to describe competition search situations were tested against the data obtained in complex search backgrounds Additional experiments were performed in order to obtain measures of peripheral acuity and ratings of the discriminability of the various targets from the two backgrounds Using these data, it was found that the equations did not provide a good description for the monochrome display, although a good fit was obtained with the color background A B K.

A75-19686 Large Space Telescope and human factors H. T Fisher (Lockheed Missiles and Space Co , Inc , Sunnyvale, Calif) In Human Factors Society, Annual Meeting, 18th, Huntsville, Ala , October 15-17, 1974 Santa Monica, Calif , Human Factors Society, 1974, p 176-186

The Large Space Telescope (LST) will be designed with on-orbit maintenance by suited astronauts using extravehicular activity as the principal maintenance mode For maintenance, the LST will be soft berthed to the Space Shuttle Orbiter, and a spares pallet and work platform will be utilized Design studies included 1-g and neutral buoyancy simulations with mockups of the Scientific Instruments (SI) and Support Systems Module (SSM) A 3 81 meter internal diameter was chosen for the SSM for compatibility with the SI and Optical Telescope Assembly (OTA) A modular approach to SSM/SI equipment design was chosen Crew work and support aids and modes of equipment transfer were studied The relative costs of various maintenance modes are compared Simulations have allowed the development of detailed orbital crew maintenance tasks and associated timelines A T S

A75-19687 Prediction of cardiac response to physical stress L E Long and L L Hoag (Oklahoma, University, Norman, Okla) In Human Factors Society, Annual Meeting, 18th, Huntsville, Ala , October 15-17, 1974 Santa Monica, Calif , Human Factors Society, 1974, p 225-227

This paper presents a method for predicting an individual's cardiac response to a series of fixed intensity tasks It was determined that cardiac responses to exercise at given work loads are similar for subjects of the same sex and level of physical fitness when they are expressed in terms of resting heart rate Using this observation as a basis, a prediction model was developed by extrapolating from emperically derived heart rate patterns The prediction error was no more than five to ten percent of the actual heart rate value in ninety percent of the predictions (Author)

A75-19688 Effects of time, rate of information presentation and physical threat stress on perceptual-motor performance. J M Owens, R S Gibson, and S D Harris (U S Navy, Naval Aerospace Medical Research Laboratory, Pensacola, Fla) In Human Factors Society, Annual Meeting, 18th, Huntsville, Ala , October 15-17, 1974 Santa Monica, Calif , Human Factors Society, 1974, p 241-243 8 refs

A75-19689 Navigation and flight proficiency under Nap of the Earth conditions as a function of aviator training and experience M L. Fineberg (U.S Army, Army Research Institute for the Behavioral and Social Sciences, Washington, D C) In Human Factors Society, Annual Meeting, 18th, Huntsville, Ala , October 15-17, 1974 Santa Monica, Calif , Human Factors Society, 1974, p 249-254 7 refs

Nap-of-the-Earth (NOE) flight involves a flight at treetop level and below The new tactic uses existing terrain features to mask the aircraft from enemy radar and optical detection It is pointed out that the introduction of NOE tactics presents special difficulties to Army rotary wing aviators, particularly in navigation These difficulties are to be overcome by appropriate NOE training In connection with this objective an investigation was conducted involving 14 helicopter pilots who had completed a preliminary course of instruction in NOE flight. G R

A75-19693 * Evaluation of localized muscle fatigue using power spectral density analysis of the electromyogram E V LaFevers (NASA, Johnson Space Center, Houston, Tex) In Human Factors Society, Annual Meeting, 18th, Huntsville, Ala , October 15-17, 1974 Santa Monica, Calif , Human Factors Society, 1974, p 278-283 15 refs

Surface electromyograms (EMGs) taken from three upper torso muscles during a push pull task were analyzed by a power spectral density technique to determine the operational feasibility of the technique for identifying changes in the EMGs resulting from muscular fatigue The EMGs were taken from four subjects under two conditions (1) in shirtsleeves and (2) in a pressurized space suit This study confirmed that frequency analysis of dynamic muscle activity is capable of providing reliable data for many industrial applications where fatigue may be of practical interest The results showed significant effects of the pressurized space suit on the pattern of shirtsleeve fatigue responses of the muscles The data also revealed (1) reliable differences between muscles in fatigue-induced responses to various locations in the reach envelope at which the subjects were required to perform the push-pull exercise and (2) the differential sensitivity of muscles to the various reach positions in terms of fatigue-related shifts in EMG power (Author)

A75-19694 Paths of movement of body members in aircraft cockpits S Deivanayagam, M M Ayoub (Texas Tech University, Lubbock, Tex), and K W Kennedy (USAF, Aerospace Medical Research Laboratory, Wright-Patterson AFB, Ohio) In Human Factors Society, Annual Meeting, 18th, Huntsville, Ala , October 15-17, 1974 Santa Monica, Calif , Human Factors Society, 1974, p 284-286 5 refs Contract No F33615-73-C-4073

This paper describes an effort to study the simultaneous motion trajectories of a large number of human body landmarks of a pilot during upper limb motions typical of those necessary to fly an aircraft The objective is to gather engineering anthropometric data necessary, from a human engineering point of view, in the design of aircraft cockpits and other similar manned work stations. Twenty subjects participated in an experiment conducted to record the movements A photographic procedure combining slow speed motion picture and interrupted light photography was employed to record the movements This paper describes the procedure and also presents a set of typical paths of movement obtained through such recording Also mentioned are some of the preliminary findings regarding the motion characteristics of parts of the human body (Author)

A75-19695 Where is the system in the man-machine system D Meister (U S Army, Army Research Institute for the Behavioral and Social Sciences, Arlington, Va) In Human Factors Society, Annual Meeting, 18th, Huntsville, Ala , October 15-17, 1974 Santa Monica, Calif , Human Factors Society, 1974, p 287-292 16 refs

Implications of the man-machine concept for Human Factors as a discipline are derived Two fundamental research questions stem from this assumption Are psychological principles describing individual and group behavior sufficient to explain operator and multiman-machine system operations, and, what is the relationship between individual responses and system outputs Review of the Human Factors literature indicates that most studies ignore the system and fail to answer these questions Reasons for and consequences of this failure are explored (Author)

A75-19696 The ten commandments for organizational effectiveness S O Parsons (Lockheed Missiles and Space Co , Inc , Sunnyvale, Calif) In Human Factors Society, Annual Meeting, 18th, Huntsville, Ala , October 15-17, 1974 Santa Monica, Calif , Human Factors Society, 1974, p 325-332 14 refs

The role of the human factors specialist in designing organizations for people vs designing equipment for people is discussed Ten principles for organizational behavior are presented which maximize the human resources along with examples and quantitative data based upon Lockheed experience and other industrial applications Particular emphasis is devoted to TEAM, a worker participation program initiated six years ago at Lockheed and still evolving in form, Upward Performance Evaluation results, and new communication techniques (Author)

A75-19697 Human factors engineering test and evaluation technology E L Holsbouser (U S Navy, Naval Missile Center, Point Mugu, Calif) In Human Factors Society, Annual Meeting, 18th, Huntsville, Ala , October 15-17, 1974 Santa Monica, Calif , Human Factors Society, 1974, p 343-349. 5 refs.

Department of Defense (DOD) Directive 5000 1 of 13 July 1971 provides direction for Test and Evaluation (T&E) of major weapon systems In addition, there are Navy unique T & E requirements which must be satisfied A Human Factors Engineering (HFE) test and evaluation concept has been proposed for implementation by the Naval Air Systems Command The proposed T & E concept will make explicit the interface among the test and evaluation activities so that the role of HFE can be realistically implemented and managed during system acquisition. The HFE T & E concept will specifically address the developmental and operational tests designed to provide HFE data for answering the Defense System Acquisition Review Council (DSARC) milestones for evolving systems. The concept also features an HFE information system which will serve as a focal point and feedback network for use by personnel needing information or data on some element in the evaluation of a particular weapon system (Author)

A75-19698 A computer aided function allocation and evaluation system /CAFES/. C W Hutchins (U.S Naval Material Command, Naval Air Development Center, Warminster, Pa). In Human Factors Society, Annual Meeting, 18th, Huntsville, Ala., October 15-17, 1974 Santa Monica, Calif , Human Factors Society, 1974, p 350-353

The Computer Aided Function Allocation and Evaluation System (CAFES) is a crew systems design support tool based on human engineering methodology, computer aids, human performance data and a data management system. It is intended to support crew systems engineers in man-machine research, requirements analysis, design, test, training and maintenance systems development The system of computer models comprising the CAFES system parallels the system development cycle and provides the required level of detail consistent with a given stage of system development The principle objectives of the present development program are to facilitate timely application of all essential elements of human factors technology in systems development, using automatic data processing techniques for rapid analysis and evaluation of crew subsystem performance as it effects total systems effectiveness. (Author)

A75-19699 Computer-aided generation of performance measures for man-machine systems E M Connelly (Omnemii, Inc , Springfield, Va), P A Knoop (USAF, Human Resources Laboratory, Wright-Patterson AFB, Ohio), F J Bourne, and D G Loental (Quest Research Corp , McLean, Va) In Human Factors Society, Annual Meeting, 18th, Huntsville, Ala , October 15-17, 1974 Santa Monica, Calif , Human Factors Society, 1974, p 359-367 Contract No F33615-72-C-2094

The computer-aided system is characterized by a logical division of human and computer processor functions, an experimental approach to deriving measures by a priori definition of a measure population, and a systematic empirical approach to validation testing Measure types generated and tested are absolute, relative and state transfer The processor performs all functions required to transform raw operator performance data into candidate measures S J M

A75-19700 Design Option Decision Tree - A method for schematic analysis of a design problem and integration of human

factors data W B Askren (USAF, Human Resources Laboratory, Wright-Patterson AFB, Ohio) and K. D Korkan (Systems Research Laboratories, Inc , Dayton, Ohio) In Human Factors Society, Annual Meeting, 18th, Huntsville, Ala , October 15-17, 1974. Santa Monica, Calif , Human Factors Society, 1974, p 368-375 Contracts No F33615-70-C-1440, No F33615-73-C-4044

A Design Option Decision Tree (DODT) is a graphic means of showing the design options available at each decision point in the design process Several examples of DODTs for aircraft design problems are shown The procedures for developing a DODT are described A proposed method for use of the DODT to resolve a design problem is presented This method includes evaluating the design options in the Tree for impact on the system, and tracing paths through the Tree as dictated by specific design goals The use of human factors data as one of the evaluation parameters is illustrated The paper concludes with a discussion of other uses of a DODT (Author)

A75-19701 The accommodated proportion of a potential user population - Compilation and comparisons of methods for estimation. A C. Bittner, Jr and W F Moroney (U S Navy, Naval Missile Center, Point Mugu, Calif) In Human Factors Society, Annual Meeting, 18th, Huntsville, Ala , October 15-17, 1974 Santa Monica, Calif , Human Factors Society, 1974, p 376-381 14 refs

Attention is given to conclusions reached by Moroney and Smith (1972) who found that a design of workspaces without awareness of the interaction between anthropometric variables ultimately leads to a considerable reduction in the size of the accommodated population The available methods for calculating the accommodated proportion are examined. Questions of method selection are considered along with prospects for future developments and problems concerning data requirements G R

A75-19702 Comparing adjectival and nonadjectival rating scale responses against performance criteria W R Helm (U S. Navy, Naval Air Test Center, Patuxent River, Md) In Human Factors Society, Annual Meeting, 18th, Huntsville, Ala , October 15-17, 1974 Santa Monica, Calif , Human Factors Society, 1974, p 382-386

Twenty-one student naval test pilots participated in a dual task experiment for the purpose of comparing the utility of adjectival and nonadjectival rating scales Modified versions of the Cooper-Harper and McDonnell pilot rating scales were compared with the non-ordinal, nonadjectival rating scale developed by Schufeldt The primary task was a serially presented four-choice discrimination task with three levels of presentation rate The secondary task was verbal requiring short term and long term memory dependent responses Analyzing task demands in bits of information processed per second, provided a comparison of S's potential information processing load with his actual performance and subjective ratings Results do not provide support for the superiority of any one rating scale in reflecting S's actual performance (Author)

A75-19703 Target detection assessment using an orthogonal mixed-factor central-composite design L A Scanlan and C Clark (Illinois, University, Urbana, Ill) In Human Factors Society, Annual Meeting, 18th, Huntsville, Ala , October 15-17, 1974 Santa Monica, Calif , Human Factors Society, 1974, p 406-413 25 refs Contract No F44620-70-C-0105

Target detection performance on a time-compressed radar display with both spatial and temporal cues was investigated The effects of six variables (frame duration, noise level, clutter level, number of stored frames, target speed, and target direction) were examined using an orthogonal mixed-factor central-composite response surface experimental design Results are discussed in terms of the contributions of spatial and temporal cues to detection performance A methodological discussion of the experimental design is also included (Author)

A75-19704 Electromyography in dynamic muscular loading T M Khalil (Miami, University, Coral Gables, Fla) and J E Otero (Southern Bell, Fort Lauderdale, Fla) In Human Factors Society, Annual Meeting, 18th, Huntsville, Ala , October 15-17, 1974 Santa Monica, Calif , Human Factors Society, 1974, p 414-417 5 refs NSF Grant No GK-37024X

This paper discusses two experiments conducted to determine some of the various effects of dynamic muscular loading upon the Total Integrated Muscular Activity (TIMA) Parameters of interest are power, time, rate, and task. In one experiment the dynamic loading of muscles was applied through a cranking operation and in another experiment it was applied through a continuous push-up task Power, time and rate had a significant effect upon TIMA The conditions under which TIMA is minimized were determined for the two experiments (Author)

A75-19705 A theoretical and empirical comparison of two mixed-factor central-composite designs. C Clark (Illinois, University, Urbana, Ill) In Human Factors Society, Annual Meeting, 18th, Huntsville, Ala , October 15-17, 1974 Santa Monica, Calif , Human Factors Society, 1974, p 418-424 13 refs

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

A75-19706 Instructional system design for aircrew training S L. Johnson, R C Sugarman (Calspan Corp , Buffalo, N Y), and C C Buckenmaier, Jr (USAF, Systems Command, Wright-Patterson AFB, Ohio) In Human Factors Society, Annual Meeting, 18th, Huntsville, Ala , October 15-17, 1974
Santa Monica, Calif , Human Factors Society, 1974, p 452-455 17 refs Contract No F33657-75-C-0021

Questions of instructional system development (ISD) methodology are considered and attention is given to the initiation cue-action verb-control-completion cue In addition to the basic task element description, supplemental information is necessary for the translation of the task data into behavioral objectives It is pointed out that the ISD methodology has had a major impact on the training programs of both military and commercial aviation G R.

A75-19707 Systems approach to training /SAT/ for the B-1 aircrew. R C Sugarman, S L Johnson (Calspan Corp , Buffalo, N Y), and C C Buckenmaier, Jr (USAF, Systems Command, Wright-Patterson AFB, Ohio) In Human Factors Society, Annual Meeting, 18th, Huntsville, Ala , October 15-17, 1974 Santa Monica, Calif , Human Factors Society, 1974, p 456-458 Contract No F33657-75-C-0021

A training system is presented that takes into account the developmental status of the B-1 strategic bomber Program objectives include transition, upgrade, and recurring Basic problem areas such as biases and traditions, breadth of content, and overspecification of hardware will be quickly dispatched by the instructional systems development approach Remaining problems due to the fact that the B-1 is not yet operational will be minimized by a computer-aided Sorting Program and Training Resources Analytical Model, supplemented with catalogs of data which may be updated as the state of knowledge and the B-1 technical specifications evolve S J M

A75-19708 Effect of environmental extremes on task performance time F W Trabold, Jr and D B Jones (Martin

Marietta Aerospace, Orlando, Fla) In Human Factors Society, Annual Meeting, 18th, Huntsville, Ala , October 15-17, 1974 Santa Monica, Calif , Human Factors Society, 1974, p 465-470

In the investigation reported subjects, trained in a shirtsleeve environment, performed the same simulated tasks under adverse environments Significant increases in completion times were observed in 10 of the 15 tests The tests most adversely affected were those requiring the greatest manual dexterity Mean differences in task performance time related to environmental factors are shown in a number of graphs G R

A75-19709 The effects of verbal interference on psychomotor performance under dual task conditions. W R Helm, R P Fishburne, Jr , and W L Waag (U S Navy, Naval Air Test Center, Patuxent River, Md) In Human Factors Society, Annual Meeting, 18th, Huntsville, Ala , October 15-17, 1974
Santa Monica, Calif , Human Factors Society, 1974, p 471-475 6 refs

Two experiments were performed in order to determine S's maximum information processing capacity under dual task conditions and to provide empirical evidence regarding the localization of the divided attention effect The measurement of psychomotor performance (primary task) was obtained by using the Response Analysis Tester (RATER) Verbal interference (secondary task) was composed of three tasks requiring varying degrees of monitoring, short term memory and long term memory The results suggest performance on the primary task to deteriorate as a joint function of both primary and secondary task processing loads These data provide support to the locus of interference to be within the control processing (memory-dependent) and to response selection stages of the processing system The possibility of a limited dual channel capacity is discussed (Author)

A75-19710 The measurement of attention capacity through concurrent task performance with individual difficulty levels and shifting priorities D Gopher and R A North (Illinois, University, Urbana, Ill) In Human Factors Society, Annual Meeting, 18th, Huntsville, Ala , October 15-17, 1974 Santa Monica, Calif , Human Factors Society, 1974, p 480-485 12 refs Contract No F44620-70-C-0105

A75-19711 * Optical range and range rate estimation for teleoperator systems N L Shields, Jr , M Kirkpatrick, III (Essex Corp., Huntsville, Ala), T B Malone (Essex Corp , Alexandria, Va), and C T Huggins (NASA, Marshall Space Flight Center, Huntsville, Ala) In Human Factors Society, Annual Meeting, 18th, Huntsville, Ala , October 15-17, 1974 Santa Monica, Calif , Human Factors Society, 1974, p 487-492

Range and range rate are crucial parameters which must be available to the operator during remote controlled orbital docking operations A method was developed for the estimation of both these parameters using an aided television system An experiment was performed to determine the human operator's capability to measure displayed image size using a fixed reticle or movable cursor as the television aid The movable cursor was found to yield mean image size estimation errors on the order of 2 3 per cent of the correct value. This error rate was significantly lower than that for the fixed reticle Performance using the movable cursor was found to be less sensitive to signal-to-noise ratio variation than was that for the fixed reticle. The mean image size estimation errors for the movable cursor correspond to an error of approximately 2 25 per cent in range suggesting that the system has some merit Determining the accuracy of range rate estimation using a rate controlled cursor will require further experimentation (Author)

A75-19712 * A manipulator system designed for Free-Flying Teleoperator Spacecraft. J R Tewell, R A. Spencer, and J J Lazar (Martin Marietta Aerospace, Denver, Colo). In Human Factors Society, Annual Meeting, 18th, Huntsville, Ala , October 15-17, 1974 Santa Monica, Calif , Human Factors Society, 1974, p 493-497 5 refs Contract No NAS8-30266.

A preliminary design of a manipulator system, applicable to a Free-Flying Teleoperator Spacecraft operating in conjunction with the Shuttle or Tug, is presented The manipulator arm incorporates two 4-ft segments to the wrist with actuators located at the shoulder, elbow, and wrist. The wrist provides three degrees-of-freedom through pitch, yaw and continuous roll joints An interchangeable end effector provides multiple task performance and satellite worksite versatility A tip force of 10 lbs and a torque of 15 ft-lbs is provided Man-in-the-loop simulations, using both unilateral and bilateral control techniques, were conducted Based upon the simulation, a new, but relatively simple, control technique was proposed for the manipulator system. (Author)

A75-19713 * Man machine interactive imaging and data processing using high speed digital mass storage H Alsberg and R Nathan (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, Calif) In Human Factors Society, Annual Meeting, 18th, Huntsville, Ala , October 15-17, 1974
Santa Monica, Calif , Human Factors Society, 1974, p 498-505 13 refs Contract No NAS7-100, Grant No NIH-RR-00443

Attention is given to general questions regarding television systems, aspects of image distortion in TV systems, approaches of image restoration, noise limitations, and the digital image integrator The digital image recorder has been built around a high-speed digital memory system It is shown that television systems can be used to augment man s capabilities in the control loop of remote manipulation systems G R

A75-19714 A hierarchical concept for man-machine communication. J. S Albus, J M Evans, and E G Johnsen (National Bureau of Standards, Washington, D C) In Human Factors Society, Annual Meeting, 18th, Huntsville, Ala , October 15-17, 1974 Santa Monica, Calif , Human Factors Society, 1974, p 506-509

According to the concept considered, a hierarchy of control functions is involved in the control of a machine A human operator may enter this control hierarchy at any level, for direct control, for programming, or for recording control signals for later playback Various control techniques are discussed Memory-driven control systems are examined, giving particular attention to the Cerebellar Model Articulation Controller G R.

A75-19715 Prediction of target detection thresholds on the basis of physiological considerations A Bernstein (Ford Automotive Safety Research Center, Dearborn, Mich) In Human Factors Society, Annual Meeting, 18th, Huntsville, Ala , October 15-17, 1974 Santa Monica, Calif , Human Factors Society, 1974, p 547-552 7 refs

A target detection model which treats the retina as a system of interconnected components is presented The model has integrated psychophysical target detection thresholds The sensitivity and threshold parameters used in the model may be used as human performance measures The equations for liminal target brightness along with the regression equations for the model's threshold and sensitivity parameters have immediate engineering applications G R

A75-19720 Human factors engineering aspects of satellite communication systems J W Kuhr and L W Tobias (Collins Radio Co , Cedar Rapids, Iowa) In Human Factors Society, Annual Meeting, 18th, Huntsville, Ala , October 15-17, 1974 Santa Monica, Calif , Human Factors Society, 1974, p 604-623 15 refs

Treatment of human factors engineering (HFE) constraints on the Air Force Satellite Communications System (AFSATCOM) development program Material is exposited within the framework of the system development sequence predesign, detail design, produc-

tion, and design verification, with emphasis on the first two categories Predesign is covered with respect to background, system requirement definition, and functional analysis, detail design comprises mainly panel planning, workspace layout, maintainability, and safety The uniqueness of the satcom system relative to other large communications systems extensively involving the man-machine relationship lies in three areas digital data transmission, computer assistance, and the possibility of good HFE with off-the-shelf components or new state-of-the-art designs The first two areas indicate a need for further development due to increasing operator data load, the third shows that the HFE must be cognizant of hardware potentialities in order to assist in designing efficient, cost-effective systems This description of system development provides an up-to-date case study of HFE problems in a military procurement setting and will prove instructive to those who are developing similar systems S J M

A75-19721 Effects of lens color on target visibility for air-sea rescue S MacLeod, R L Hilgendorf, and R G Searle (USAF, Aerospace Medical Research Laboratory, Wright-Patterson AFB, Ohio) In Human Factors Society, Annual Meeting, 18th, Huntsville, Ala , October 15-17, 1974 Santa Monica, Calif , Human Factors Society, 1974, p 624-627 18 refs

A simulated rescue operation terrain model under low daylight with artificial haze was employed to evaluate target acquisition performance using the naked eye and four lenses Hazemaster (yellow), Oakley Doc (pink), Cosmetan (brown), and N-15 (gray) Performance measures were response time and number of targets found The unaided eye was superior to all viewing circumstances, with Oakley Doc the best and Cosmetan the worst of the lenses These results indicate that supposed enhancement properties of colored lenses are offset by losses due to their absorption of light S J M

A75-19722 Human factors role in equipment definition and facility layout for the Space Computational Center and the NORAD Computer System Improvement Program. J H Van Arsdel, Sr (System Development Corp , Colorado Springs, Colo) In Human Factors Society, Annual Meeting, 18th, Huntsville, Ala , October 15-17, 1974 Santa Monica, Calif , Human Factors Society, 1974, p 634-640 5 refs

A75-19950 Intersensory generalization and conditioning in adaptation to visual tilt. H H Mikaelian (Georgia, University, Athens, Ga) *American Journal of Psychology,* vol 87, Mar -June 1974, p 197-202 11 refs Contract No N00014-72-C-0124

Three measures of adaptation were taken at half-hour intervals over two hours of exposure to a 20-deg counterclockwise prismatic tilt a test of the visual vertical with goggles on (cue conditioning), one with goggles off, and a test of the proprioceptive vertical The visual aftereffects measured with the goggles did not differ from those measured without Significant proprioceptive changes and visual aftereffects occurred early in exposure, but the visual ones continued to grow with prolonged exposure while the proprioceptive ones did not (Author)

A75-20006 # *The significance of the commissural system of the brain in lateralization of sleep and wakefulness (Znachenie komissural'noi sistemy mozga v lateralizatsii sna i bodrstvovaniia).* R. S. Rizhinashvili and V. M. Mosidze (Akademiia Nauk Gruzinskoi SSR, Institut Fiziologii, Tiflis, Georgian SSR). *Akademiia Nauk Gruzinskoi SSR, Soobshcheniia,* vol. 76, Nov. 1974, p 441-443. In Russian.

Consideration of the role of the brain commissures in lateralization of sleep and wakefulness following hemisection of the brain stem Hemisections were performed on two groups of cats - one with intact commissural systems and one which had previously been commissurotomized. The background electrical activity during sleep and wakefulness was studied in each group. It is found that in animals with a split brain (i e , the commissurotomized animals) subjected to unilateral impairment of the stem structures a prolonged lateralization of sleep and wakefulness occurs. The data obtained indicate that the commissural system plays an important role in the bilateralization of synchronized activity caused by hemisection of the brain stem A B.K

A75-20007 # Cardiodynamics of athletes performing muscular work (Kardiodinamika u sportsmenov pri myshechnoi rabote). R. A Svanishvili (Tbilisskii Gosudarstvennyi Meditsinskii Institut, Tiflis, Georgian SSR) *Akademiia Nauk Gruzinskoi SSR, Soobshcheniia,* vol 76, Nov 1974, p 449-451 8 refs In Russian

Results of an analysis of the shifts in the cardiac activity parameters of trained athletes undergoing muscular exertion while exercising on a veloergometer in three different load ranges It is found that with an increase in the level of muscular exertion the cardiodynamic indices of trained athletes are adequately modified It is concluded that a study of the cardiodynamics of athletes engages in muscular activity makes it possible to obtain an idea of the relation between changes in the phase structure of the heart contraction and the volume of muscular activity performed A B.K.

A75-20087 # Vibrations of the basilar membrane of the cochlea (O kolebaniiakh baziliarnoi membrany ulitki ukha). L A Ostrovskii and A M Sutin (Nauchno-Issledovatel'skii Radiofizicheskii Institut, Gorki, USSR). *Akusticheskii Zhurnal,* vol 20, Nov.-Dec 1974, p 874-880 14 refs In Russian

Solution of the hydrodynamic equations of the cochlea is given It is shown that in the region of maximum displacement amplitude of the basilar membrane, the Wentzel-Kramers-Brillouin approximation is valid The solution is obtained in analytic form and is applicable in the whole range of audible frequencies and in the ultrasonic region In the low-frequency range, it agrees with Bekeshi's (1963) findings P T H

A75-20122 Effect of sampling procedure upon the performance of an electrical model of auditory detection A D. Gaston, Jr and L A Jeffress (Texas, University, Austin, Tex). *Acoustical Society of America, Journal,* vol 56, Dec 1974, p 1815-1817 11 refs Navy-PHS-supported research

Data for an electrical model of auditory detection were obtained using two different methods of sampling One used as the sample the voltage at the termination of the signal, the other selected the largest amplitude peak that occurred during the observation interval Results showed that while detection performance for the end-of-signal samples plateaued at about 200 msec and showed no further improvement with duration, detection based on peak samples showed continued improvement in performance out to 2 sec It is suggested that the continued improvement with duration exhibited by human subjects may be due to their use of amplitude peaks (Author)

A75-20123 Two-tone distortion products in a nonlinear model of the basilar membrane. J L Hall (Bell Telephone Laboratories, Inc , Murray Hill, N J) *Acoustical Society of America, Journal,* vol 56, Dec 1974, p 1818-1828 27 refs

Two-tone distortion products (DPs) were studied in an electrical transmission-line model for motion of the basilar membrane The entire length of the membrane was represented, and an asymmetric as well as a symmetric nonlinearity was introduced There were substantial similarities between the properties of even- and odd-order DPs observed in the model and those formerly observed psychophysically These similarities support the contention that both the 2f1 - f2 and f2 - f1 DPs may be, under some conditions, generated by mechanical nonlinearities on the basilar membrane (take f1 and f2 to be two primary tones, f1 less than f2) These DPs do not show up on some previous observations of mechanical motion of the basilar membrane, and they are therefore of interest S J M

A75-20124 **Spectral cues used in the localization of sound sources on the median plane** J. Hebrank and D Wright (Duke University, Durham, N C) *Acoustical Society of America, Journal,* vol 56, Dec 1974, p 1829-1834 10 refs

Three experiments investigating the sound spectral cues used in median-plane localization were performed Results show that spectra from 4 to 16 kHz are necessary for localization Frontal cues are a one-octave band reject (notch) with a lower cutoff between 4 and 8 kHz and increased energy above 13 kHz, elevational cues are a 1/4-octave peak between 7 and 9 kHz, and rearward cues are a small peak between 10 and 12 kHz with a decrease of energy above and below the peak Hypothesize that the concha's shape results in part from the necessity for elevation cues to be encoded by the external ear These cues are generated primarily by interference of the reflection of a sound off the posterior concha wall with the same sound as it directly enters the external auditory canal S J.M

A75-20125 **Rate versus level functions for auditory-nerve fibers in cats - Tone-burst stimuli.** M B. Sachs and P J. Abbas (Johns Hopkins University, Baltimore, Md). *Acoustical Society of America, Journal,* vol. 56, Dec 1974, p. 1835-1847 27 refs Grant No PHS-2-R01-NS-05143, Contract No F44620-71-C-0024

Average discharge rate of single auditory-nerve fibers in cats was measured in response to 400 msec single-frequency tone bursts of varying intensity There was a continuum of curve behaviors between flat and sloping saturations at hyperthreshold levels Higher threshold fibers tended to have more sloping saturations than did lower threshold fibers with the same characteristic frequency (CF) For fibers with the same CF, normalized slopes of the rate-level functions for CF tones were a decreasing function of threshold For frequencies above the CF, the slope of the rate-level functions decreased with increasing frequency, below the CF, slopes either approximated the CF slope or increased to some maximum as frequency decreased A model is presented that relates rate to basilar-membrane displacement via a saturating nonlinearity equation, and it compares well with the results S J.M

A75-20126 **Transformation of sound pressure level from the free field to the eardrum in the horizontal plane.** E A G. Shaw (National Research Council, Div of Physics, Ottawa, Canada) *Acoustical Society of America, Journal,* vol 56, Dec. 1974, p 1848-1861 25 refs

Measurements of pressure transformation, azimuthal dependence, interaural level difference, and ear canal pressure distribution from 12 studies are brought together in a common framework The pool of data covers 100 subjects, the majority male, measured in five countries over a 40-yr period Logical procedures are developed to identify the surfaces which best fit these essentially three-dimensional distributions of data, making allowance for the many disparities between studies Sheets of data are presented showing transformation to the eardrum, azimuthal dependence, and interaural difference as functions of frequency from 0 2 to 12 kHz at 45 deg intervals in azimuth Other sheets show azimuthal dependence and interaural difference as functions of azimuth at 24 discrete frequencies The logical procedures, data presentations, and review of disparities lead to the construction of self-consistent families of curves best fitting the data and showing the average sound pressure transformation from the free field to the human eardrum as a function of frequency at 15 deg intervals in azimuth Possible explanations of differences between studies are suggested (Author)

A75-20127 **Pure-tone, third-octave, and octave-band attenuation of ear protectors** R Waugh (National Acoustic Laboratories, Millers Point, Australia) *Acoustical Society of America, Journal,* vol 56, Dec 1974, p 1866-1869 7 refs

Experimental confirmation is shown of the practical identity of measuring ear-protector attenuation for pure tones and for 1/3-octave bands centered at the same pure-tone frequencies In typical broad-band industrial noise, variations of spectrum shape have a negligible influence on an ear protector's octave-band attenuation The use of pure-tone attenuation values at octave-band center frequencies as estimates of octave-band attenuation can lead to errors exceeding 10 dB. In the octaves centered at 500 Hz and above, ear-protector attenuation should be measured at 1/3-octave center frequencies (Author)

A75-20128 **Hypothesis on the function of the crossed olivocochlear bundle.** C D Geisler (Wisconsin, University, Madison, Wis) *Acoustical Society of America, Journal,* vol 56, Dec 1974, p 1908, 1909 19 refs Grant No NIH-NS-06225

Electrophysical evidence indicates that maximum stimulation of the crossed olivocochlear bundle (COCB) shifts auditory nerve discharge rate curves to the right The hypothesis presented here holds that this shifting is a significant function of the COCB it adjusts the dynamic ranges of the afferent neurons to allow the encoding, by discharge rate, of higher intensity stimuli Some behavioral data are discussed that support the theory S.J M

A75-20129 **Model of crossed olivocochlear bundle effects.** C D Geisler (Wisconsin, University, Madison, Wis) *Acoustical Society of America, Journal,* vol 56, Dec 1974, p 1910-1912 17 refs Grant No NIH-NS-06225

A modification of the familiar variable-resistance electrical circuit is presented as a model of the crossed olivocochlear bundle's effects mediated by efferent synapses on the outer hair cells. The model's field potentials and neural discharges are compared with experimental findings (Author)

A75-20130 **Determination of the transfer function of the external ear by an impulse response measurement** V. Mellert, K. F. Siebrasse, and S. Mehrgardt (Gottingen, Universitat, Gottingen, West Germany) *Acoustical Society of America, Journal,* vol. 56, Dec 1974, p. 1913-1915. 9 refs.

The transfer function of the human ear in a free sound field is measured by an impulse response technique The impulse response of the system is determined and the frequency response is computed with aid of a digital computer Disturbing responses in time and frequency domain caused by loudspeaker, probe microphone, and surrounding objects are eliminated. (Author)

A75-20249 **Human cortical magnification factor and its relation to visual acuity.** A Cowey and E. T Rolls (Oxford University, Oxford, England) *Experimental Brain Research,* vol 21, Dec 30, 1974, p 447-454 14 refs Medical Research Council Grant No. G-971-397-B

Human magnification factor (M), or the linear extent of visual striate cortex to which each degree of the retina projects, is calculated and compared to previously measured human visual acuity Results indicate that the reciprocal of M is directly proportional to the minimum angle of resolution and, correspondingly, that the magnification factor is directly proportional to visual acuity in man The total extent of striate cortex is estimated, and this estimation agrees closely with previous direct measurements S.J M

A75-20250 **Functional organization of primate oculomotor system revealed by cerebellectomy.** G Westheimer and S M Blair (California, University, Berkeley, Calif) *Experimental Brain Research,* vol 21, Dec 30, 1974, p 463-472 12 refs Grant No PHS-EY-00592

Unilateral cerebellar lobectomy was carried out in young and mature macaques. There is no significant abnormality in saccadic eye movement or in the vestibulo-ocular reflex There is a constant drift of the eyes in the contralateral direction, and the abilities to maintain eccentric gaze and to make smooth pursuit movements are jointly affected The syndrome is transient in young monkeys, and even bilateral cerebellar lobectomy carried out serially leaves some ability to hold eccentric gaze and pursue smoothly The findings permit the conclusion that the primate oculomotor organization depends on the active maintainence of straight ahead gaze Saccades move the eyes in a coordinated way, and are also associated with correlated innervation to hold the gaze in the new position Since cerebellar interventions which cause centripetal drift also always produce defects in pursuit movements, the abilities to maintain eccentric gaze and to pursue smoothly must have a common origin (Author)

A75-20294 * Evoked potential correlates of selective attention with multi-channel auditory inputs. V. L. Schwent and S. A. Hillyard (California, University, La Jolla, Calif.). *Electroencephalography and Clinical Neurophysiology,* vol 38, Feb. 1975, p 131-138. 27 refs. Grants No. NGR-05-009-198, No NIH-1-RO1-MH-25594-01

Ten subjects were presented with random, rapid sequences of four auditory tones which were separated in pitch and apparent spatial position. The N1 component of the auditory vertex evoked potential (EP) measured relative to a baseline was observed to increase with attention. It was concluded that the N1 enhancement reflects a finely tuned selective attention to one stimulus channel among several concurrent, competing channels. This EP enhancement probably increases with increased information load on the subject A.T S

A75-20295 The contingent negative variation during a memory retrieval task. W T Roth, B. S Kopell, J. R Tinklenberg, C F. Darley, R Sikora, and T. B Vesecky (Stanford University, Stanford, U S Veteran Administration Hospital, Palo Alto, Calif). *Electroencephalography and Clinical Neurophysiology,* vol 38, Feb 1975, p 171-174 12 refs Research supported by the Van Ameringen Foundation and U S. Veterans Administration, Grant No NIH-AA-00498-02

Scalp recorded evoked potentials were measured during a memory-retrieval task in which the subjects were required to decide whether a probe digit was contained in a set of target digits The amplitude of the contingent negative variation (CNV) was found to be greatest when there was only one target digit The evoked potential 300 msec after the probe increased with decreasing set size, regardless of whether a motor response was required A T S

A75-20524 * A universal bird head-holder for stereotaxic surgery G N McEwen, Jr. (Illinois, University, Urbana, Ill , NASA, Ames Research Center, Moffett Field, Calif) *Electroencephalography and Clinical Neurophysiology,* vol 37, Dec 1974, p 657, 658 NSF Grant No GB-13797

A75-20525 * Immediate and delayed effects of nitrogen mustard on cell replication in an autogenous rat sarcoma J Post, R J Sklarew, and J Hoffman (Goldwater Memorial Hospital, Roosevelt Island, N Y) *National Cancer Institute, Journal,* vol 52, June 1974, p 1897-1903 19 refs Grants No NGR-33-016-102, No PHS-CA-03917-13, No. PHS-CA 14432-01

A75-20795 Difference thresholds for interaural delay. E R. Hafter and J De Maio (California, University, Berkeley, Calif) *Acoustical Society of America, Journal,* vol 57, Jan 1975, p 181-187. 18 refs Grant No. NIH-NS-07787

Cross-correlational models of binaural interaction postulate an interaural delay line in which neural impulses arising in one ear are delayed relative to those from the other. For localization based on interaural differences of time, accuracy is limited by the resolving power of this hypothetical delay line The present study sought to determine whether the delay line is organized in such a way as to provide a foveal area of best acuity, as exists in spatial vision Thus, threshold increments of interaural time difference (delta-t) were determined as a function of overall delay (t) Stimuli were acoustic transients of either low (0.1-2 kHz) or high (3-4 kHz) frequency content, ranging in level from 18 to 68 dB SPL The overall delay ranged from 0 to 500 microsec In general, the functions that relate delta-t to t were found to rise gradually with lowest thresholds occurring for the lower-frequency and higher-level clicks Clearly no sharp delineation exists in sound localization as in vision (Author)

A75-20796 Relation of the loudness function to the intensity characteristic of the ear W S Hellman (Boston University, Boston, Mass) and R P Hellman (Harvard University, Cambridge, Mass) *Acoustical Society of America, Journal,* vol 57, Jan 1975, p 188-192 26 refs NIH-supported research

A representation of the pure-tone loudness function, given by Psi - x raised to the power of theta times F(x), is discussed, where x is the ratio of stimulus to threshold intensity and theta is the power function exponent The form of F(x) is obtained from the empirical loudness curves at 1000 and 250 Hz The structure of F(x) is shown to be in quantitative agreement with known steady-state driven firing rate activity of eighth-nerve units. We suggest that F(x) is proportional to the driven firing rate function R(x) of the auditory sensory receptor A specific choice is made for the algebraic form of R(x) by identifying it with the driven rate function in a sensory receptor model proposed recently by Zwislocki Within the model, a three-parameter fit to the loudness function is obtained It is shown that similar results can be obtained for vibrotaction (Author)

A75-20825 Individual differences in response to the environment. R T Wilkinson (Medical Research Council, Applied Psychology Unit, Cambridge, England) *Ergonomics,* vol 17, Nov 1974, p 745-756 21 refs

Questions of performance are considered, taking into account a laboratory study of stress involving loss of sleep and serial reaction time, aircraft noise, a special design required to examine individual differences, and the effect of a loss of sleep on rote learning Effects of the environment on personal comfort are also examined, giving attention to questions of validation, the consistency of subjective ratings, and range effects G R

A75-20826 * Immediate cardiac response to exercise - Physiologic investigation by systolic time intervals at graded work loads. A P Xenakis, V. M Quarry, and D H Spodick (Lemuel Shattuck Hospital, Tufts University, Boston, Mass.) *American Heart Journal,* vol 89, Feb 1975, p. 178-185 19 refs. Grant No NGR-22-012-026.

A75-20827 The use of echocardiography to measure isometric contraction time. G M Ziady, T Hardarson, and R Curiel (Royal Postgraduate Medical School, Hammersmith Hospital, London, England) *American Heart Journal,* vol 89, Feb 1975, p 200-206 20 refs. Research supported by the British Heart Foundation

Current methods for estimating isometric contraction time are discussed, and an alternative method using echocardiography is

suggested. In 11 out of 15 patients tested, the alternative (ultrasonic) technique results correlated with the internal isometric contraction time. The ultrasound isometric contraction time showed a superior discriminating value to the external isometric contraction time for differentiating the normal subjects (also tested) from the patients
S.J.M

A75-20882 **Effect of a general aviation trainer on the stress of flight training** C E Melton, J M McKenzie, J R Kelln, S M Hoffmann, and J T Saldivar (FAA, Civil Aeromedical Institute, Oklahoma City, Okla.) *Aviation, Space, and Environmental Medicine*, vol 46, Jan 1975, p 1-5 18 refs

Sixteen students were given flight training according to a highly standardized and rigidly controlled 35-hr syllabus Eight of the group (TG) received 10 hr of their training in a Link GAT-1 ground trainer and 25 hr in a Cherokee 140B The other eight (AG) received all of their training in the airplane The resting heart rate, physical work, as indicated by O2 consumption, and urine chemistry were measured Objective flight tests administered four times during the syllabus indicated insignificant differences between TG and AG Likewise, a check pilot who did not know to which group a student belonged could not differentiate between groups TG and AG It was concluded that 10 hr training in the GAT-1 did not compromise the flying skill as judged by the check pilot (Author)

A75-20883 **Effects of long-term exposures to 100% oxygen at selected simulated altitudes on the pulmonary surfactant in mice.** P J. Sheffield (USAF, School of Aerospace Medicine, Brooks AFB, Tex.) *Aviation, Space, and Environmental Medicine*, vol. 46, Jan 1975, p 6-10. 20 refs.

A75-20884 * **Effect of potassium depletion in normal males - An Apollo 15 simulation.** K H. Hyatt, S B Hulley, J M Vogel, C P Spears (U S Public Health Service Hospital, San Francisco, Calif.), P C Johnson (Baylor University, Houston, Tex.), G W Hoffler, P C Rambaut, J A Rummel, and C Huntoon (NASA, Johnson Space Center, Houston, Tex.) *Aviation, Space, and Environmental Medicine*, vol 46, Jan 1975, p 11-15 7 refs.

In the course of Apollo 15, physiologic abnormalities, manifested by ectopic activity on the ECG and unusual alterations in exercise tolerance, occurred in the crew of the Lunar Excursion Module These were associated with decreases in total body potassium, measured by K-42, of 10% and 15% The possibility of inadequate potassium (K+) intake existed. A simulation study was performed prior to Apollo 16, corresponding in duration to Apollo 15 Subjects endured the same sleep aberrations and caloric expenditure as the Apollo 15 astronauts Subjects consumed a diet containing only 15 mEq/d of K+ during the entire 12 days of absolute bedrest. Study implications and reasons for discrepancies between K+ loss measured by balance techniques and K-42 are reviewed. (Author)

A75-20885 **Organ fluid changes and electrolyte excretion of rats exposed to high altitude** B. M Christensen, H. L. Johnson, and A. V. Ross (U.S. Army, Letterman Institute of Research, San Francisco, Calif.). *Aviation, Space, and Environmental Medicine*, vol 46, Jan 1975, p. 16-20. 21 refs.

A75-20886 * **Ultrastructural alterations observed in mouse lung after prolonged He/O2 exposure.** G. A. Harrison (NASA, Ames Research Center, Moffett Field, Calif.) and J. D. Solomon (Union Carbide Corp., Tonawanda, N.Y.). *Aviation, Space, and Environmental Medicine*, vol. 46, Jan 1975, p 21-25 19 refs Contract No. NAS2-3900

A75-20887 **Effects of a multi-hour immersion with intermittent exercise on urinary excretion and tilt table tolerance in athletes and nonathletes.** J. Stegemann, U. Meier, W Skipka, W. Hartlieb, B. Hemmer, and U. Tibes (Deutsche Sporthochuschule, Cologne, West Germany) *Aviation, Space, and Environmental Medicine*, vol 46, Jan 1975, p 26-29 18 refs Research supported by the Bundesministerium für Verteidigung

A75-20888 * **Microbiological sampling of the spacecraft atmosphere during a simulated Skylab mission** R. M. Brockett and J. K. Ferguson (NASA, Johnson Space Center, Epidemiology Section, Houston, Tex.). *Aviation, Space, and Environmental Medicine*, vol 46, Jan 1975, p 30-32 10 refs.

A Skylab Air Sampler (SAS) has been developed for use during Skylab missions. The SAS was used in the Skylab Medical Experiments Altitude Test (SMEAT) to gather baseline data which could be directly compared to data obtained during actual Skylab missions. The results obtained in the SMEAT gave no evidence of consistent change in either concentration or types of microorganisms in the SMEAT atmosphere over the 56-d test Microorganisms found included some potential pathogens but were largely normal human microflora Few typical soil microorganisms were found. These findings are related to commonly anticipated effects of long-term spaceflights on environmental microflora and to other closed environment studies. (Author)

A75-20889 **Physiological reactions to wet-cold** L Vanggaard (Copenhagen, University, Copenhagen, Denmark) *Aviation, Space, and Environmental Medicine*, vol 46, Jan 1975, p 33-36. 8 refs

Changes in extremity temperatures during general cold stress were investigated The changes in local temperatures were found equal to those seen under circulatory arrest In order to investigate the influence of these changes on motor function, the relation between local temperature and nervous conduction velocity in a peripheral motor nerve (n ulnaris) was carried out in subjects exposed to a minor cold stress (to avoid the influence of Lewis hunting reaction) The decrease in conduction velocity was found to be 15 m/s per 10 C fall in temperature At a local temperature of 8-10 C a complete nervous block was established This leads to an explanation of the clinical findings in wet-cold situations, where the very rapid onset of physical impairment corresponds to the effect of a local cooling in the extremities and not, as commonly accepted, to a developing general hypothermia. (Author)

A75-20890 **Optimal use of nitrogen to suppress the high pressure nervous syndrome.** P B Bennett, J Roby, S Simon, and D. Youngblood (Duke University Medical Center, Durham, N C.). *Aviation, Space, and Environmental Medicine*, vol 46, Jan 1975, p 37-40 20 refs Grants No PHS-HL-07896-11, No. PHS-HL-12157, Contract No N00014-67-A-0251-0022

Five subjects were compressed to 1000 ft for 2 hr breathing 3 2 ATA nitrogen, 0 5 ATA oxygen, and the remainder helium The compression took 33 min with a 10 sec stage at 50 ft (2 5 ATA), 1 min at 320 ft (10 7 ATA), and 2 min at 700 ft (22 ATA) Hypothetically, this 1 10 ratio for nitrogen-helium partial pressures should induce neither nitrogen narcosis nor the high pressure nervous syndrome (HPNS) Tests, therefore, were made during the experiment of postural tremor, spontaneous electroencephalogram, psychomotor and intellectual activities, and subjective sensations It is concluded that use of a 1 10 ratio of N2 H2 is effective in the control of narcosis and HPNS during rapid compression to 1000 ft. (Author)

A75-20891 **Respiration during heat stress.** C Saxton (RAF, Institute of Aviation Medicine, Farnborough, Hants, England) *Aviation, Space, and Environmental Medicine*, vol 46, Jan 1975, p 41-46 13 refs

In human subjects at rest, changes in heart rate, pulmonary ventilation, tidal volume, respiratory rate, and end-tidal carbon dioxide tension were examined at increases in deep body temperature of 1 C and 2 C Each of these latter target temperatures was achieved at two different rates of temperature increase The increase in deep body temperature was associated with a rise in heart rate and tidal volume and a reduction in respiratory rate An increase in pulmonary ventilation associated with a reduction in end tidal carbon dioxide tension occurred only when deep body temperature increase reached 1 5 C The apparently greater change in both pulmonary ventilation and end-tidal carbon dioxide tension during the more rapid increase in deep body temperature by 2 C was not significant (Author)

A75-20892 * **Plasma thyroxine changes of the Apollo crewmen.** M Sheinfeld, C S Leach (NASA, Johnson Space Center, Endocrine Laboratory, Houston, Tex), and P C Johnson (Baylor University, Methodist Hospital, Houston, Tex) *Aviation, Space, and Environmental Medicine*, vol 46, Jan 1975, p 47-49 13 refs

Blood drawn from Apollo crew members prior to the mission, at recovery, and postmission, was used to examine the effect Apollo mission activities have on thyroid hormone levels At recovery, statistically significant increases in thyroxine and the free thyroxine index were found Serum cholesterol and triglycerides were decreased No change of statistical significance was found in the T3 binding percentage, total serum proteins, and albumin We conclude that Apollo activities and environment caused the postmission increase in plasma thyroxine The prolonged postmission decreases in serum cholesterol may be one result of the increased thyroxine activity (Author)

A75-20893 **Adrenocortical activity and urinary cyclic AMP levels - Effects of hypobaric hypoxia.** R Francesconi and A Cymerman (U S Army, Research Institute of Environmental Medicine, Natick, Mass) *Aviation, Space, and Environmental Medicine*, vol 46, Jan 1975, p 50-54 26 refs

Six highly motivated and trained military test subjects were exposed to a simulated altitude of 4267 m (447 torr) for 48 hours, preceded and followed by sea level runs lasting 32 hours During each scenario test subjects were required to perform their respective military tasks on a continual basis with sporadic rest not exceeding several hours Extremely high levels of plasma cortisol prior to the start of each session and persistently elevated concentrations of urinary 17-OH corticosteroids at sea level were consistently observed This observation probably explains the relatively minor changes in adrenocortical output noted during acute exposure to hypobaric hypoxia Analogous results were obtained for urinary cyclic AMP, i e , elevated baseline levels and minimal response to high altitude The results indicate an attenuated response as well as an association between urinary measures of adrenocortical activity and cyclic AMP excretion (Author)

A75-20894 **Re-evaluation of a tilt-back seat as a means of increasing acceleration tolerance.** J W Burns (USAF, School of Aerospace Medicine, Brooks AFB, Tex) *Aviation, Space, and Environmental Medicine*, vol 46, Jan 1975, p 55-63 11 refs

Relaxed tolerance was determined on seven subjects exposed to rapid onset (RO, 1 G/sec) and gradual onset (GO, 1 G/10 sec) acceleration at seat back angles of 13, 30, 45, 55, 65, and 75 deg from the vertical There was no significant difference between relaxed tolerance at the control angle of 13 and tolerance at 30 deg However, at 45 deg there was a significant 0 5 G increase in tolerance compared to control Thereafter, tolerance continued to increase in an exponential manner to 8 G at 75 deg, an increase over control of 100% As relaxed tolerance increased with increasing back angle, peak heart rate during acceleration significantly decreased The amount of thoracic pressure necessary to maintain a preselected visual field declined as the back angle was increased from 13 to 45 to 65 deg at the same acceleration level (Author)

A75-20895 **Distribution characteristics of methylhydrazine in the plasma and cerebrospinal fluid of monkeys** W T Gormley (USAF, Aerospace Medical Research Laboratory, Wright-Patterson AFB, Ohio) *Aviation, Space, and Environmental Medicine*, vol 46, Jan. 1975, p 64-68 23 refs

A lumped parameter mathematical model including extracellular fluid, intracellular fluid, and cerebrospinal fluid compartments has been applied to describe methylhydrazine (MMH) distribution kinetics in the blood and cerebrospinal fluid of Rhesus monkeys Ten monkeys, average weight 5 5 kg, were given intravenous infusions of MMH while blood and cerebrospinal fluid samples were periodically collected and analyzed for MMH The mathematical model was used to simulate the infusions and the simulations were compared with experimental data to validate the model and to evaluate the mass transfer parameters required by the model. (Author)

A75-20896 **Normal coronary angiography in an aircrewman with serial exercise test changes.** A J Thompson, V F Froelicher, Jr , M R Longo, Jr , and J H Triebwasser (USAF, School of Aerospace Medicine, Brooks AFB, Tex) *Aviation, Space, and Environmental Medicine*, vol 46, Jan 1975, p 69-73 16 refs

A75-20899 **Some highlights of aircraft passenger behavior research** H B Altman (Survival and Flight Equipment Association, Canoga Park, Calif) *Aviation, Space, and Environmental Medicine*, vol 46, Jan 1975, p 89-91 7 refs

A brief review is offered of the field of aircraft passenger safety research Problems associated with passenger behavior, e g , panic, and passenger safety education studies and requirements are discussed In addition, a comparison is drawn between commercial and corporate aircraft passenger safety requirements and current research and development programs It is concluded that there is a need for increased funding and more emphasis to be placed on education in the areas of aircraft passenger safety research (Author)

A75-20900 * **Temperature responses to infusion of electrolytes during exercise** J E Greenleaf, S Kozlowski, H. Kaciuba-Uscilko, K Nazar, and Z Brzezinska (NASA, Ames Research Center, Moffett Field, Calif , Polish Academy of Sciences, Laboratory of Applied Physiology, Warsaw, Poland) In Temperature regulation and drug action Basel, S Karger AG, 1975, p 352-360 26 refs

To gain more insight into the ion-osmotic influence on temperature regulation, the rectal temperature responses of mongrel dogs were measured during one hour of treadmill-running at 1 2 m/sec up a 12 deg slope Results indicate that as in man, the rise in body temperature during exercise appears to be a regulated process There is a direct relationship between the rise and equilibrium levels of rectal temperature and the plasma sodium and osmotic concentrations It remains to be determined if the hypernatremic-osmolality inhibits peripheral blood flow, the panting, salivation response, or both Some background on previous experiments on resting and exercising dogs and men is recounted S J M

A75-20918 # **Reactions of neurons in the second auditory cortical area to sound stimulation (Reaktsii neironov vtoroi slukhovoi zony na zvukovoe razdrazhenie).** I I Shelest (Akademiia Nauk Ukrainskoi SSR, Institut Fiziologii, Kiev, Ukrainian SSR) *Neirofiziologiia*, vol. 6, Nov.-Dec. 1974, p. 571-576 19 refs. In Russian.

A75-20950 **Tolerance of one species of jerboa /Jaculus orientalis/ to prolonged exposure to deep hypothermia** R K Andjus, M El Hilali, J-P Veillat, and K. Baddouri (Beograd, Univerzitet, Belgrade, Yugoslavia, Université Mohammed V, Rabat, Morocco) *Journal of Physiologie*, vol 68, Jan. 1975, p 531-542 23 refs

Jerboas were found to have better tolerance to prolonged hypothermia than most nonhibernators A mean survival time of 3 5 days for a group of 25 animals was obtained, and six animals were rewarmed after two to six days of hypothermia The breathing pattern consisted of alternating periods of deep breathing and apnea The underlying mechanisms of the survival have yet to be determined, it is also not yet known whether there is a connection between this survival and the jerboa's tolerance to dehydration

S J M

A75-20958 * **Heightened sexual interest and sleep disturbance.** V Zarcone, A De La Pena, and W C Dement (U S Veterans Administration Hospital, Palo Alto, Stanford University, Stanford, Calif) *Perceptual and Motor Skills*, vol 39, Dec 1974, p 1135-1141 8 refs Grants No PHS-MH-13860, No NGR-05-020-168

The study demonstrates a behavioral effect of selective sleep disturbance in normal human subjects Ten male subjects were selectively REM-deprived for two nights by awakening them at the onset of REM sleep In addition, there were baseline and non-REM awakening conditions Heightened sexual interest was defined by the number of film frames (using a Mackworth camera) in which subjects fixated on parts of the female figure in photographs The largest mean difference in sexual interest was found between baseline and REM-deprivation Both the non-REM awakenings and REM-sleep deprivation enhanced sexual interest The failure to demonstrate a significant difference between REM-deprivation and non-REM awakenings may be due to the fact that subjects were REM-sleep-deprived in both conditions It is suggested that REM-sleep loss may lead to increased selective attention and preoccupation with any cues which are usually interesting (Author)

A75-20959 **Effect of delay of feedback and type of movement on laterally displaced vision.** S F Wong and C R Borresen (Wichita State University, Wichita, Kan) *Perceptual and Motor Skills*, vol 39, Dec 1974, p 1331-1336 14 refs

144 Ss were run in an experiment investigating the effects of type of movement (active vs passive), type of feedback (none, delayed, immediate) and the interaction effect on laterally displaced vision The main hypothesis was that delayed feedback would be particularly effective under the condition of passive movement While the main hypothesis was not supported, several secondary ones were supported The hindering effect of the lack of significance of the main effect of type of movement on other hypotheses was pointed out (Author)

A75-20960 **Ventricular performance and energy of compression, power, and rate of change of power during isovolumic contraction.** P D Stein, G G McBride, and H. N. Sabbah (Oklahoma, University, U S. Veterans Administration Hospital, Oklahoma City, Okla) *Cardiovascular Research*, vol 9, Jan 1975, p. 29-37 10 refs Research supported by the U S. Veterans Administration and American Heart Association, Grant No. NIH-72-2921B

During isovolumic contraction, there is a calculable compression of the blood within the ventricle Energy is expended by the ventricle during isovolumic contraction, and some of it is transferred to the blood in the form of elastic compression The rate of energy transfer (power) and acceleration of energy transfer (rate of change of power) during isovolumic contraction were calculated. In anaesthetized dogs, the isovolumic energy of compression was 42 + or - 6 dyn cm, peak isovolumic power was 1,400 + or - 300 dyn cm/sec, and peak rate of change of power was 56,000 + or - 15,000 dyn cm/sec/sec. During states of augmented contractility induced by isoproterenol, the peak acceleration of energy expenditure increased to 126,000 + or - 33,000 dyn cm/sec/sec. Conversely, with a reduction of contractility induced by propranolol, the peak isovolumic rate of change of power decreased to 30,000 + or - 5,700 dyn cm/sec/sec (Author)

A75-20961 **Effects of hypoxia, cyanide, and ischaemia on myocardial contraction - Observations in isolated muscle and intact heart.** F. A. Pirzada, W. B Hood, Jr , J V. Messer, and O. H. L. Bing (Boston City Hospital, Tufts University, Boston University, Boston, Mass). *Cardiovascular Research*, vol. 9, Jan. 1975, p. 38-46. 23 refs. Research supported by the Massachusetts Heart Association and American Heart Association; Grants No NIH-71-2498, No NIH-HL-14646

A75-20962 **Design and function of a mechanical assembly for recording echocardiograms during upright exercise.** D. R. Redwood, W L Henry, S Goldstein, and E R Smith (National Institutes of Health, Div of Research Services and National Heart and Lung Institute, Bethesda, Md) *Cardiovascular Research*, vol 9, Jan 1975, p. 145-149 12 refs.

A75-21001 * **Origins of biological information and the genetic code.** S W Fox (Miami, University, Coral Gables, Fla). *Molecular and Cellular Biochemistry*, vol. 3, Apr 15, 1974, p 129-142 72 refs NASA-supported research

Information, defined as the capacity of a molecule or system for selective interactions with other molecules or systems, is followed through its evolution from prebiological information to proto-ribosomes Emphasis is on proteins and protein-like polymers, and later on ATP The research will contribute more to the understanding of the essence of the genetic mechanism. S.J M.

A75-21022 **Ophthalmologic stereophotography.** V Kratky (National Research Council, Ottawa, Canada) *Photogrammetric Engineering and Remote Sensing*, vol 41, Jan 1975, p 49-64 15 refs

Stereophotographs taken by ophthalmologic instruments do not meet basic photogrammetric requirements, their geometry is atypical and cannot be assessed by standard calibration procedures This analysis of two basic categories of instruments shows the peculiarities of the single-image and stereoimage formations Although parallax-type instruments and analog plotters can mainly provide approximate solutions, analytical methods (and especially analytical plotters) offer a more rigorous and reliable photogrammetric treatment. This includes the reconstruction of a model from parallel or nearly parallel projections which are typical for some ophthalmologic instruments The basic theory of these unconventional procedures is illustrated by an example (Author)

A75-21042 * **Fine structural changes in the lateral vestibular nucleus of aging rats.** J E. Johnson, Jr. and J. Miquel (NASA, Ames Research Center, Neurosciences Branch, Moffett Field, Calif). *Mechanisms of Ageing and Development*, vol 3, 1974, p 203-224. 56 refs NASA Task 970-21-11-11

The fine structure of the lateral vestibular nucleus was investigated in Sprague-Dawley rats, that were sacrified at 4 weeks, 6-8 weeks, 6-8 months, and 18-20 months of age. In the neuronal perikaria, the following age-associated changes were seen with increasing frequency with advancing age rodlike nuclear inclusions and nuclear membrane invaginations, cytoplasmic dense bodies with the characteristics of lipofuscin, and moderate disorganization of the granular endoplasmic reticulum. Dense bodies were also seen in glial cells Rats 18 to 20 months old showed dendritic swellings, axonal

degeneration, and an apparent increase in the number of axosomatic synaptic terminals containing flattened vesicles (presumed to be inhibitory in function). (Author)

A75-21043 * # Correlation between thermal death and membrane fluidity in Bacillus stearothermophilus. A F. Esser (California State University, Fullerton, Calif) and K A Souza (NASA, Ames Research Center, Biological Adaptation Branch, Moffett Field, Calif) *National Academy of Sciences, Proceedings,* vol 71, Oct 1974, p 4111-4115. 27 refs. NASA Order A-89977.

A75-21098 The effect of head tilt on meridional differences in acuity - Implications for orientation constancy. M S Banks (Minnesota, University, Minneapolis, Minn) and S J Stolarz (California, University, La Jolla, Calif) *Perception and Psychophysics,* vol 17, Jan 1975, p 17-22 34 refs

Horn and Hill (1969) and others have reported that a small number of units in the cat visual cortex undergo changes in receptive field orientation associated with body tilt Such units reportedly compensate for tilt and may represent a mechanism for human orientation constancy To test this, we measured meridional differences in visual acuity for heat-vertical and head-tilted viewing conditions The results of Experiment 1 did not directly support or refute the involvement of tilt-compensatory units The results of Experiment 2, in which we controlled for countertorsion of the eyes, showed that meridional acuity differences correspond to the retinal and not the spatial orientation of the stimulus We conclude that *tilt-compensatory cortical units are not involved in human orientation* constancy The physiological evidence indicating the existence of tilt-compensatory units in the visual cortex is also reexamined (Author)

A75-21099 *Area-luminance effects and the visual evoked* brain response. G Kress (Regis College, Denver, Colo) *Perception and Psychophysics,* vol 17, Jan 1975, p 37-42 18 refs Grant No PHS-MH-14020-03

Psychophysical and electrophysiological studies report that luminance must be systematically increased as stimulus area is decreased if a constant response is to be elicited The visual evoked brain response (VEBR) was recorded from three human subjects as a function of eight stimulus intensities for five different areas The results indicate (1) the amplitude of the B-C component of the VEBR increases in a linear fashion as a function of increases in log luminance, (2) there is a linear reciprocal relationship between the magnitude of log area and log luminance for targets up to 20 deg, and (3) substituting total number of receptors in an area for stimulus size results in receptor-luminance functions identical to the corresponding area-luminance function Results are discussed in terms of neural summation (Author)

A75-21100 *Simultaneous visuomotor adaptation to optical* tilt and displacement G M Redding (Illinois State University, Normal, Ill) *Perception and Psychophysics,* vol 17, Jan 1975, p 97-100 15 refs Grant No PHS-MH-24420-01

Change in visuomotor direction and orientation was measured following simultaneous exposure to optical displacement and tilt Adaptation to both transforms simultaneously was not different from adaptation to each transform separately These results are consistent with previous work involving purely visual change, and suggest that the two kinds of adaptation involve independent processes for locus-specific and relational analysis (Author)

A75-21113 # On the theoretical basis of the optimal oxygen content in the atmosphere for the human being (O teoreticheskom obosnovanii optimal'nogo soderzhaniia kisloroda v atmosfere dlia cheloveka). I S Breslav and V N Salazkin (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR) *Fiziologicheskii Zhurnal SSSR,* vol 60, Dec 1974, p 1865-1872 11 refs In Russian

On the base of experimental data a mathematical model of man's physiological responses to graduated muscular loads with different oxygen concentrations in the breathing mixtures was developed An analysis of this model suggests that such responses can be optimized (i e respiratory and circulatory stress can be minimized) by varying of the inspiratory oxygen content Optimal oxygen concentration data obtained ranged from 21 to 33 per cent in relation of loads applied The respiratory parameters were found to be the most suitable criteria of the breathing environment optimality for the human being (Author)

A75-21114 # Physiological reactions of thermoregulation to convective and radiant heat stimuli (Fiziologicheskie reaktsii termoreguliatsii na konvektivnoe i luchistoe teplovoe vozdeistvie). L M Melesova (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Fiziologicheskii Zhurnal SSSR,* vol 60, Dec 1974, p 1873-1879 16 refs In Russian

Laboratory experiments were done with rabbits to compare the reactions of an animal's thermoregulation system to purely convective and purely radiant heating Temperature was recorded from the hypothalamus, the rectum, the skin of the ear, the bridge of the nose, and the back, and related to the room temperature measured in a hollow sphere to model a blackbody Vasodilation in the rabbit's ear was measured to indicate the reaction of the thermoregulation system It was found that with radiant heating, vasodilation and heat exchange in the rabbit begin at higher temperatures of the skin and hypothalamus than with convective heating It is thought that this difference is due to the fact that radiant heat has a smaller effect on the skin's thermoreceptors, so that a longer heating period is needed to trigger the thermoregulation system A T S

A75-21166 Unclocklike behaviour of biological clocks A T Winfree (Purdue University, West Lafayette, Ind) *Nature,* vol 253, Jan 31, 1975, p 315-319 88 refs

The mechanisms which could underlie circadian rhythms fall naturally into groups with qualitatively different responses to disruption Experiments designed to distinguish between these mechanisms seem to exclude all of them It may be that multicellular organisms keep time, not by one 'clock' but by averaging many independent circadian oscillators (Author)

A75-21174 A mechanism for the electrocardiogram response to left ventricular hypertrophy and acute ischemia P S Thiry (California, University, Berkeley, Calif), R M Rosenberg (San Francisco General Hospital, San Francisco, Calif), and J A Abbott (California, University, San Francisco, Calif) *Circulation Research,* vol 36, Jan 1975, p 92-104 31 refs.

A proposed mechanism for explaining the electrocardiographic response in left ventricular hypertrophy and in subendocardial and epicardial acute ischemia was incorporated in a mathematical model of electrical heart activity The model of hypertrophy was simply an increase in cell size, and the principal effect on the computer-generated 12-lead electrocardiograms (ECGs) was an increase in R-wave amplitude and ventricular activation time and a flattening or polarity reversal of the T wave The model of acute ischemia was a reduction between plateau and resting potential of the transmembrane action potential The principal effect on the computer-generated 12-lead ECGs was an S-T segment displacement up or down depending on the location of the lesion (Author)

A75-21175 **A model of psychosocial hypertension showing reversibility and progression of cardiovascular complications** J P Henry, P M. Stephens (Southern California, University, Los Angeles, Calif), and G. A. Santisteban (Seattle University, Seattle, Wash) *Circulation Research,* vol 36, Jan 1975, p 156-164 22 refs Grants No NIH-MH-19441-03, No NIH-HL-09758-05

The sequence of pathophysiological changes that can result from the stimulating effects of a sustained disturbance of the social environment was studied in ten colonies of socially deprived mice Sixteen formerly isolated males were placed with 16 normal females in population cages consisting of seven intercommunicating boxes Six of these socially disturbed 32-member colonies were terminated after periods of interaction ranging from 2 days to 9 months The remaining four were terminated a month or more after the males had been returned to individual isolation Indirect blood pressure measurements, body and heart weights, and sections of hearts and aortas were studied in the males Following the shorter exposures, blood pressure reverted to normal in a few days Exposures of 6 months or more were associated with unchanged body weights and sustained increases in heart weight and blood pressure readings In addition, there was a significant development of aortic arteriosclerosis and myocardial fibrosis These changes persisted despite prolonged return to isolation (Author)

A75-21474 # **The heterogeneity of hemoglobin in man and animals (Pro geterogennist' gemoglobinu liudini i tvarin).** M F Starodub *Akademiia Nauk Ukrains'koi RSR, Visnik,* vol 38, Dec 1974, p 44-52 87 refs In Ukrainian

The present work reviews the main results of numerous studies on the heterogeneity of hemoglobin in man and in other mammals The physico-chemical properties of the individual types of hemoglobin and their components are summarized Various polymer forms of hemoglobin in mice are briefly discussed Studies on rats and cats have shown their hemoglobin to consist of various fractions Directions of future research on the physiological role of different hemoglobin forms are indicated P T H

A75-21522 # **Characteristics of conditioned reactions in different phases of natural human sleep (Osobennosti uslovnykh reaktsii v razlichnye fazy estestvennogo sna u cheloveka)** V M Vasil'eva, M V Slavutskaia, and L A Farber (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR) *Zhurnal Vysshei Nervnoi Deiatel'nosti,* vol 24, Nov -Dec 1974, p 1122-1129 28 refs In Russian

It is shown that during all phases of sleep, correspondence of skin-galvanic, EEG, and EMG responses to the signal significance of stimuli is preserved It is most pronounced in the paradoxal phase of sleep as compared with slow-wave sleep. Suggestions have been made regarding physiological mechanisms of the phenomena (Author)

A75-21523 # **Automatic methods of seismoactogram analysis when studying spontaneous and evoked motor activity (Avtomaticheskie metody analiza seismoaktogrammy pri issledovanii spontannoi i vyzvannoi dvigatel'noi aktivnosti)** V P Leutin and G V Abuladze (Akademiia Meditsinskikh Nauk SSSR, Novosibirsk, USSR) *Zhurnal Vysshei Nervnoi Deiatel'nosti,* vol 24, Nov -Dec 1974, p 1306-1308 In Russian

Description of a sensor-equipped platform that provides electrical signals corresponding to seismic (vertical) and horizontal motor activity of small laboratory animals in neurophysiological experiments A vibration sensor attached to the elastically suspended platform provides the seismic-activity signals, while an electric grid on the platform surface serves as the source of horizontal-activity signals Recording equipment includes filters, amplifiers, a strip recorder, pulse counter, and a signal analyzer Figures illustrate quantitative records of motor activity as evidenced by habituation curves and stimuli-response curves for both seismic and horizontal motion T M

A75-21565 **Ventilatory effects of hypoxia and their dependence on CO2 pressure** A S Rebuck and W E Woodley (McMaster University, Hamilton, Ontario, Canada) *Journal of Applied Physiology,* vol 38, Jan 1975, p 16-19 20 refs Medical Research Council of Canada Grant No MA-5126

In 11 healthy subjects the effect of progressive hypoxia on pulmonary ventilation at various alveolar carbon dioxide pressures was studied A rebreathing technique was used to produce hypoxia, CO2 was held constant and oxygen saturation was taken as the independent variable We found a linear relationship between ventilation and falls in oxygen saturation when CO2 pressure was held at the resting mixed venous, end-tidal, or any intermediate level Within this range of CO2 pressure, a family of ventilation vs O2 saturation response curves was obtained for each subject The effect of altering the isocapnic level was to change the slope and position of the ventilation vs O2 saturation response curve, the amount by which the slope changed being related to the slope for that subject at their mixed venous CO2 pressure (Author)

A75-21566 **Effect of added elastances on the first loaded breath in man.** L D Pengelly, J Greener, I Bowmer, A Luterman, and J Milic-Emili (McGill University, Montreal, Canada) *Journal of Applied Physiology,* vol 38, Jan 1975, p 39-43 17 refs Research supported by the Medical Research Council of Canada

Tidal volume together with end-inspiratory pressure was measured in four seated healthy men, during normal breathing and during single inspirations taken from a series of rigid containers which provided added elastances (range 5-70 cmH2O/1) Experiments were performed both during quiet breathing and during ventilation increased by added dead space Added elastic loads always resulted in a decreased tidal volume This decrease was partly compensated by increased pressure developed by ths inspiratory muscles, being more so with greater added elastance, control ventilation, or both Analysis of our results indicates that the load-compensatory response may be attributed to changes in mechanical impedance of the ventilatory pump, due to the mechanical arrangement and the intrinsic properties of the inspiratory muscles (force-length and force-velocity relationships), changes in respiratory frequency with increasing ventilation, and to vagally mediated load compensation (Author)

A75-21567 * **Forearm blood flow during body temperature transients produced by leg exercise** C B Wenger, M F Roberts, J. A J Stolwijk, and E R Nadel (Yale University, New Haven, Conn) *Journal of Applied Physiology,* vol 38, Jan 1975, p 58-63 43 refs. Grants No NIH-ES-00123, No NIH-ES-00354, No. NGR-07-008-002

Subjects exercised for 30 min on a bicycle ergometer at 30, 50, and 70% of maximal aerobic power in ambient temperatures of 15, 25, and 35 C and vapor pressures of less than 18 torr Exercise was used to vary internal temperature during an experiment, and different ambient temperatures were used to vary skin temperatures independently of internal temperature Forearm skin temperature was fixed at about 36 5 C Esophageal temperature was measured with a thermocouple at the level of the left atrium, and mean skin temperature was calculated from a weighted mean of thermocouple temperatures at eight skin sites Forearm blood flow was measured by electrocapacitance plethysmography Data are well accounted for by a linear equation independent of exercise intensity, although some subjects showed an equivocal vasodilator effect of exercise (Author)

A75-21568 **Glucagon and plasma catecholamine responses to graded and prolonged exercise in man** H Galbo (Copenhagen, University, Copenhagen, Denmark), J J Holst (Bispebjerg Hospital, Copenhagen, Denmark), and N J Christensen (Kommunehospitalet, Aarhus, Denmark) *Journal of Applied Physiology,* vol 38, Jan 1975, p 70-76 33 refs

Eight men were studied during graded (47, 77, and 100% of maximal oxygen uptake) and prolonged (76%) exhaustive treadmill running During graded exercise the glucagon concentration increased 35% During prolonged exercise glucagon increased progressively to three times the resting value Norepinephrine increased from 0 40 ng/ml to 2 22, epinephrine from 0 07 to 0 42 during graded, and to 1 51 and 0 33, respectively, during prolonged exercise Insulin concentrations were depressed during work except for the heaviest load Fatty acids rose throughout prolonged exercise, whereas blood glucose significantly diminished 30 min afterward Glucagon concentrations correlated significantly with norepinephrine and epinephrine concentrations during prolonged and with epinephrine during graded exercise Although increments in catecholamines were similar, the glucagon secretion was larger during prolonged than during graded exercise While increments in catecholamines might explain increased glucagon secretion during graded exercise, they cannot account completely for the rise of glucagon during prolonged exercise (Author)

A75-21569 **A theory of aerosol deposition in the human respiratory tract.** D B Taulbee and C P Yu (New York, State University, Buffalo, N Y) *Journal of Applied Physiology,* vol 38, Jan 1975, p 77-85 16 refs NSF Grant No K-040794

A theory is developed to predict particle deposition and its distribution in the human respiratory tract for any breathing condition A convection-diffusion equation for the particle concentration with a loss term is used to describe the transport and deposition of particles In this equation, an apparent diffusion coefficient due to the velocity dispersion in the lung is present and found to be the dominant diffusion mechanism for the cases considered here The governing equation is solved numerically with Weibel's lung model A The particle concentration at the mouth is calculated during washin and washout and compared favorably with experimental recordings for 0 5-micron diameter di(2-ethylhexyl) sebacate particles The total deposition in the lung for particle size ranging from 0 05 to 5 microns is also computed for a 500-cu cm tidal volume and 15 breaths/min The results in general agree with recent measurements of Heyder et al (1973) (Author)

A75-21570 **Acceleration time series resulting from repetitive extension-flexion of the hand** R N Stiles (Tennessee, University, Memphis, Tenn) *Journal of Applied Physiology,* vol 38, Jan. 1975, p 101-107 16 refs Grant No NIH-NS-08692

Power, or variance, spectra of acceleration records obtained from normal subjects during extension-flexion oscillations of a hand at frequencies between 0 5-5 0 Hz generally contained two or three frequency bands Partial separation of these oscillations in the time domain was obtained using the method of digital filtering (smoothing) In general, the peak frequency of the lowest frequency band occurred at, or nearly at, the frequency that the subject attempted to maintain during a 16-sec digitization period Consideration of absolute frequencies and the effect of mass on frequency indicated that one of the higher frequency bands was the result of normal hand tremor For low frequencies of voluntary oscillation, a second, higher frequency band occurred with a peak frequency within the range usually reported for abnormal hand tremor For voluntary oscillation frequencies above 1 5 Hz, this second, higher frequency oscillation generally occurred at twice the frequency of the voluntary oscillation (Author)

A75-21571 **Early changes in lungs of rats exposed to 70% O2** R A Redding, T Arai, W H J Douglas, H Tsurutani, and J Overs (Memorial Hospital, Pawtucket, R I, W Alton Jones Cell Science Center, Lake Placid, N Y) *Journal of Applied Physiology,* vol 38, Jan 1975, p 136-142 31 refs Grant No NIH-71-2153

Sixty-six respiratory disease-free rats, divided into four groups, were exposed to 70% O2 for 1 5, 4, 7, and 10 days and compared with 31 littermates exposed to room air for equal times Lung surfactant was separated from macrophages and potential serum protein contamination by differential centrifugation of endobronchial washings In the O2-exposed rats, developing lung edema was demonstrated by decreased dried/fresh lung weight ratio and increased alveolar protein content at 7 and 10 days At 7 days, lung compliance slope and hysteresis loop are decreased, while critical opening pressure increased Ultrastructurally, the only abnormality seen was an irregular widening of the alveolar capillary basement membrane on day 10 Alveolar lecithin content decreased slightly during the 10 days exposure, but remained highly saturated, whereas whole lung lecithin content increased These results suggest that the initial mechanical and morphological alterations in rats exposed to 70% O2 are related to lung edema and are not dependent upon lung surfactant alterations (Author)

A75-21572 **Hypoxic ventilatory depression in dogs** C G Morrill, J R Meyer, and J V Weil (Colorado, University, Denver, Colo) *Journal of Applied Physiology,* vol 38, Jan 1975, p 143-146 23 refs Grant No NIH-HL-14985

An experiment was carried out on dogs to determine the degree of hypoxia required to produce ventilatory depression and to study the effects of chloralose anesthesia, variations in blood carbon dioxide tension, and peripheral chemoreceptor denervation on hypoxic ventilatory depression In the awake, intact dog, ventilatory depression did not occur until the alveolar oxygen pressure reached 18 6 mm Hg (SEM) This value was not significantly different from that observed in chloralose anesthetized dogs Hyper- and hypocapnia had no significant effect on the alveolar oxygen pressure at which ventilatory depression occurred Denervation of either aortic or carotid chemoreceptors produced a very small change in the alveolar oxygen pressure of ventilatory depression Denervation of both aortic and carotid chemoreceptors produced a further small increase In peripheral chemoreceptor-denervated animals, hypoxia produced no significant change in ventilation until the ventilatory depression point was reached These studies indicate that in the dog hypoxic ventilatory depression occurs only during severe hypoxia and is uninfluenced by chloralose anesthesia, hyper- or hypocapnia, and only slightly affected by chemoreceptor denervation (Author)

A75-21573 * **Circadian variation of intercompartmental potassium fluxes in man** M C Moore Ede, M F Brennan, and M R Ball (Harvard University, Peter Benet Brigham Hospital, Boston, Mass) *Journal of Applied Physiology,* vol 38, Jan 1975, p 163-170 32 refs Contracts No NAS9-14249, No DA-49-193-MD-2337, Grant No NIH-HL-13872-15

Circadian rhythms of plasma potassium concentration and urinary potassium excretion persisted in three normal volunteers when diurnal variations in activity, posture, and dietary intake were eliminated for 3-10 days Measurements of the arteriovenous difference in plasma potassium concentration across the resting forearm and of erythrocyte potassium concentration suggested that there is a net flux of potassium from ICF to ECF in the early morning and a reverse net flux later in the day The total net ICF-ECF fluxes were estimated from the diurnal variations in extracellular potassium content corrected for dietary intake and urinary potassium loss The net fluxes between ICF and ECF were found to be counterbalanced by the circadian rhythm in urinary potassium excretion Desynchronization of these rhythms would result in marked fluctuations in extracellular potassium content These findings suggest that some revision is required of the concept of basal state in potassium homeostasis (Author)

A75-21574 **Blood P/50/ calculated from a single measurement of pH, P/O2/, and S/O2/** A Aberman, J M Cavanilles, M H Weil, and H Shubin (Southern California, University, Hollywood Presbyterian Hospital, Los Angeles, Calif) *Journal of Applied Physiology,* vol 38, Jan 1975, p 171-176 Grants No PHS-HL-05570, No PHS-GM-16462, No PHS-HS-00238

P(50), which is the oxygen tension corresponding to 50% saturation at pH 7 40, CO2 pressure 40 torr, and temperature 37 C, was calculated from a single measurement of pH, oxygen pressure, and oxygen saturation at a known temperature in 135 blood samples from 21 normal nonsmokers and eight patients In the 92 blood samples with oxygen saturation between 20 and 90%, the standard deviation of repeated calculated P(50)'s on the same sample of blood at different oxygen saturation was plus or minus 1 0 torr Below oxygen saturation of 20% and above oxygen saturation of 90%, the standard deviations were plus or minus 5 5 and plus or minus 2 4 torr, respectively Combined measurement errors of plus or minus 1 torr in oxygen pressure, plus or minus 1% in oxygen saturation, plus or minus 0 01 in pH, and plus or minus 0 1 C in temperature are sufficient to explain the observed variation in calculated P(50) in 90% of 135 blood samples from 29 subjects and account for the greater observed variation at oxygen saturation less than 20% and greater than 90% (Author)

A75-21575 **A stable, sensitive, low-compliance capacitance force transducer** B B Hamrell, R Panaanan, J Trono, and N R Alpert (Vermont, University, Burlington, Vt) *Journal of Applied Physiology,* vol 38, Jan 1975, p 190-193 22 refs Research supported by the American Heart Association, Vermont Heart Association, and NSF, Grant No PHS-5 S01-RR-05429 12

The measurement of active and passive force levels in heart muscle requires short- and long-term base-line stability The capacitance force transducer described here represents an optimization of the relationship between sensitivity, compliance, and frequency response in a design that minimizes long-term base-line drift related to thermal gradients within the apparatus Thermal stability of the instrument is obtained with the use of quartz and Invar in the construction of the variable capacitor, the maintenance of internal transducer temperature at a constant level well above ambient, and the use of thermally insulating air gaps Sensitivity ranges from 1 0 to 2 0 V/g wt in the several instruments tested, the output is linear, compliance is negligible with static loads up to 6 g wt, hysteresis is not significant with transient loading with 20 g wt, and long-term drift is less than 0 050 g wt These instruments are designed for use with myocardial preparations but can be adapted for skeletal muscle experiments (Author)

A75-21797 **The relation of noise exposure to noise induced hearing damage** J C Guignard (Dayton, University, Dayton, Ohio) and D L Johnson (USAF, Wright-Patterson AFB, Ohio) *Sound and Vibration,* vol 9, Jan 1975, p 18-23 14 refs

A review is made of three documents prepared for the US Air Force and Environmental Protection Agency in 1973 dealing with the effects of noise on hearing, for continuous noise and impulsive noise, and factors influencing the incidence of noise-induced permanent threshold shift (NIPTS) The most important conclusion drawn is that there exists a sufficient data base from which to predict, statistically, the effect of noise on the general population Areas are indicated in which further research is needed A T S

A75-21804 **Processing of positional information in the human visual system.** I Rentschler, R Hilz, and W Grimm (Munchen, Universitat, Munich, West Germany) *Nature,* vol 253, Feb 6, 1975, p 444, 445 7 refs

Experiments were performed on human subjects' ability to perceive correctly the angular separation between two lines separated by less than 10 minutes of arc It was found that the lines appear to be displaced towards each other when they are of unequal luminance It is concluded that the detection of line stimuli and the neural evaluation of their positions are performed separately in the human visual system A T S

A75-21867 **A truly three-dimensional vectorcardiographic display** V Kalff, D J Dewhurst, E R Trethewie (Melbourne, University, Melbourne, Australia), and W J Perkins (Melbourne, University, Melbourne, Australia, National Institute for Medical Research, London, England) *Computers in Biology and Medicine,* vol 4, Dec 1974, p 137-144 19 refs Research supported by the University of Melbourne

The future clinical use of vectorcardiography is dependent upon a standardization of measurement procedures and an effective display of the vector loop Conventional two-dimensional displays of the three-dimensional loop may not adequately demonstrate certain cardiac abnormalities This paper describes a method for visualizing the complete vector loop on a cathode ray screen or plotter Transformation of the three coordinates for each point of the display is effected by an algorithm which allows for manual rotation of the loop about the orthogonal axes and provides depth perception by intensity modulation of the z-axis coordinates (Author)

A75-21868 ***Quantification of abnormal* EEG *spike characteristics*** P Y Ktonas and J R Smith (Florida, University, Gainesville, Fla) *Computers in Biology and Medicine,* vol 4, Dec 1974, p 157-163 11 refs NSF Grant No GK-15373, Grant No AF-AFOSR-72-2171

A digital computer technique is presented whereby abnormal scalp EEG transients are magnified and processed so that detailed characteristics of their morphology can be precisely quantified A set of six parameters describing these characteristics is proposed, and data from a quantitative analysis of abnormal spikes chosen from three human epileptics are presented Finally, the advantages of the presented method are discussed (Author)

A75-21944 **Differential diagnosis of anomalies of the great arteries by real-time two-dimensional echocardiography** W L Henry, B J Maron, J M Griffith, D R Redwood, and S E Epstein (National Institutes of Health, National Heart and Lung Institute and Div of Research Services, Bethesda, Md) *Circulation,* vol 51, Feb 1975, p 283-291 31 refs

Results of the study indicate that the use of a newly-developed, real-time, mechanical sector-scanning two-dimensional ultrasound system to obtain images of the great arteries at their origin provides an accurate noninvasive method for categorizing individuals with cyanotic congenital heart disease Anomalies studied included transposition of the great arteries, tetralogy of Fallot, truncus arteriosus, and pulmonary atresia This accurate an examination of the great arteries was formerly only available at necropsy S J M

A75-21945 **Predictive implications of stress testing Follow-up of 2700 subjects after maximum treadmill stress testing** M H Ellestad and M K C Wan (Memorial Hospital Medical Center, Long Beach, Calif) *Circulation,* vol 51, Feb 1975, p 363-369 9 refs Research supported by the Long Beach Heart Association, Central Valley Heart Association, and Memorial and Childrens Medical Center Foundation

Follow-up data including incidence of myocardial infarctions, progression of angina, and death were collected over a period of eight years after treadmill stress testing of a group of subjects A high correlation between positive test results and subsequent coronary events was observed The high incidence of events in equivocal responders indicates that the lower limit for a positive stress test should be lowered from the present 1 5 mm ST-segment depression to 1 0 mm Of the positive responders, those having had a previous infarct had twice the incidence of coronary events than did those without a previous infarct Subjects with large ST depressions (4 mm or more) showed no significant increase in events over subjects with 2 mm depressions Chronotropic incompetence, even if unaccompanied by ischemia, was correlated with the development of some new coronary event S J M

A75-22010 **Basal forebrain and hypothalamic connections to frontal and parietal cortex in the rhesus monkey.** J Kievit and H G. J. M. Kuypers (Rotterdam, Erasmus Universiteit, Rotterdam, Netherlands) *Science,* vol 187, Feb 21, 1975, p 660-662 19 refs Research supported by the Dutch Organization for Fundamental Research in Medicine

Horseradish peroxidase was injected in different parts of the frontal and parietal cortex in 17 rhesus monkeys In all cases the enzyme was transported retrogradely to neurons in the substantia innominata and hypothalamus as well as in the thalamus These new findings demonstrate that these cortical areas receive direct afferent fibers from limbic basal forebrain areas concerned with emotion and motivation. (Author)

A75-22200 **Changes in detection measures and skin resistance during an auditory vigilance task** S Milosevic (Institute of Psychology, Belgrade, Yugoslavia) *Ergonomics,* vol 18, Jan 1975, p 1-8 17 refs

Twenty subjects detected slight changes of intensity in a 42 dB, 700 Hz signal, presented in an anechoic chamber According to the degree of confidence in signal perception, the subjects gave responses, within intervals of 4 sec, on a scale consisting of up to three categories of response During the run, the subjects' skin resistance was measured each 10 min Results showed that during the run the percentage of correct and false responses decreased for both extreme criteria of response Sensitivity remained the same and the criterion index increased as a function of time Skin resistance also increased progressively The TSD parameters changed in accordance with Welford's activation hypothesis prediction, activation was closely related to the criterion and strategy of decision-making, and not to sensitivity (Author)

A75-22201 **The effect of rating scale parameters on the assessment of vibration intensity** D J Oborne and M. J Clarke (Swansea, University College, Swansea, Wales) *Ergonomics,* vol 18, Jan 1975, p 67-79 10 refs Research supported by the Science Research Council

Two experiments were performed to investigate the effects of (1) rating scale type (rating line or magnitude estimation scale), (2) scale ends and (3) type of rating line, on subjective ratings of vibration intensity Twenty-five S's took part in the first experiment (rating line) and the results indicated that neither different types of rating line nor the more common types of scale ends differentially affected rating behaviour The stimuli used in Experiment I were presented to eighteen S's in Experiment II, who were required to make their ratings by ascribing a number to each stimulus (magnitude estimation) The results obtained from this experiment were very similar to those of Experiment I In addition to the above it was demonstrated that the rating method is a highly reliable method of obtaining subjective responses to vibration stimuli (Author)

A75-22202 **Waveguide modes and refractive index in photoreceptors of invertebrates** D G Stavenga (Groningen, Rijksuniversiteit, Groningen, Netherlands) *Vision Research,* vol 15, Mar 1975, p 323-330 67 refs Research supported by the Nederlandse Organisatie voor Zuiver-Wetenschappelijk Onderzoek

The refractive index of visual photoreceptors, if estimated by utilizing waveguide propagation, has to be corrected by a factor depending on the occurring mode The correction factor is presented graphically for a number of relevant modes Applied to the honeybee rhabdoms, it is shown that the correction for the mode propagation shifts the refractive index value of the rhabdom n = 1 347 as reported by Varela and Wiitanen (1970), to much higher levels, presumably in the range of n = 1 365 plus or minus 0 006 It is concluded that this value represents an acceptable estimate for the refractive index of invertebrate photoreceptors Observed mode patterns now are in accordance with the theory The consequences of the deduced data for the literature concerning waveguide optical studies of invertebrate photoreceptors are reviewed (Author)

A75-22203 **Saccadic presentation of a moving target** F Holly (Michigan State University, East Lansing, Mich) *Vision Research,* vol 15, Mar 1975, p 331-335 14 refs

Observers viewed a rightward moving dot (CRO Trace) during rightward and diagonal eye movements It was found that (1) with horizontal saccades, when the trace moved at the same velocity as the eyes it appeared as a stationary dot located at the left edge of the trace's path (indicating the absence of an extraretinal movement signal), and (2) whether the perceived target was aligned with the left or right edge of the trace's path (rightward eye movement condition) and whether it appeared to move upward or downward from the actual trace path (diagonal eye movement condition) depended upon whether the velocity of the trace was greater than or less than that of the eyes Results were discussed in terms of ex-afference and re-afference and the interpretation that one makes of such stimuli (Author)

A75-22204 **Temporal independence of the Bezold-Brucke hue shift.** J D Cohen (Mount Holyoke College, South Hadley, Mass) *Vision Research,* vol 15, Mar 1975, p 341-351 30 refs Grant No NIH-EY-00249

The Bezold-Brucke hue shift was measured using a haploscopic matching technique at 12 spectral loci between 450 and 650 nm, for each of five exposure durations from 150 to 2000 msec The size of the luminance-dependent hue shift remained constant across durations, indicating that the hue shift was independent of exposure duration A differential adaptation hypothesis that had been proposed as the unitary basis for the qualitatively similar time-dependent and luminance-dependent hue shifts is incorrect Separate mechanisms must underlie the two types of hue shift It was also shown that under conditions where retinal contrast is eliminated, measures of wavelength discrimination are independent of exposure duration in the 150-2000 msec range (Author)

A75-22205 * **Characteristics of moving visual scenes influencing spatial orientation.** R Held, J Bauer (MIT, Cambridge, Mass), and J. Dichgans (MIT, Cambridge, Mass., Neurologische Universitatsklinik, Freiburg im Breisgau, West Germany) *Vision Research,* vol 15, Mar 1975, p 357-365 19 refs Research supported by the Sloan Foundation, Deutsche Forschungsgemeinschaft Contract No SFB-70, Grant No NIH-1-R01-EY-01191-01, Grant No NGL-22-009-308

A visual display rotating in a frontal plane induces effects equivalent to a change in the apparent direction of gravity. Magnitude of visual tilt was measured as a function of time from onset of rotation, velocity of rotation, and area and retinal location of the stimulating field The major part of the tilt occurs within 30 sec from onset of stimulation It increases with angular velocity, but independently of area and location of field, up to about 30 to 40 deg of rotation per sec and then levels off Tilt increases with field size but the effect of thin ring-fields increases with retinal eccentricity The interaction of visual and nonvisual determinants of the induced effects is discussed (Author)

A75-22206 **Function of perception - Influence of visual parameters (Fonction de perception - Influence des paramètres visuels)** G Cassin (Paris, Université, Institut d'Optique, Paris, France) *Vision Research,* vol 15, Mar 1975, p 367-374 13 refs In French

Some aspects of the perception function are studied This function is defined as the subjective to objective contrast ratio when an object test (sine grating) is observed Various methods of measurements of this function are briefly described and compared The influence of various parameters such as object field, observation distance, and so on, is shown in the case of one of these methods, previously described by Bryngdahl It is found that the results are very dependent upon these parameters This phenomenon contributes to restrict the validity of the measurements and makes difficult a formulation of this function (Author)

A75-22207 **Plane-polarized light in microspectrophotometry.** F I Harosi and F E Malerba (National Institutes of Health, Laboratory of Neurophysiology, Bethesda, Md) *Vision Research,* vol 15, Mar 1975, p 379-388 16 refs

Photoreceptor dichroism (the anisotropic absorption of plane-polarized light by sideways-illuminated visual cells) as measured microspectrophotometrically is analyzed assuming noncollimated measuring light The analysis postulates that the angular distribution of light rays of the measuring beam and the angular distribution of transition moments of the photoreceptor chromophores are governed by independent processes The interaction between light and pigment is assumed to be restricted to absorption (or transmission) such that it leaves the independence of the two probability distributions unaffected The resulting separability of the variables of the two processes leads to mathematical simplifications Measured dichroic ratio is precisely interpreted in terms of axial extinction and condenser aperture Mathematical appendices concerning the distributions of polarization vector in condenser aperture cone and of transition moment vector in cylindrical photoreceptor cell are included S J M

A75-22208 **Spatial summation of foveal increments and decrements.** T E Cohn and D J Lasley (California, University, Berkeley, Calif). *Vision Research,* vol 15, Mar 1975, p 389-399 24 refs Grant No NIH-FR-7006

The findings cited reveal that the same kind of failure of summation that occurs in the spectral and temporal domains (i e , the weakness in Ricco's law) also appears in the spatial domain Stimuli used were luminance increments or decrements of two targets with varying angular separation. At small separations, increment-increment combinations were detected most easily, at intermediate separations, increment-decrements, and at large separations, all stimulus combinations were equally detectable Inhibitory effects were inferred from the intermediate results A proposed model postulates differencing channels that carry information independent of that found in the summing channels This model applies in the wavelength and time domains as well S J M

A75-22209 **Light adaptation and the saturation of colours.** A Valberg (Oslo, University, Oslo, Norway) *Vision Research,* vol 15, Mar 1975, p 401-404 7 refs Research supported by the Norwegian Council for Science and the Humanities and Schweizerischer Nationalfonds zur Forderung der wissenschaftlichen Forschung

The effect of the luminance of an achromatic surround on the saturation of central color stimuli has been measured by means of the haploscopic color matching method It was found that the opponent purity of the matching stimuli varied according to a power function of the luminance of the achromatic surround field The exponent is the same for all five stimuli tested A saturation index is defined that is a measure of the variation of saturation with adaptation luminance (Author)

A75-22210 **The role of on and off transients in determining the psychophysical spatial frequency response** B Breitmeyer and B. Julesz (Bell Telephone Laboratories, Inc., Murray Hill, N.J) *Vision Research,* vol. 15, Mar 1975, p. 411-415 18 refs.

The transient vs sustained channel distinction was investigated by measuring the visual system's sensitivity to sinusoidal gratings of variable spatial frequency when the onsets and/or offsets of their presentations were either abrupt or gradual It was found that the abrupt presentations increased contrast sensitivity at low spatial frequencies but left it unchanged at high frequencies relative to the gradual presentations It was also discovered that at low spatial frequencies, a presentation having an abrupt on- and gradual offset increased contrast sensitivity relative to one having a gradual onset and an abrupt offset I e , the sensitivity increase at low frequencies was primarily due to the abrupt onset. These results are analogous to those obtained with different temporal frequencies and sharp or blurred spatial windows S.J M.

A75-22211 **Stereopsis with large disparities - Discrimination and depth magnitude.** J M Foley, T H Applebaum (California, University, Santa Barbara, Calif.), and W A Richards (MIT, Cambridge, Mass) *Vision Research,* vol 15, Mar 1975, p 417-421 20 refs Grants No NIH-EY-00666, No NIH-EY-00742

Depth discrimination and perceived depth magnitude (indicated by a manual pointing response) were studied for disparities from 0.5 to 8 deg For briefly exposed targets, discrimination and depth magnitude yield somewhat different functions of disparity Discrimination begins to decline when depth magnitude is still increasing This suggests that the variance of the depth signal increases faster than the magnitude of the signal This result is consistent with the notion that stereoscopic processing involves the pooling of the activity of disparity detectors (Author)

A75-22212 **The spatial Broca-Sulzer and sensitization effects for foveal viewing.** K E Higgins (Pennsylvania College of Optometry, Philadelphia, Pa) and E J Rinalducci (Virginia, University, Charlottesville, Va) *Vision Research,* vol 15, Mar 1975, p 423-425 8 refs U S Coast Guard Grant No 83635, Grant No NIH-EY-00353

The results of this experiment show that the spatial Broca-Sulzer effect and the Westheimer sensitization effect cannot be considered synonimous That is, variation in the apparent brightness of a circular stimulus field with change in field diameter and increment threshold variation with change in diameter are different phenomena In order to compare the two effects at similar levels of retinal illuminance, the illuminance needed to produce a constant brightness response as a function of stimulus size was first determined, then it was ascertained whether the combinations of these equally-bright area-retinal illuminance combinations were also equivalent with respect to their effects on the visibility of a small, brief increment-flash. S J M

A75-22213 **The role of positional and orientational disparity cues in human fusional response** J C Wright and A E Kertesz (Northwestern University, Evanston, Ill) *Vision Research,* vol 15, Mar 1975, p 427-430 9 refs Grant No NIH-EY-1055.

The purpose of the study was to isolate the two types of torsional disparity cues, positional vs orientational, in order to determine their relative effectiveness in evoking human cyclofusional response Orientational disparities alone elicited the smallest fusional ranges, positional and orientational cues together, intermediate fusional response, and positional cues alone, the greatest response. Cyclofusional stimulation affords an opportunity to observe the central-mechanism of the brain isolated from the compensatory eye movements present when the fixation point is not stationary S J.M.

A75-22214 **The 'fluttering heart' and spatio-temporal characteristics of color processing. I - Reversibility and the influence of luminance. II - Lateral interactions across the chromatic border.** M W. von Grunau (Toronto, University, Toronto, Canada) *Vision Research,* vol 15, Mar 1975, p 431-440 41 refs National Research Council of Canada Grant No A-0001

The first part of the project consisted of two experiments The first experiment showed that the effect was reversible, i e , that both a red target on a blue background and a blue target on a red background are delayed This finding discounts a theory based on the differential latencies of the rods and cones The second experiment showed that luminance differences were not a necessary or sufficient condition for the fluttering heart effect, whereas color differences were both a necessary and sufficient condition for the phenomenon. Thus the fluttering heart arises from a genuine delay in the visual system and not from a phase difference In the second part of the project it was demonstrated that lateral interactions between the

color processing mechanisms across the chromatic target-background border are responsible for the lags these lags were eliminated by placing a black border around the colored target Findings from both parts of the project correspond with literature data S J M

A75-22215 Graded, unitary and eye movement potentials in lateral geniculate nucleus following reticular stimulation J B Munson, C J Van Hartesveldt, and D C Spray (Florida, University, Gainesville, Fla) *Vision Research,* vol 15, Mar 1975, p 443-446 22 refs NSF Grant No GB-7622, Grant No NIH-MH-10320-08

A75-22216 Precise recording of human eye movements H Collewijn, F van der Mark, and T C Jansen (Erasmus University, Rotterdam, Netherlands) *Vision Research,* vol 15, Mar 1975, p 447-450

A modification of the Robinson method of measuring eye movements (by mounting an induction coil on a scleral contact lens and generating an a c magnetic field around the subject's head, which induces an a c potential in the coil that is variable with eye position) is described Instead of a full lens, only an ocular ring is mounted on the limbic area, concentric to the cornea Slipping is much less frequent, the cornea bulges less, and the subjects are more comfortable than in the original method Results of measurements with the new carrier system show a satisfactory correlation between eye movement measurements and inputs to an oscilloscope spot followed by the eye S J M

A75-22217 What causes decay of pattern-contingent chromatic aftereffects D M MacKay and V MacKay (Keele, University, Keele, Staffs , England) *Vision Research,* vol 15, Mar 1975, p 462-464

Evidence is presented in favor of the explanation that a night's sleep arrests the normal process of decay rather than refreshes the read-out mechanism In the first of two experiments, exposure to red and green gratings before sleep was accompanied by little or no decay of the pattern-contingent chromatic aftereffects (PCCAs) during 6 or 8 hours of sleep The second experiment determined that *absence of optical input, and not sleep per se or darkness,* was responsible for the lack of decay S J M

A75-22296 Differing responses to hypercapnia and hypoxia following pneumotaxic center ablation. W M Saint John (Arkansas, University, Little Rock, Ark) *Respiration Physiology,* vol 23, Jan 1975, p 1-9 20 refs Grant No NIH-5-S01-RR-05350

The main purpose of the present report was to define more concretely the differential brain stem integration of hypoxic and hypercapnic stimuli by examination of hypoxia-induced respiratory alterations following pneumotaxic center ablation under conditions of isocapnia Experimental animals exhibited lower hypercapnia- and hypoxia-induced minute volumes than did control animals at end-expired oxygen partial pressures above 65 mm Hg Below 65 mm Hg, minute volumes of experimental animals became indistinguishable from those of control animals Control brain stem lesions produced no significant respiratory alterations It was concluded that the pneumotaxic center constitutes an integral component of the central chemoreceptor CO2-H+ controlling subsystem S J M

A75-22297 Hyperoxic hyperventilation in carotid-deafferented cats. M J Miller and S M Tenney (Dartmouth College, Hanover, N H) *Respiration Physiology,* vol 23, Jan 1975, p 23-30 19 refs Grant No NIH-HL-02888-17

Breathing changes resulting from carotid sinus nerve section (chemo-deafferentation) were studied Normal air ventilation, tidal volume, and frequency decreased and partial tracheal CO2 pressure increased in deafferented cats relative to intact cats Hyperoxic breathing parameters did not alter significantly relative to normoxic parameters in intact cats, but a dramatic increase in ventilation and tidal volume and decrease in CO2 partial pressure occurred due to hyperoxia relative to normoxia in deafferented animals This experiment explains the transient reduction in ventilation following hyperoxic breaths in normal animals that is known to occur A hypoxic drive center (the chemoreceptor) is inactivated in 100% oxygen Moreover, central mechanisms are in some manner stimulated by hyperoxia, thus the result in deafferented cats S J M

A75-22298 Hypoxia-induced tachypnea in carotid-deafferented cats. M J Miller and S M Tenney (Dartmouth College, Hanover, N H) *Respiration Physiology,* vol 23, Jan 1975, p 31-39 16 refs Grant No NIH-HL-02888-16

The results of this study support the proposal that hypoxia, in the 7-16% oxygen range, in a physiological manner, depresses central tidal volume and stimulates central respiratory frequency generation in unanesthetized, chemodeafferented cats These findings challenge the hypothesis that hypoxia exerts only depressant actions on central regulatory mechanisms, i e , that the peripheral chemoreceptors are responsible for all excitatory responses S J M

A75-22299 Vagal modulation of respiratory control during exercise S Lahiri, S S Mei, and F F Kao (Downstate Medical Center, Brooklyn, N Y) *Respiration Physiology,* vol 23, Jan 1975, p 133-146 16 refs Grants No NIH-HL-04032, No NIH-HL-08805

Respiratory response to chemical stimuli and to exercise was tested in normal and vagotomized dogs Hypercapnic and/or hypoxic arterial stimuli increased both depth and rate of ventilation during rest and exercise in intact animals After bilateral vagotomy chemical drive increased ventilation mostly by depth and little by rate Muscular exercise, however, largely restored frequency response in the experimental group Separate mechanisms are therefore postulated for chemical and exercise respiratory influences the volume-related vagal reflex for the former, and presumably the bulbopontine control for the latter S J.M

A75-22399 G-tolerance and protection with anti-G suit concepts R R Burton and R W Krutz, Jr (USAF, School of Aerospace Medicine, Brooks AFB, Tex) *Aviation, Space, and Environmental Medicine,* vol 46, Feb 1975, p 119-124 12 refs

The effects of pressurizing various functional units of an experimental pneumatic-lever anti-G suit (PLS, frequently called a capstan suit) on +Gz tolerance and protection were determined at relaxed +Gz levels and during +6 Gz for 60 sec - termed high sustained G (HSG) Measured were +Gz tolerance and protection on nine male subjects using light loss criteria, increases in heart rate during HSG and subjective analysis These data from the PLS were compared with similar findings obtained from the same persons wearing the USAF standard anti-G suits (CSU-12/P) with and without suit pressurization Abdominal bladder inflation offered the highest increase in relaxed +Gz tolerance (0 7 G) whereas leg pressurization offered the greatest anti-G protection (heart rate criterion and subjective analysis) at HSG Specifically regarding the PLS, it was found superior to the CSU-12/P at HSG regarding both +Gz protection and subject comfort (Author)

A75-22400 Reaction time performance with and without backscatter from intense pulsed light A R Zeiner and G A Brecher (Oklahoma, University, Oklahoma City, Okla) *Aviation, Space, and Environmental Medicine,* vol 46, Feb 1975, p 125-127 17 refs U S Department of Transportation Contract No FA71-WA-2545

Twenty male graduate students, 22-30 years of age, were assigned by a table of random numbers to two groups, and visual reaction-time performance with and without backscatter was measured The subjects' task was to observe a 5-cm dial face whose needle deflected 2 mm either left or right of center Meter deflections were either preceded by 10 light pulses from a strobe or they were not preceded by light pulses Two measures of performance were recorded (1) voice reaction time in milliseconds, and

(2) errors The error rate (3 5%) did not discriminate between groups or conditions The reaction time (RT) was almost twice as long with backscatter as without backscatter (1,556 ms and 854 ms, respectively) This RT increase was highly reliable statistically The variability of RT performance increased markedly with backscatter In practical terms, the results suggest that the effects of backscatter could induce a cumulative performance decrement in instrument scanning which might endanger air safety (Author)

A75-22401 Telemetric control of heart adaptation during automatic and free-fall parachute jumps R Deroanne, A Cession Fossion, J Juchmes, J C Servais, and J M Petit (Liège, Université, Liege, Institut E Malvoz, Belgium) *Aviation, Space, and Environmental Medicine*, vol 46, Feb 1975, p 128-131 12 refs

Telemetered heart rate recordings have been obtained from 17 parachutists (6 during automatic jumps, 11 during free-fall jumps) Catecholamine (adrenaline and noradrenaline) concentrations have been measured in urine and plasma of six of these subjects No difference appears between heart rates recorded in the two types of jumps at egress and at parachute deployment On the other hand, higher heart-rate values are recorded during automatic jumps during descent and at ground impact The urine catecholamine analysis after jump shows a statistically significant increase in adrenaline and noradrenaline concentrations It is suggested that simulation of the orthosympathetic system is due to two facts muscular work performed during jumping and the emotional stress which it involves The importance of these two causes varies with the jump circumstances (Author)

A75-22402 * Changes in serum proteins, viscosity, and protein-bound carbohydrates during prolonged bedrest D E McMillan (Sansum Medical Research Foundation, Santa Barbara, Calif) and C L Donaldson (U S Public Health Service Hospital, San Francisco, Calif) *Aviation, Space, and Environmental Medicine*, vol 46, Feb 1975, p 132-135 20 refs Grant No NGR-05-073-001

A75-22403 * Changes in haptoglobin and other plasma proteins of rats during exposure to pure oxygen at 760 torr B W Grunbaum (California, University, Berkeley, Calif) and H A Leon (NASA, Ames Research Center, Moffett Field, Calif) *Aviation, Space, and Environmental Medicine*, vol 46, Feb 1975, p 136-140 13 refs Grant No NGL-05-003-024.

A75-22404 Characteristics of the electrocardiogram under physical and emotional stress in man P V Simonov, M V Frolov, and E P Sviridov (Academy of Sciences, Institute of Higher Nervous Activity and Neurophysiology, Moscow, USSR) *Aviation, Space, and Environmental Medicine*, vol 46, Feb 1975, p 141 143 5 refs.

The changes in the length of the interval R-R and the heart rate are widely used for estimation of man's physical state However, this ECG index has several drawbacks, including a relatively low sensitivity and non-specificity of changes under different states attention and fatigue, physical and emotional stress, etc Moreover, one and the same factor, e g , emotional stress, can lead to both a decrease and an increase in the heart rate, Hence, it is necessary to find other more adequate ECG parameters which would enhance the reliability and accuracy of assessment of man's state An analysis of data found in the literature and the results of preliminary experiments have shown that the amplitude of the T peak and the duration of the R-T interval of the ECG can be used as such parameters (Author)

A75-22405 Glucose tolerance of lowlanders during prolonged stay at high altitude and among high altitude natives K K Srivastava, M M L Kumria, S K Grover, K Sridharan, and M S Malhotra (Defence Institute of Physiology and Allied Sciences, Delhi, India) *Aviation, Space, and Environmental Medicine*, vol 46, Feb 1975, p 144-146 15 refs

A75-22406 Somatic-evoked brain responses as indicators of adaptation to nitrogen narcosis T D Langley and R W Hamilton, Jr (Union Carbide Corporate Research Laboratory, Tarrytown, N Y) *Aviation, Space, and Environmental Medicine*, vol 46, Feb 1975, p 147-151 23 refs NOAA-supported research, Contracts No N00014-69-C-0405, No N00014-72-C-0189

Two two-week experimental pressure-chamber exposures to nitrogen-oxygen breathing mixtures afforded an opportunity to study adaptation to nitrogen narcosis Somatic-evoked brain responses induced by electrical stimulation of the median nerve in the wrist were processed on-line with a signal averager The N1P2 interval was seen generally to be reduced in amplitude as a result of exposure to increased nitrogen partial pressure Compressions with air were made from sea level and saturation to 200, 250 and 300 ft of sea water (fsw) equivalent (61, 76, and 91 m) The decrement was found to be less, for equivalent exposures, in subjects who had been saturated at the pressure of 90 and 120 fsw (27 and 36 m), this is interpreted as evidence of a nonspecific adaptation Less adaptation was seen from 30 and 60 fsw (9 and 18 m) These results are consistent with performance tests on the same exposures, and with subjective impressions Saturation with 3 or 4 atm of nitrogen may permit somewhat deeper diving, without serious narcosis, than is possible from sea level (Author)

A75-22407 Determination of body fluid compartments by electrical impedance measurements P Jenin, J Lenoir, C Roullet, A L Thomasset, and H Ducrot (Lyon I, Universite, Lyons, Hôpital Necker, Paris, France) *Aviation, Space, and Environmental Medicine*, vol 46, Feb 1975, p 152-155 11 refs Translation

The ratio of the LF and HF impedances appears to be an excellent and simple tool for investigation of liquid specimens, either of the total human body, taking into consideration global impedances, or of a particular organ, taking into consideration local impedances A study was made of the global impedance ratio variations with age In most cases, not only does the ratio decrease, but there is extreme difficulty in reestablishing normal values Whatever action is undertaken, it seems that the intracellular liquid compartment remains insufficient with respect to that of the extracellular liquid compartment It is as if the water will not enter in the cells or as if it were no longer retained within the cells Finally, with this concept of impedance ratios, a promising experimental method has been found which will, perhaps, enable better investigations in this field (Author)

A75-22408 Investigation of electrical impedance variations of dog brain tissue during experimental metabolic disturbances J Lenoir, C Roullet, P Jenin, A L Thomasset, and M Pellet (Lyon I, Université, Lyons, France) *Aviation, Space, and Environmental Medicine*, vol 46, Feb 1975, p 156-160 12 refs Translation

A75-22409 Effects of increased partial pressures of oxygen on the embryonic and post-embryonic development of drosophila melanogaster S L Smith and S F Gottlieb (Purdue University, Fort Wayne, Ind) *Aviation, Space, and Environmental Medicine*, vol 46, Feb 1975, p 161-169 22 refs

A75-22410 Emesis in monkeys following exposure to ionizing radiation G R Middleton and R W Young (U S Defense Nuclear Agency, Armed Forces Radiobiology Research Institute, Bethesda, Md) *Aviation, Space, and Environmental Medicine*, vol 46, Feb 1975, p 170-172 15 refs

There were 129 male rhesus monkeys (Macaca mulatta) exposed to prompt radiations (neutron/gamma = 0 4 and pulse width = 50 ms) ranging from 700 to 5600 rad (midhead dose) The animals were fasted 18 h preexposure and observed for incidence of vomiting for 2 h postexposure For doses less than 1000 rads the number of animals that vomited increased directly with dose Above 1000 rads, the number of animals that vomited decreased with increasing dose The total number of vomits per dose group followed a nearly identical pattern to the incidence of emesis In all dose groups, most of the emetic episodes occurred between 20 and 50 min postirradiation (Author)

A75-22411 Human amino acid excretion patterns during and following prolonged multistressor tests. H B Hale, J B Garcia, Jr , J P Ellis, Jr , and W F Storm (USAF, School of Aerospace Medicine, Brooks AFB, Tex) *Aviation, Space, and Environmental Medicine,* vol 46, Feb 1975, p 173-178 13 refs

As a feasibility study, two men were tested in a series of simulated flights which comprised a factorial experiment Physiologic data were collected during a 2-d baseline period, four 36-h experimental periods, and four recovery periods The experimental conditions were as follows (1) uncomplicated simulated flight, (2) flight complicated by extreme environment dryness, (3) flight complicated by mild hypoxia, and (4) flight complicated by both dryness and hypoxia Five other men were studied under baseline conditions and during a 48-h simulated flight complicated by hypoxia Urinary nitrogeneous metabolites, including individual amino acids, were examined for sensitivity to the stressor complexes Certain of the amino acids had high stressor sensitivity, tending to differentiate the effects of the single, double, and triple stressor complexes They also differentiated the physiologic states in the experimental and recovery periods (Author)

A75-22412 Climatologic aspects of obesity and therapeutic semistarvation. H B Hale, J P Ellis, Jr., and E W Williams (USAF, School of Aerospace Medicine, Brooks AFB, Tex) *Aviation, Space, and Environmental Medicine,* vol 46, Feb 1975, p 179-185 56 refs

Multifactor stress was studied, using obese men subjected to long-term (49-d) semistarvation in either a temperate or a hot climate The study was wide in scope, giving information on endocrine-metabolic effects of (1) uncomplicated obesity, (2) obesity in combination with climatic heat, (3) obesity plus semistarvation, and (4) obesity combined with semistarvation plus climatic heat The test subjects - groups of 12 to 13 obese men - remained on a diet which provided 335-400 kcal/d and contained at least 45 g protein, 14 g carbohydrate, and 11 g fat Overnight urine specimens collected at 7-d intervals were analyzed for epinephrine, norepinephrine, 17-OHCS, ketones, urea, uric acid, creatinine, inorganic phosphate, sodium, and potassium Most of the physiologic response patterns in the triple-stressor circumstance were unlike those in the double-stressor situation Thus, there was evidence of compounding of stressor effects Evidence of diminished sensitivity to heat appeared when obesity was lessened (Author)

A75-22414 Catecholamine and phagocytic responses in infected mice exposed to hyperbaric helium-oxygen atmospheres W D Won (California, University, Berkeley, Calif) and H C Ross (U S Navy, Naval Supply Center, Oakland, Calif) *Aviation, Space, and Environmental Medicine,* vol 46, Feb 1975, p 191-193 8 refs Research supported by the Bureau of Medicine and Surgery and U S Navy.

A75-22415 EEG criteria for flying fitness applied by the German Air Force Institute of Aviation Medicine. H Oberholz (Bundesministerium der Verteidigung, Flugmedizinisches Institut, Furstenfeldbruck, West Germany), J Kugler (Neurologische Klinik, Munich, West Germany), and W Jessberger (St -Hedwigshospital, Regensburg, West Germany) *Aviation, Space, and Environmental Medicine,* vol 46, Feb 1975, p 194-198 25 refs

A re-evaluation of EEGs of more than 1000 applicants for flying training is presented All EEG abnormalities were re-evaluated by three EEG specialists Out of 1630 EEG records, 5 4% were classified as abnormal and, of these, 24 were found to have a bearing on flying qualification SW-variants and paroxysms were cause for elimination in any case This study led to the adoption of the following policy any subject showing EEG abnormalities, possibly requiring a permanent elimination, will undergo a second EEG by another examiner In cases with EEG anomalies, a followup EEG is done with a concurrent sensory-motor performance test This is supplemented by an evaluation of collateral cerebral circulation, using unilateral and bilateral compression of the vertebral and carotid arteries In cases without noticeable performance deficiencies, another EEG is done a year later in order to excluse a progression of the EEG anomalies (Author)

A75-22416 Drug interactions - How to identify them. T Q Davis (USAF, School of Aerospace Medicine, Brooks AFB, Tex) *Aviation, Space, and Environmental Medicine,* vol 46, Feb 1975, p 199-203 10 refs

Interactions between therapeutic agents have been recognized as increasingly important causes of drug toxicity Combinations of certain drugs at their usual recommended dose may, under certain conditions, produce toxicity of life-endangering proportions While the recognition of drug toxicity resulting from interactions is of importance to all physicians, it is especially so for the clinician responsible for the welfare of those in the aerospace environment This paper attempts to provide a basis for the understanding and identifications of important drug interactions Guidelines are provided to assist the clinician in his logical approach to the identification of drug interactions when serious drug toxicity is encountered in a patient Only with knowledge of the interaction can the therapeutic regimen be altered so as to provide therapeutic levels of necessary drugs while avoiding toxicity (Author)

A75-22417 Pseudo-internuclear oculomotor ophthalmoplegia secondary to Guillain-Barré polyneuronitis simulating myasthenia gravis in an air transport pilot. S Diamond, M F Leeds (Pan American World Airways, Inc , San Francisco, Calif), and H E Schear *Aviation, Space, and Environmental Medicine,* vol 46, Feb 1975, p 204-207 7 refs

A75-22454 * Ultrastructural studies on plasma membrane related secondary vacuoles in cultured cells. P G Mahlberg, F R Turner, C. Walkinshaw, and S Venketeswaran (Indiana University, Bloomington, Ind) *American Journal of Botany,* vol 61, Aug 1974, p 730-738 15 refs Contracts No NAS9-9211, No NAS9-10947

A75-22455 * Depth of immersion as a determinant of the natriuresis of water immersion. M. Epstein (Miami, University, U S Veterans Administration Hospital, Miami, Fla , Howard Hughes Medical Institute), M Miller, and N Schneider (Miami, University, U S Veterans Administration Hospital, Miami, Fla) *Society for Experimental Biology and Medicine, Proceedings,* vol 146, 1974, p 562-566 11 refs Research supported by the U S Veterans Administration, Grants No NIH-RR-261, No NGR-10-007-097

The current study was undertaken to further assess the contribution of an immersion-induced hydrostatic pressure gradient on the redistribution of blood volume The rate of sodium excretion by seated subjects was significantly increased by water immersion up to the chest and neck compared to waist immersion and controls These results are consistent with the hypothesis that whereas immersion to the level of the diaphragm merely cancels the

intravascular hydrostatic pressure gradient by providing an identical external gradient, immersion above the diaphragm level results in increased water pressure which tends to favor a shift in blood volume from the lower extremities S J M

A75-22465 Constituents of human muscle in isometric fatigue. J Karlsson, C F Funderburk, B Essen, and A R Lind (St Louis University, St Louis, Mo) *Journal of Applied Physiology* vol 38, Feb 1975, p 208-211 14 refs Contract No F33615-71-C 1320

Three subjects performed five successive isometric contractions to fatigue, the tension in any one experiment was constant at tensions varying from 20 to 80% of the maximal voluntary contraction (MVC) The interval between contractions was held constant at 11 min Muscle biopsy specimens were obtained at the start of the experiment, after the first, fourth, and fifth, and before the second and fifth of the successive contractions The concentrations of ATP, CP, glycogen, and lactate were measured in each sample of muscle Changes in ATP and glycogen were insufficient to be held accountable for the development of isometric fatigue Changes in CP and lactate were large after fatigue at intermediate tensions, but those of CP were considered unlikely to be repsonsible for the fatigue At tensions of 30-50% MVC the increase in lactate could be responsible for fatigue either directly or by indirect changes in pH, at higher and lower tensions the possibility that lactate is directly implicated in the development of fatigue seems remote (Author)

A75-22466 # Effect of physical training on the metabolism of thyroid hormones in man. A Balsam and L E Leppo (USAF, School of Aerospace Medicine, Brooks AFB, Tex) *Journal of Applied Physiology,* vol 38, Feb 1975, p 212-215 14 refs

A75-22467 # Assessment of the degradation of thyroid hormones in man during bed rest A Balsam and L E Leppo (USAF, School of Aerospace Medicine, Brooks AFB, Tex) *Journal of Applied Physiology,* vol 38, Feb 1975, p 216-219 17 refs

A75-22468 Sleep metabolism and age P Webb and M Hiestand (Webb Associates, Inc , Yellow Springs, Ohio) *Journal of Applied Physiology,* vol 38, Feb 1975, p 257-262. 20 refs Contract No F33615-72-C-1875

Continuous recordings were made of oxygen consumption and EEG, EMG, and EOG during two nights of sleep for 20 men who were between 19 and 63 yr old There was a linear decrease in overnight oxygen consumption with age, even though the older men slept less and woke more often than the younger ones On the first night, oxygen consumption was higher, and sleep stages less like normal than on the second In the second night data, individual oxygen consumptions averaged over the whole night ranged from 138 to 482 ml/min No relationship appeared between stage of sleep and oxygen consumption level, but there was usually a decline in oxygen consumption in the first hour of sleep, and a slow rise in the 2-3 h before awaking Periodic breathing was observed in the men older than 45 yr (Author)

A75-22469 Relative susceptibility of altitude-acclimatized mice to acute oxygen toxicity. P Hall, C L Schatte, and J W Fitch (Colorado State University, Fort Collins, Colo) *Journal of Applied Physiology,* vol 38, Feb 1975, p 279-281 11 refs

The influence of hypoxic acclimatization at altitudes of 0, 5,000, or 15,000 ft on the relative susceptibility to acute oxygen poisoning was determined in 288 adult female mice After acclimatization periods of 1, 2, 4, or 8 wk, the mice were exposed to oxygen at high pressures (OHP) of 4, 6, or 9 ATA, and the times to convulsion and death were recorded A factorial analysis of variance indicated that altitude and OHP level had inverse, log-linear effects on both parameters The duration of acclimatization progressively decreased the time to death The onset of convulsions and death was independent of body weight There were significant interactions on the measured parameters between various combinations of altitude, OHP level, and duration of acclimatization While alterations in the metabolism of gamma-aminobutyric acid and high-energy compounds are common to both hypoxia and hyperoxia, the most plausible explanation of the results relates to the decrease in buffer base induced by hypoxic acclimatization which might have caused CO2 potentiation of OHP symptoms (Author)

A75-22470 Changes of thermal balance induced by passive heating in resting man R Henane and J Bittel (Ministère des Armées, Service de Santé des Armées, Lyons, France) *Journal of Applied Physiology,* vol 38, Feb 1975, p 294-299 24 refs Research supported by the Direction des Recherches et Moyens d'Essais and Service de Santé des Armées

A75-22471 # Tissue oxygenation and splenic erythropoiesis during chronic hypoxia and hypercapnia. R G Streeter, W E Pepelko, and S M Cain (USAF, School of Aerospace Medicine, Brooks AFB, Tex) *Journal of Applied Physiology,* vol 38, Feb 1975, p 309-314 21 refs

Tissue (gas pocket) oxygen levels and erythropoietic activity were monitored in groups of rats chronically exposed to hypoxia, hypercapnia, or a combination of the two conditions Arterial gas tensions and pH were also measured Overall condition of the animals was assessed by comparison of growth rates with pair-fed controls Hypoxic-hypercapnic pocket oxygen pressure values were similar to normoxic-normocapnic values, but greater than in hypoxia-normocapnia, and less than in normoxia-hypercapnia Erythropoietic activity during hypoxia-hypercapnia ceased and the rats had a growth rate significantly below that of other groups While chronic CO2 does increase tissue (pocket) oxygenation to near normal levels, the hypoxic-hypercapnic rats evidenced greater detrimental effects than did rats in hypoxic or hypercapnic environments (Author)

A75-22495 # Mathematical modelling, simulation and experimental testing of biomechanical system crash response. A I King and C C Chou (Wayne State University, Detroit, Mich) *American Institute of Aeronautics and Astronautics, Annual Meeting and Technical Display, 11th, Washington, D C , Feb 24-26, 1975, Paper 75-272* 19 p 102 refs Contract No N00014-69-A-0235-0003

A review of mathematical models simulating biodynamic response to impact acceleration is given along with the associated experimental validation studies that have been performed The types of models surveyed include gross motion simulators, head injury models, and spinal and thoracic models Sufficient details are provided to indicate to potential users their applicability and relative cost (Author)

A75-22694 Long-wavelength analysis of plane wave irradiation of a prolate spheroid model of man. C H Durney, C C Johnson, and H Massoudi (Utah, University, Salt Lake City, Utah) *IEEE Transactions on Microwave Theory and Techniques,* vol MTT-23, Feb 1975, p 246-253 11 refs USAF-supported research

An electromagnetic (EM) field perturbation technique is used to find internal electrical fields and the absorbed power of a prolate spheroid being irradiated by a plane wave when the wavelength is long compared to the dimensions of the spheroid The results show significant differences in the power-absorption patterns with changes in the orientation of the spheroid with respect to the incident EM fields Calculations of the power absorbed by a prolate spheroid model of man are given (Author)

A75-22715 # **Problems associated with studies of vibrations in man-machine systems (Problemy issledovaniia kolebanii v sistemakh 'chelovek-mashina')** K V Frolov and B A Potemkin In Machine dynamics Moscow, Izdatel'stvo Nauka, 1974, p 197-201 7 refs In Russian

The influence of machine-generated vibrations on the human operator is examined on the basis of a man machine block diagram Experimental data concerning the reaction of the human operator to random vibrations are discussed It is shown that the problem under consideration requires further studies in such areas as the biochemical characteristics of the human body, the influence of vibrations on the functional systems of the human organism, and the development of effective vibration protection systems for the operator V P

A75-22740 * **Space Shuttle food galley design concept** N D Heidelbaugh, M C Smith (NASA, Johnson Space Center, Biomedical Research Div , Houston, Tex), R Fischer (Pillsbury Co , Minneapolis, Minn), and B Cooper (Fairchild Republic Co , Farmingdale, N Y) *SAE, AIAA, ASME, ASMA, and AIChE, Intersociety Conference on Environmental Systems, Seattle, Wash , July 29-Aug 1, 1974, SAE Paper 740922* 42 p

A food galley has been designed for the crew compartment of the NASA Space Shuttle Orbiter The rationale for the definition of this design was based upon assignment of priorities to each functional element of the total food system Principle priority categories were assigned in the following order food quality, nutrition, food packaging, menu acceptance, meal preparation efficiency, total system weight, total system volume, and total power requirements Hence, the galley was designed using an 'inside-out' approach which first considered the food and related biological functions and subsequently proceeded 'outward' from the food to encompass supporting hardware The resulting galley is an optimal design incorporating appropriate priorities for trade-offs between biological and engineering constraints This design approach is offered as a model for the design of life support systems (Author)

A75-22742 **Membrane ultrafiltration to treat laundry wastes and shower wastes for water reuse** D Bhattacharyya, P J W The, and R B Grieves (Kentucky, University, Lexington, Ky) *SAE, AIAA, ASME, ASMA, and AIChE, Intersociety Conference on Environmental Systems, Seattle, Wash , July 29-Aug 1, 1974, SAE Paper 740924* 11 p

A75-22743 **Spacecraft applications of electrochemical processes** B M Greenough (Lockheed Missiles and Space Co , Inc , Sunnyvale, Calif) *SAE, AIAA, ASME, ASMA, and AIChE, Intersociety Conference on Environmental Systems, Seattle, Wash , July 29-Aug 1, 1974, SAE Paper 740929* 29 p 5 refs

The development of environmental systems for future long-duration manned space missions is leading to new and sophisticated applications of chemical and electrochemical processes to augment the basic mechanical/electrical systems This paper highlights the role of electrochemical processes in spacecraft environmental systems development and, by example, describes the fundamentals of these processes In overview, oxygen recovery, carbon dioxide removal, two-gas pressure and composition control, water and waste management, and night orbit power supply are shown to be functions which can be at least partially performed with electrochemical processes Oxygen and nitrogen generation by the electrolysis of water and hydrazine, and electrolytic treatment of urine are described as example processes (Author)

A75-22744 * **Environmental carbon dioxide control.** M Onischak, B Baker, and D Gidaspow (Energy Research Corp , Bethel, Conn) *SAE, AIAA, ASME, ASMA, and AIChE, Intersociety Conference on Environmental Systems, Seattle, Wash , July 29-Aug 1, 1974, SAE Paper 740931* 37 p. 12 refs Contract No NAS2-7023

A study of environmental carbon dioxide control for NASA EVA missions found solid potassium carbonate to be an effective regenerable absorbent in maintaining low carbon dioxide levels The supported sorbent was capable of repeated regeneration below 150 C without appreciable degradation Optimum structures in the form of thin pliable sheets of carbonate, inert support and binder were developed Interpretation of a new solid-gas pore closing model helped predict the optimum sorbent and analysis of individual sorbent sheet performance in a thin rectangular channel sorber can predict packed bed performance (Author)

A75-22745 **An electrochemical device for carbon dioxide concentration - System design, performance and steady state analysis.** C H Lin (Lockheed Electronics Co , Inc , Houston, Tex) and J Winnick (Missouri, University, Columbia, Mo) *SAE, AIAA, ASME, ASMA, and AIChE, Intersociety Conference on Environmental Systems, Seattle, Wash., July 29-Aug 1, 1974, SAE Paper 740932* 78 p 14 refs

A system comprised mainly of 90 electrochemical cells has been designed for use as a CO2 concentrator in a manned spacecraft Cabin air, with a CO2 partial pressure of about 3 mm Hg is passed across the cathode of an oxygen-hydrogen fuel cell It is concentrated through the carbonate electrolyte and expelled into the hydrogen-filled anode cavity The total system, as well as the individual cell design, is described Experimental results are shown for the full (90-cell) system and also for smaller scale (1- and 3-cell) tests Excellent consistency among the tests was found A steady state analytical model is developed and numerical simulations of the system are carried out (Author)

STAR ENTRIES

N75-16206*# National Aeronautics and Space Administration National Space Technology Labs, Bay Saint Louis, Miss
AQUATIC PLANTS FOR REMOVAL OF MEVINPHOS FROM THE AQUATIC ENVIRONMENT
B C Wolverton Feb 1975 8 p refs
(NASA-TM-X-72720) Avail NTIS HC $3 25 CSCL 06C

Fragrant waterlily (Nymphaea odorata, Ait), joint-grass (Paspalum distichum L), and rush (Juncus repens, Michx) were used to evaluate the effectiveness of vascular aquatic plants in removing the insecticide mevinphos (dimethyl-1-carbomethoxy-1propen-2-yl phosphate) from waters contaminated with this chemical The emersed aquatic plants fragrant waterlily and joint-grass removed 87 and 93 ppm of mevinphos from water test systems in less than 2 weeks without apparent damage to the plants, whereas rush, a submersed plant, removed less insecticide than the water-soil controls Water-soil control still contained toxic levels of this insecticide, as demonstrated by fish bioassay studies, after 35 days Author

N75-16207# Aerospace Corp, El Segundo, Calif Labs Operation
DESORPTIVE TRANSFER A MECHANISM OF CONTAMINANT TRANSFER IN SPACECRAFT Interim Report
H K Alan Kan 9 Oct 1974 16 p
(Contract F04701-74-C-0075)
(AD-787857, TR-0075(9270-02)-1, SAMSO-TR-74-226) Avail NTIS CSCL 07/4

The transfer of contaminants in spacecraft by desorption is examined In this mechanism, contaminants are transferred in an apparent non-line-of-sight manner by first being adsorbed on and subsequently desorbed from a transfer surface The parameters governing the kinetics of contaminant build-up on a collector surface are determined and discussed (Modified author abstract) GRA

N75-16211*# Tennessee Univ, Memphis Materials Science Toxicology Labs
TOXICITY OF THE PYROLYSIS PRODUCTS OF SPACECRAFT MATERIALS Annual Report, 1 Aug 1973 - 30 Nov. 1974
W H Lawrence 25 Nov 1974 72 p
(Contract NAS9-13617)
(NASA-CR-141497) Avail NTIS HC $4 25 CSCL 06E

A number of spacecraft construction materials are evaluated for the toxic effects of their thermodegradation products on rats Pyrolysis toxicity testing of pyrolysate fumes establish carbon monoxide, carbon dioxide and hydrogen cyanide as the most common intoxicating agents Generally, COHb levels of animals expiring in the test chamber suggest higher concentrations of CO are produced with larger samples of most materials G G

N75-16212*# Washington Univ, Seattle Nuclear Medicine Div
TOTAL BODY CALCIUM ANALYSIS Annual Report, 1 Nov. 1972 - 1 Oct 1974
Tom K Lewellen and W B Nelp 9 Nov 1974 46 p refs
(Contract NAS9-13029)
(NASA-CR-141573) Avail NTIS HC $3 75 CSCL 06P

A technique to quantitate total body calcium in humans is developed Total body neutron irradiation is utilized to produce argon 37 The radio argon, which diffuses into the blood stream and is excreted through the lungs, is recovered from the exhaled breath and counted inside a proportional detector Emphasis is placed on (1) measurement of the rate of excretion of radio argon following total body neutron irradiation, (2) the development of the radio argon collection, purification, and counting systems, and (3) development of a patient irradiation facility using a 14 MeV neutron generator Results and applications are discussed in detail J M S

N75-16213*# Grambling State Univ, La Dept of Physics
LYMPHOID CELL KINETICS UNDER CONTINUOUS LOW DOSE-RATE GAMMA IRRADIATION: A COMPARISON STUDY Semiannual Status Report
Bessie Ruth Foster 12 Feb 1975 15 p refs
(Grant NsG-9014)
(NASA-CR-142068) Avail NTIS HC $3 25 CSCL 06E

The mechanism of cell proliferation is studied in the lymphoid tissue of the mouse spleen under the stress of continuous irradiation at a dose-rate of 10 roentgens per day for 105 days Autoradiography and specific labeling with tritiated thymidine were utilized It was found that at least four compensatory mechanisms maintained a near-steady state of cellular growth (1) an increase in the proportion of PAS-positive cells which stimulate mitotic activity, (2) maturation arrest of proliferating and differentiating cells which tend to replenish the cells damaged or destroyed by irradiation, (3) an increase in the proportion of cells proliferating, and (4) an increase in the proportion of precursor cells The results are compared to previous findings obeserved in the thymus N E R

N75-16214# Westinghouse Electric Corp, Pittsburgh, Pa Astronuclear Lab
NUCLEAR-POWERED ARTIFICIAL HEART PROTOTYPE SYSTEM DEVELOPMENT PROGRAM: PHASE 3 Quarterly Progress Report, 1 Apr. - 30 Jun. 1974
1974 165 p
(Contract AT(11-1)-3043)
(COO-3043-16) Avail NTIS HC $6 25

Thermal insulation component development continued The 26 skirted cup test insulation package was assembled and tested The guarded heater insulation test stands were evaluated Thermal converter development was continued on five specific components, hot finger, control valve, oil pump, bellows seals, and shaft seals Blood pump drive mechanism component development progress is discussed The design of the IVBM thermal converter was completed and is described The blood pump drive mechanism design was completed and most of the components were released for manufacture or purchase Progress in the fabrication of the insulation cups and fluff foil is reported The 60 cup electrical IVBM insulator package was manufactured, assembled, and placed on test Procurement action was initiated for the blood pump drive mechanism fabrication effort and for the auxiliary components Author (NSA)

N75-16215# California Univ, Berkeley. Dept of Mechanical Engineering
AN ENGINEERING ANALYSIS OF THE HUMAN SPINAL COLUMN Final Report
Robert F Steidel, Jr and Keith Markolf 1974 103 p refs
(Grant SRS-RD-3548)
(PB-235383/7) Avail NTIS HC $5 25 CSCL 06B

The spinal column was studied as an engineering structure, and this analysis was applied to the specific problem of spinal bracing There are two key areas of importance in spinal mechanics: (1) the definition of forces, moments, or systems of forces and moments acting upon the spinal column, and (2) the deformation of the intervertebral joint, under load The experimental data were used to design and construct a mechanical model instrumented to measure relative rotation at the intervertegral joint levels The model spine was then inserted into a plastic body jacket and internally inflated into a mock-up of a human torso Bending tests were performed both with this torso alone and with the torso and a lumbosacaral corset or chairback brace GRA

N75-16216# School of Aerospace Medicine, Brooks AFB, Tex
CIRCADIAN VARIATIONS IN RENAL EXCRETION OF MAGNESIUM, CALCIUM, AND PHOSPHORUS DURING A 3-DAY FLIGHT Final Report, Dec 1970 - Dec. 1971
Carl L Giannetta and Vishnampet S Jayanthinathan Sep 1974 11 p refs
(AF Proj 7930, AF Proj 62202F)
(AD-787661, SAM-TR-74-38) Avail NTIS CSCL 06/19

The effect of a 3-day flight on the excretion of calcium, magnesium, and inorganic phosphorus in the urine of C-5 crewmembers was studied The excretion rate of the minerals was analyzed for evidence of circadian rhythm Magnesium showed a significant ($P < 05$) day/time interaction during the flight and day-to-day variation ($P < 05$) during the recovery Phosphorus had a significant time-of-day variation ($P < 05$) The day-to-time and day-to-day variations for calcium were of borderline significance Author (GRA)

N75-16217# Naval Submarine Medical Research Lab , Groton, Conn
BIOCHEMICAL RESPONSES OF MEN TO SIMULATED AIR DIVES OF 100 FEET Interim Report
Donald V Tappan and Elly Heyder 19 Mar 1974 14 p refs (MR0410601)
(AD-787066, NSMRL-774) Avail NTIS CSCL 06/19

Six men were subjected to a simulated dive in air to 100 FSW for one hour followed by a 70-minute decompression Total 24 hour excretions of 12 urinary parameters were measured for two days prior to and 11 days following the dives Blood serum constituents were determined in pre-dive samples, in samples taken immediately upon reaching the surface and in sera obtained for 9 post-dive days Urinary hydroxyproline increased on the 7th day while phosphorus decreased on the 6, 8, and 9th days post-dive Serum electrolyte imbalance occurred during the first 24 hours after the dive and again on the 7th day The first episode results primarily from low potassium excretion while the second from a high sodium output The present findings provide tentative evidence that recovery periods of 7-9 days may necessarily follow shallow or medium depth dives (Modified author abstract) GRA

N75-16218# Naval Submarine Medical Research Lab , Groton, Conn
HEMOSTATIC ALTERATIONS FOLLOWING SEVERE DYSBARIC STRESS Medical Research Progress Report
Michael J Jacey, Richard O Madden, and Donald V Tappan 12 Feb 1974 15 p refs
(AD-787065, NSMRL-773, PR-3) Avail NTIS CSCL 06/19

Hemostatic parameters were measured in the blood of mature Sprague Dawley rats during a three-day period following exposure to a compression-decompression schedule designed to produce severe dysbaric stress The animals were compressed on air to 300 feet of sea water for 30 minutes and stage decompressed over a 42-minute interval Acute decompression stress produced a transient decrease in clotting time Circulating platelet population was unchanged during the early phase of recovery from severe decompression but significantly declined by two days post-surfacing and then returned to control levels by the end of the observation period Associated with this thrombocytopenic episode was a tendency toward platelet aggregation Core temperature measurements indicated the presence of a chronic hyperthermic condition A significant hyperfibrinogenemia developed by one day post-dive with a normalization of fibrinogen content occurring during the following two days No alterations in either prothrombin time or partial thromboplastic time were detected This animal research has much significance in the biomedical aspects of human diver safety and health Author (GRA)

N75-16219*# Stanford Research Inst , Menlo Park, Calif
EFFECTS ON SLEEP OF NOISE FROM TWO PROPOSED STOL AIRCRAFT Final Contractor Report
Jerome S Lukas D J Peeler and J E Davis Jan 1975 31 p refs
(Contract NAS1-12378 SRI Proj 2871)
(NASA-CR-132564) Avail NTIS HC $3 75 CSCL 05E

Responses, both overt behavior and those measured by electroencephalograph to noise by eight male subjects were studied for sixteen consecutive nights Test stimuli were (1) The simulated sideline noise of a short takeoff and landing aircraft with blown flaps (2) the simulated sideline noise of a STOL aircraft of turbofan design, (3) the simulated takeoff noise of the blown flap STOL aircraft, and (4) a four second burst of simulated pink noise Responses to each noise were tested at three noise intensities selected to represent levels expected indoors from operational aircraft The results indicate that the blown flap STOL aircraft noise resulted in 8 to 10 percent fewer sleep disturbance responses than did the turbofan STOL aircraft when noises of comparable intensities from similar maneuvers were used Author

N75-16220*# *Bolt Beranek and Newman, Inc Los Angeles Calif*
EFFECT OF CESSATION OF LATE-NIGHT LANDING NOISE ON SLEEP ELECTROPHYSIOLOGY IN THE HOME Final Report
Karl S Pearsons, Sanford Fidell, Ricarda L Bennett, Joyce Friedman (Calif Univ , Irvine), and Gordon Globus (Calif Univ Irvine) Dec 1974 35 p refs
(Contract NAS1-12261)
(NASA-CR-132543 Rept-2602) Avail NTIS HC $3 75 CSCL 05E

Simultaneous measurements of noise exposure and sleep electrophysiology were made in homes before and after cessation *of nighttime aircraft landing noise Six people were tested all* of whom had been exposed to intense aircraft noise for at least two years Noise measurements indicated a large reduction in the hourly noise level during nighttime hours, but no charge during the daytime hours Sleep measures indicated no dramatic changes in sleep patterns either immediately after a marked change in nocturnal noise exposure or approximately a month thereafter No strong relationship was observed between noise level and sleep disturbances over the range from 60 to 90 db(A) Author

N75-16221# Rochester Univ , N Y Dept of Radiation Biology and Biophysics
SENSATION AND PERCEPTION OF MICROWAVE ENERGY
Sol M Michaelson 1974 12 p refs Presented at the 7th Intern Conf on Environ Toxicity Fundamental and Applied Aspects of Nonionizing Radiation Rochester N Y 5 Jun 1974 Sponsored by AEC and Dept of Navy
(Contract FDA 73-30)
(UR-3490-550 Conf-740658-1) Avail NTIS HC $3 25

Sensing or perception of microwave/radiofrequency energy is accomplished through various mechanisms In mammals the main phenomena of sensation or perception are those of thermal sensations and in selected cases, audition Thermal sensation is accomplished by stimulation of thermosensitive nerve endings in the skin Although some investigators believe that hearing or audition is evidence of direct nerve stimulation the most recent data show this phenomena to be due to electromechanically induced vibrations in tissue and normal reception in the cochlea of the ear Author (NSA)

N75-16222# California Univ., Torrance Dept of Psychiatry
CHEMICAL INDEX TO FITNESS (BIOCHEMICAL CORRELATES OF STRESS IN SPECIALIZED POPULATIONS) Final Report, Sep 1973 - Aug 1974
Robert T Rubin 1 Nov 1974 9 p refs
(Contract N00014-73-C-0127 NR Proj 108-912, NR Proj 202-004)
(AD-787824) Avail NTIS CSCL 05/10

The report discusses studies on the characteristics of the release of both anterior and posterior pituitary hormones as well as their target organ hormones in human subjects under several different conditions of central nervous system activity These studies are encompassing the biorhythms of these hormones and the specific interrelationships of pituitary hormones interacting on their target organ glands GRA

N75-16223# Human Engineering Labs., Aberdeen Proving Ground, Md
THE INFLUENCE OF SIMULTANEOUS AND SEQUENTIAL DISPLAY MODES ON HUMAN INFORMATION-TRANSFER BEHAVIOR Final Report
Eckhard Behr Aug 1974 47 p refs
(AD-787288, HEL-TM-18-74) Avail NTIS CSCL 05/10

The experiment investigated how two display modes affect human information-transfer performance Subjects read test numbers from a cathode-ray tube and entered them into a keyboard The numbers appeared either one digit after another (sequentially) or all digits at once (simultaneously) There were three number-lengths (four, six, and eight digits) and three exposure times (100, 500, and 1000 msec) Performance was evaluated from errors and response times and subjects transfer strategies were examined Simultaneous displays transferred digits *more effectively than sequential ones Performance was better* with shorter numbers or longer exposure times Subjects transferred only four to five digits accurately, and only when the exposure time was 500 msec or longer Their channel capacity approximated 13 bits Author (GRA)

N75-16224# University of Southern Calif., Los Angeles
BUILDING A DISTANCE FUNCTION FOR GESTALT GROUPING Final Report, 1 Jul 1972 - 31 Aug 1974
Albert L Zobrist, Robert E Kalaba, and William Thompson 1974 6 p refs
(Grant DA-ARO(D)-31-124-72-G200)
(AD-787525, AROD-10708-4-EL) Avail NTIS CSCL 09/2

The authors have devised and studied a method of combining multiple cues for grouping A standardized scene has been used to eliminate the semantic problem so that the interaction of texture brightness, and color could be studied The primary goal of the research has been to simulate human performance as closely as possible A secondary goal is the development of a useful and orderly methodology for this area of research Author (GRA)

N75-16225*# National Aeronautics and Space Administration Langley Research Center Langley Station, Va
PRELIMINARY FLIGHT TESTS OF AN OCULOMETER
D B Middleton, G J Hurt, Jr M A Wise, and J D Holt Nov 1974 32 p refs
(NASA-TM-X-72621) Avail NTIS HC $3 75 CSCL 06B

A remote sensing oculometer has been successfully operated during flight tests This device was able to track the pilot s eye-point-of-regard (lookpoint) consistently and unobtrusively in the flight environment The instantaneous position of the lookpoint was determined to within approximately 1 degree Data were recorded on both analog and video tape The video data consisted of continuous scenes of the aircraft's instrument display and a superimposed white dot (simulating the lookpoint) dwelling or moving from instrument to instrument as the pilot monitored the display information during landing approaches Author

N75-16226*# URS/Matrix Co., Huntsville Ala Man Systems Div
AN EVALUATION OF THE ATM MAN/MACHINE INTERFACE PHASE 3 ANALYSIS OF SL-3 AND SL-4 DATA Final Report
James R Bathurst, Jr., Richard F Pain, and Dana B Ludewig Dec 1974 148 p refs
(Contract NAS8-25627)
(NASA-CR-120586, DCN-1-4-50-42583(1F)) Avail NTIS HC $5 75 CSCL 05H

The functional adequacy of human factored crew operated systems under operational zero-gravity conditions is considered Skylab ATM experiment operations generated sufficient telemetry and voice transcript data to support such an assessment effort Discussions are presented pertaining to the methodology and procedures used to evaluate the hardware, training and directive aspects of Skylab 3 and Skylab 4 manned ATM experiment operations Author

N75-16227*# Pillsbury Mills Inc Minneapolis Minn
SPACE SHUTTLE/FOOD SYSTEM STUDY Final Report
1974 48 p refs Prepared Jointly with Fairchild Republic Co
(Contract NAS9-13138)
(NASA-CR-141482) Avail NTIS HC $3 75 CSCL 06H

This document establishes the functional, physical and performance interface requirements are studied between the space shuttle orbiter and the galley water system the orbiter and the galley electrical system, and the orbiter and the galley structural system Control of the configuration and design of the applicable interfacing items is intended to maintain compatibility between co-functioning and physically mating items and to assure those performance criteria that are dependent upon the interfacing items Author

N75-16228*# Chemtric, Inc., Rosemont, Ill
ADVANCE PROTOTYPE SILVER ION WATER BACTERICIDE SYSTEM Final Report, Sep 1973 - Jun 1974
W J Jasionowski and E T Allen Dec 1974 102 p refs
(Contract NAS9-13718)
(NASA-CR-141557, FR-3104) Avail NTIS HC $5 25 CSCL 06K

An advance prototype unit was designed and fabricated to treat anticipated fuel cell water The unit is a single canister that contains a membrane-type prefilter and a silver bromide contacting bed A seven day baseline simulated mission test was performed, the performance was satisfactory and the effluent water was within all specifications for potability After random vibrations another seven day simulated mission test was performed, and results indicate that simulated launch vibrations have no effects on the design and performance of the advanced prototype Bench tests and accelerated breadboard tests were conducted to define the characteristics of an upgraded model of the advance prototype unit which would have 30 days of operating capability A preliminary design of a silver ion generator for the shuttle orbiter was also prepared Author

N75-16229*# Spectrix Corp Houston, Tex
POTABLE WATER TASTE ENHANCEMENT Final Report
Dec 1974 64 p refs
(Contract NAS9-12969)
(NASA-CR-141577) Avail NTIS HC $4 25 CSCL 06K

An analysis was conducted to determine the causes of and remedies for the unpalatability of potable water in manned spacecraft Criteria and specifications for palatable water were established and a quantitative laboratory analysis technique was developed for determinig the amounts of volatile organics in good tasting water Prototype spacecraft water reclamation systems are evaluated in terms of the essential palatability factors N E R

N75-16230*# McDonnell-Douglas Technical Services Co., Inc., Houston Tex
ADVANCE CREW PROCEDURES DEVELOPMENT TECHNIQUES PROCEDURES GENERATION PROGRAM REQUIREMENTS DOCUMENT
J D Arbet, R L Benbow and M L Hawk 20 Dec 1974 26 p ref
(Contract NAS9-14354)
(NASA-CR-141561 MDC-W1006) Avail NTIS HC $3 75 CSCL 05H

The Procedures Generation Program (PGP) is described as an automated crew procedures generation and performance monitoring system Computer software requirements to be implemented in PGP for the Advanced Crew Procedures Development Techniques are outlined NER

N75-16231*# Pillsbury Mills, Inc , Minneapolis, Minn
SPACE SHUTTLE/FOOD SYSTEM STUDY PACKAGE FEASIBILITY STUDY, MODIFICATIONS 3S, 4C AND 5S Final Report
[1974] 41 p Prepared in cooperation with Fairchild Republic Div
(Contract NAS9-13138)
(NASA-CR-141483) Avail NTIS HC $3 75 CSCL 06H
An optimum feeding system for the space shuttle was presented This system consisted of all rehydratable type foods which were enclosed in a 4 in x 4 in x 1 in flexible package A feasibility follow-on study was conducted, and two acceptable feasible prototypes for this package are described Author

N75-16232*# Pillsbury Mills, Inc , Minneapolis, Minn
SPACE SHUTTLE/FOOD SYSTEM STUDY REQUIREMENTS DOCUMENT, MODIFICATIONS 3S, 4C AND 5S Final Report
[1974] 48 p refs Prepared in cooperation with Fairchild Republic Div
(Contract NAS9-13138)
(NASA-CR-141484) Avail NTIS HC $3 75 CSCL 06H
Design specifications are enumerated for a galley subsystem which will provide a centralized location for performing all food related functions (except dining) within the space shuttle orbiter NER

N75-16233# Utah Univ , Salt Lake City
BIOMEDICAL ENGINEERING SUPPORT Quarterly Report, 16 Feb - 15 May 1974
L M Smith and G M Sandquist 15 May 1974 86 p refs
(Contract AT(11-1)-2155)
(COO-2155-12, QR-3) Avail NTIS HC $4 75
During the reporting period a fit trial experiment was conducted to determine and evaluate the accommodation in a calf of the proposed Westinghouse blood pump drive train and electric motor configuration The proposed system would permit exchange of the electric motor with the plutonium loaded thermal converter sometime after total heart replacement had occurred and the calf was convalescing Modifications were made and a tentative drive train system was established which would permit successful interchange of the electric motor and thermal converter Author

N75-16234# Manned Systems Sciences, Inc , Northridge, Calif
TRAINEE PERFORMANCE MEASUREMENT DEVELOPMENT USING MULTIVARIATE MEASURE SELECTION TECHNIQUES Final Report, Dec 1972 - Dec 1973
Donald Vreuls Richard W Obermayer, and Ira Goldstein Sep 1974 52 p refs
(Contract N61339-73-C-0066, ARPA Order 2310)
(AD-787594 NAVTRAEQUIPC-73-C-0066-1) Avail NTIS CSCL 05/9
A study was conducted to extend a descriptive structure for measuring human performance during training to a fixed-wing, high-performance aircraft simulation, and to develop measure selection statistical techniques The effort required (1) definition of candidate performance measures for the simulated flight task, (2) development of computer programs to acquire raw data and produce candidate measures for 18, one-hour training sessions with four participants, and (3) most especially, to develop methods to reduce the resulting candidate measures to a small and efficient set which reflects the skills change that occurs as a function of training It was desired that the resultant measurement have the capability of discriminating between different levels of proficiency and predicting later performance based on measures of current performance Two measure selection methods which were developed and the results of applying them are discussed (Modified author abstract) GRA

N75-16235# Naval Air Development Center, Warminster, Pa Crew Systems Dept
THE ENCAPSULATING LIFE RAFT SYSTEM
Craig S Jencks and David N DeSimone 1 May 1974 24 p refs
(AD-787637, NADC-74103-40) Avail NTIS CSCL 06/7
The encapsulating life raft system has been developed as an emergency flotation platform for the purpose of substantially increasing water survivability for downed aircrewmen of ejection seat type aircraft Actuation of this life raft system during parachute descent results in the aviator becoming rapidly and completely enclosed within the raft system, prior to water impact Water immersion of the aviator is effectively prevented thereby greatly eliminating the survival hazards associated with parachute entanglement, raft boarding, and physiological degradation caused by cold water exposure With the demonstrated ability of this system to prevent water immersion of the man, this life raft has been made an essential component in the development of a passive, fully integrated survival system that expectantly will eliminate the need for cumbersome cold weather anti-exposure garments Verification of both the life raft's feasibility and reliability has been proven in an extensive test program Author (GRA)

N75-17056 British Library Lending Div , Boston Spa (England)
BIOSATELLITE RESULTS OF AN EXPERIMENT
O Gazenko [1974] 6 p Transl into ENGLISH from the Russian
(BLL-M-23466-(5828 4F)) Avail British Library Lending Div , Boston Spa Engl 1 BLL photocopy coupon
The Cosmos 605 satellite carrying white rats, tortoises, insects microorganisms and fungi, landed on the earth bringing back valuable information from its 22-day-long flight Postflight evaluation of weightlessness stress effects on rats established an inhibition of weight gain, reduced oxygen consumption and body temperatures inhibition of oxidative phosphorylation in skeletal muscles, changes in enzyme activity in the tissues of the heart muscle the skeletal muscles, the liver the kidneys and in endocrine glands, as well as disturbance of the fatty metabolism Also demonstrated was reduction in lymphocytes and reticulocytes, and an increase in eosinophils in the peripheral blood G G

N75-17057*# Techtran Corp , Glen Burnie, Md
EFFECT OF EXTREMAL FACTORS ON THE STRUCTURE OF THE ORGANS AND TISSUES
M G Prives ed and S S Mikhaylov ed Washington NASA Feb 1975 93 p refs Transl into ENGLISH of the book Vliyaniye Ekstremalnykh Faktorov na Stroyeniye Organov i Tkaney' Moscow, Meditsina Press, 1972 p 1-95
(Contract NASw-2485)
(NASA-TT-F-791) Avail NTIS HC $4 75 CSCL 06C
High altitude and spaceflight stress effects on animal organs and tissues are studied by observing physiological responses to g-forces hypokinesia, and radiation

N75-17058* Techtran Corp , Glen Burnie, Md
ADAPTATION OF THE VASCULAR SYSTEM TO EXTREMAL FACTORS
M G Prives *In its* Effect of Extremal Factors on the Struct of the Organs and Tissues (NASA-TT-F-791) Feb 1975 p 1-8 refs Transl into ENGLISH from the book ' Vliyaniye Ekstremalnykh Faktorov na Stroyeniye Organov i Tkaney" Moscow, Meditsina Press 1972 p 3-13
CSCL 06C
Exposure to g-forces causes changes in the vascular systems

of animals The vessels are distorted and their contents may escape Various parts of a given organ may react differently according to their structure and arteries will undergo changes that depend on their position relative to the direction of the g-force vector Author

N75-17059* Techtran Corp , Glen Burnie, Md
INFLUENCE OF G-FORCES ON THE BLOOD VESSELS IN THE NERVOUS SYSTEM OF THE RABBIT
N I Zotova V A Muratikova and I N Preobrazhenskaya *In its* Effect of Extremal Factors on the Struct of the Organs and Tissues (NASA-TT-F-791) Feb 1975 p 9-13 refs Transl into ENGLISH from the book "Vliyaniye Ekstremalnykh Faktorov na Stroyeniye Organov i Tkaney Moscow Meditsina Press 1972 p 14-18
CSCL 06C

Arteries in the brain are constricted by g-forces applied in the head-pelvis direction Transversely applied g-forces have less effect Appropriate conditioning can reduce the severity of all g-force applications Author

N75-17060* Techtran Corp Glen Burnie Md
INFLUENCE OF G-FORCES ON THE VESSELS IN THE RETINA, KIDNEY AND UTERUS OF THE RABBIT
Ye A Belyayeva L I Savinova and L M Selivanova *In its* Effect of Extremal Factors on the Struct of the Organs and Tissues (NASA-TT-F-791) Feb 1975 p 15-17 Transl into ENGLISH from the book Vliyaniye Ekstremalnykh Faktorov na Stroyeniye Organov i Tkaney' Moscow, Meditsina Press 1972 p 19-24
CSCL 06C

The vascular system of the retina uterus, and kidneys is highly resistant to the effects of exposure to g-forces The uterine vessels recover more rapidly than those in the retina and kidneys Author

N75-17061* *Techtran Corp Glen Burnie Md*
INFLUENCE OF G-FORCES AND HYPODYNAMIA ON THE PORTAL SYSTEM OF THE LIVER
A V Drozdova *In its* Effect of Extremal Factors on the Struct of the Organs and Tissues (NASA-TT-F-791) Feb 1975 p 18-22 Transl into ENGLISH from the book "Vliyaniyd Ekstremalnykh Faktorov na Stroyeniye Organov i Tkaney' Moscow, Meditsina Press 1972 p 25-28
CSCL 06C

Longitudinally and transversely applied g-forces as intolerable levels cause damage to the interlobular veins of the liver, with maximum damage caused by dorso-ventral g-force application The portal vein system is more resilient with respect to g-forces at the limit of tolerance Author

N75-17062* Techtran Corp , Glen Burnie Md
INFLUENCE OF G-FORCES ON THE NEURORECEPTOR APPARATUS OF THE CARDIOVASCULAR SYSTEM
S S Mikhaylov, V K Klebanov, and S I Yevloyev *In its* Effect of Extremal Factors on the Struct of the Organs and Tissues (NASA-TT-F-791) Feb 1975 p 23-32 refs Transl into ENGLISH from the book ' Vliyaniya Ekstremalnykh Faktorov na Stroyeniye Organov i Tkaney Moscow, Meditsina Press, 1972 p 29-41
CSCL 06C

Morphological and functional changes occur in the nerve apparatus of the cardiovascular system during exposure to g-forces They are reversible at lower magnitudes but not at higher ones Author

N75-17063* Techtran Corp Glen Burnie Md
HISTOLOGICAL ANALYSIS OF TISSUE STRUCTURES OF THE INTERNAL ORGANS OF STEPPE TORTOISES FOLLOWING THEIR EXPOSURE TO SPACEFLIGHT CONDITIONS WHILE CIRCUMNAVIGATING THE MOON ABOARD THE ZOND-7 AUTOMATIC STATION
L S Sutulov, Yu L Sutulov and L V Trukhina *In its* Effect of Extremal Factors on the Struct of the Organs and Tissues (NASA-TT-F-791) Feb 1975 p 33-36 Transl into ENGLISH from the book ' Vliyaniye Ekstremalnykh Faktorov na Stroyeniye Organov i Tkaney' Moscow, Meditsina Press 1972 p 42-44

CSCL 06C

Tortoises flown around the Moon on the 6-1/2 day voyage of the Zond-7 automatic space station evidently did not suffer any pathological changes to their peripheral blood picture heart, lungs intestines, or liver Author

N75-17064* Techtran Corp , Glen Burnie, Md
INFLUENCE OF G-FORCES ON VENOUS AND NERVOUS SYSTEMS
Ye A Dyskin, R A Prives-Bardina and L P Tikhonova *In its* Effect of Extremal Factors on the Struct of the Organs and Tissues (NASA-TT-F-791) Feb 1975 p 37-41 Transl into ENGLISH from the book Vliyaniye Ekstremalnykh Faktorov na Stroyeniye Organov i Tkaney' Moscow Meditsina Press 1972 p 45-49
CSCL 06C

Cats and rabbits were subjected to rotation in the centrifuge Controls were maintained to determine the individual tolerance to g-forces Thickening of the vascular wall was found to occur due to the g-forces' effect as well as other vascular changes Nervous changes included edema and chromatolysis of the nerve cells Author

N75-17065* Techtran Corp Glen Burnie Md
DYNAMICS OF MORPHOLOGICAL MANIFESTATIONS OF REACTIONS OF THE ORGANISM UNDER CONDITIONS OF HYPERGRAVITATION
G D Knyazeva, V K Podymov and Ye A Savina *In its Effect of Extremal Factors on the Struct of the Organs and* Tissues (NASA-TT-F-791) Feb 1975 p 42-45 Transl into ENGLISH from the book Vliyaniye Ekstremalnykh Faktorov na Stroyeniye Organov i Tkaney" Moscow, Meditsina Press, 1972 p 51-55
CSCL 06C

The dynamics of the reaction of the hypothalamus-hypophysis-adrenal system to g-forces of 4 G s magnitude reveal a phasal nature of the adaptational system, dependent both on duration of force and position of the body Author

N75-17066* Techtran Corp Glen Burnie Md
MORPHOLOGICAL MANIFESTATIONS OF THE STRESS REACTION UNDER THE INFLUENCE OF TRANSVERSELY DIRECTED G-FORCES
V P Derevyanko, Yu N Kopayev and Yu V Mashkovtsev *In its* Effect of Extremal Factors on the Struct of the Organs and Tissues (NASA-TT-F-791) Feb 1975 p 46-50 refs Transl into ENGLISH from the book "Vliyaniye Ekstremalnykh Faktorov na Stroveniye Organov i Tkaney Moscow Meditsina Press, 1972 p 56-61
CSCL 06C

Multiple exposure to g-forces evokes alarm reactions in animals which are reflected in increased secretion from the ACTH cells and adrenocorticocytes, with increased lymphocytolysis and suppressed mitotic activity Author

N75-17067* Techtran Corp , Glen Burnie, Md
INVESTIGATION OF CARBOHYDRATE AND PROTEIN METABOLISM IN THE DIGESTIVE ORGANS OF THE RABBIT UNDER THE COMBINED INFLUENCE OF VIBRATION, ACCELERATION AND IRRADIATION
R I Yuy *In its* Effect of Extremal Factors on the Struct of the Faktorov na Stroyeniye Organov i Tkaney" Moscow, Meditsina Press, 1972 p 62-65

During spaceflight, the organism is subjected to the influence of various extremal factors such as acceleration, vibration, irradiation, etc The study of the influence of these factors on metabolism, especially carbohydrate and protein metabolism in young rabbits is of great significance in simulation experiments Dynamic factors and irradiation, depending on dose and duration, lead to reduced RNA and protein metabolism Author

N75-17068* Techtran Corp , Glen Burnie, Md
MORPHOLOGICAL AND CYTOCHEMICAL INDICES OF THE STRESS REACTION IN THE BLOOD SYSTEM UNDER THE INFLUENCE OF G-FORCES
N A Yurina *In its* Effect of Extremal Factors on the Struct of the Organs and Tissues (NASA-TT-F-791) Feb 1975 p 55-58 refs Transl into ENGLISH from the book "Vliyaniye Ekstremalnykh Faktorov na Stroyeniye Organov i Tkaney" Moscow Meditsina Press, 1972 p 66-68
CSCL 06C

G-forces cause morphological and cytochemical changes characteristic of the stress reaction The cytochemical changes in RNA content on lymphocytes glycogen, and activity of oxidative enzymes in granulocytes are phasal in nature Author

N75-17069* Techtran Corp , Glen Burnie, Md
STRUCTURAL AND CYTOCHEMICAL INVESTIGATIONS OF THE GRAVITY RECEPTOR UNDER CONDITIONS OF RELATIVE REST AND FOLLOWING EXPOSURE TO ACCELERATIONS
M Z Aronova, L K Titova, and T P Tsirulis *In its* Effect of Extremal Factors on the Struct of the Organs and Tissues (NASA-TT-F-791) Feb 1975 p 59-62 refs Transl into ENGLISH from the book Vliyaniye Ekstremalnykh Faktorov na Stroyeniye Organov i Tkaney' Moscow, Meditsina Press 1972 p 70-73

When investigating the influence of g-forces on vertebrates a number of cytochemical and ultrastructural changes are observed deflection of the stereocilia change in concentration as well as the localization of a number of chemical biologically active substances, displacement of the mitochondria their pressure against the membranes the release into the cytoplasm of the ribosomes of nucleolar RNA the formation of additional membranes in the cytoplasmatic network etc According to preliminary data, it is assumed that similar processes are observed in the gravity receptors of invertebrates as well It is concluded that gravity receptors in vertebrates and invertebrates are strikingly similar despite different evolutionary paths Author

N75-17070* Techtran Corp , Glen Burnie, Md
INFLUENCE OF MAXIMUM TOLERABLE TRANSVERSELY-DIRECTED G-FORCES ON THE ULTRASTRUCTURE OF INTERCELLULAR AND INTRACELLULAR CHANNELS IN THE ADENOHYPOPHYSIS
V S Strizhkov *In its* Effect of Extremal Factors on the Struct of the Organs and Tissues (NASA-TT-F-791) Feb 1975 p 63-67 Transl into ENGLISH from the book "Vliyaniye Ekstremalnykh Faktorov na Stroyeniye Organov i Tkaney' Moscow, Meditsina Press, 1972 p 74-79
CSCL 06C

Exposure of rats to g-forces of high magnitude results in changes in the ultrastructure of the intercellular channels of the adenohypophysis Evidence indicates that the chromophobic cells in the walls of the channels and pseudofollicles exert a secretory activity Author

N75-17071* Techtran Corp , Glen Burnie, Md
HISTOLOGICAL ANALYSIS OF THE INFLUENCE OF CERTAIN EXTREMAL FACTORS ON THE POSTRADIATIONAL CHANGES IN THE TISSUES OF EXPERIMENTAL ANIMALS
L S Sutulov N A Gaydamakin, and Yu L Sutulov *In its* Effect of Extremal Factors on the Struct of the Organs and Tissues (NASA-TT-F-791) Feb 1975 p 68-73 Transl into ENGLISH from the book 'Vliyaniya Ekstremalnykh Faktorov na Stroyeniye Organov i Tkaney' Moscow, Meditsina Press, 1972 p 80-85

Protons with energies of 120 MeV at a dose of 640 rads or gamma-neutron radiation at a dose of 300 rads produce radiation sickness of moderate severity in rats The significance of toxemia and disturbances to the endocrine regulatory system in the development of metabolic processes in various stages of radiation sickness are discussed Author

N75-17072* Techtran Corp , Glen Burnie, Md
MORPHOLOGY OF THE INTERNAL ORGANS IN THE ADAPTATION OF ANIMALS TO HIGH-ALTITUDE CONDITIONS
Ya A Rakhimov, V Sh Belkin and M U Usmanov *In its* Effect of Extremal Factors on the Struct of the Organs and Tissues (NASA-TT-F-791) Feb 1975 p 74-78 Transl into ENGLISH from the book 'Vliyaniye Ekstremalnykh Faktorov na Stroyeniye Organov i Tkaney" Moscow, Meditsina Press 1972 p 87-90
CSCL 06C

Disruption of metabolic processes in the walls of the blood vessels as well as changes in the functional activity of the endocrine glands play an important role in the process of an animal's accommodation to a combination of stress factors Preliminary training of animals for stays at high-altitude markedly reduces the severity of the morphological picture Author

N75-17073* Techtran Corp Glen Burnie, Md
CHANGE IN THE INTRAORGANIC NERVE APPARATUSES OF MUSCLES UNDER CONDITIONS OF THE COMBINED ACTION OF A dc MAGNETIC FIELD AND ACCELERATION
V P Govev and G V Chepelenko *In its* Effect of Extremal Factors on the Struct of the Organs and Tissues (NASA-TT-F-791) Feb 1975 p 79-83 refs Transl into ENGLISH from the book "Vliyaniye Ekstremalnykh Faktorov na Stroyeniye Organov i Tkaney' Moscow, Meditsina Press, 1972 p 91-95

CSCL 06C

Damage to neurons in the rat when the animals are subjected to a constant magnetic field is a function of their reactive capacity The reactive stage is characterized by dystrophic changes without any definite signs of destruction of tissue Author

N75-17074*# Scientific Translation Service, Santa Barbara, Calif
CONTRIBUTION TO THE QUESTION OF THE CONTAMINATION OF SUSPENDED SUBSTANCES FILTERS BY GERMS
G Reckzeh and W Dontenwill Washington NASA Feb 1975 20 p refs Transl into ENGLISH from Zentralbl Bakteriol Parasitenk , Abt 1 Orig B (East Germany), v 159 1974 p 272-283
(Contract NASw-2483)
(NASA-TT-F-16149) Avail NTIS HC $3 25 CSCL 06M

The germ-count of HEPA-filtered air and the germ content of HEPA filters in the air conditioning plant of an experimental animal department, constructed in accordance with the barrier system are reported In the 888 samples routinely collected with slit samplers during the 26 months' operation of the filters a total quantity of 503 cu m HEPA-filtered supply air was investigated In these investigations no germs were detected, either with slit samplers or on sedimentation plates In measurements performed with Greenburg-Smith impingers on a total quantity of 20 4 cu m air a total of 3 colonies of Staph albus were detected in 2 out of 36 samples, but these should be regarded as contamination produced during the test procedure itself Author

N75-17075*# Scientific Translation Service Santa Barbara, Calif
INHIBITION OF GERMINATION OF ACTINOMYCETES SPORES IN A STATIONARY MAGNETIC FIELD
R R Aslanyan S V Tulskiy, L M Pozharitskaya, and Ye A Lapteva Washington NASA Feb 1975 7 p refs Transl into ENGLISH from Mikrobiologiya (USSR), v 42, no 3 p 556-558
(Contract NASw-2483)
(NASA-TT-F-16203) Avail NTIS HC $3 25 CSCL 06C

Research exploring the reaction of biological systems to various components of electromagnetic radiation was conducted It was found that a stationary magnetic field (10 000 ersted) inhibits the germination of the spores of Actinomyces streptomycini B-6 and Thermoactinomyces vulgaris 136 Author

N75-17076*# Kanner (Leo) Associates Redwood City Calif
FREQUENCY OF DIFFERENTIATED SECTORED COLONIES AMONG BACTERIA IN SUSPENSION IN THE OUTSIDE AIR OBSERVED OVER THREE YEARS (ITS CORRELATION WITH VARIOUS PARAMETERS. WOLF'S NUMBERS, SOLAR FLUX, GEOMAGNETIC ACTIVITY, FLUCTUATING PHENOMENA
P Faraone Washington NASA Feb 1975 22 p refs Transl into ENGLISH from Ann Sclavo (Italy), v 15 no 2, Mar-Apr 1973 p 207-224
(NASA-TT-F-16202) Avail NTIS HC $3 25 CSCL 06M

The incidence of the colonies with differentiated sectors among the bacteria suspended in the external air during three years has been studied It seems probable that the frequency may be connected with many astrophysical factors, as for instance the fluctuating phenomena Author

N75-17077*# Hawaii Univ, Honolulu Botany Dept
THE PERFORMANCE AND CAPABILITIES OF TERRESTRIAL ORGANISMS IN EXTREME AND UNUSUAL GASEOUS AND LIQUID ENVIRONMENTS Ph D Thesis Semiannual Report
Sanford M Siegel Nov 1974 63 p refs
(Grant NGL-12-001-042)
(NASA-CR-142192, Rept-38) Avail NTIS HC $4 25 CSCL 06M

The similarities and differences in salt and cold tolerance mechanisms of Dunaliella salina and Dunaliella tertiolecta are described Author

N75-17078*# Catholic Univ of America Washington D C
DATA PROCESSING PROGRAMS FOR NONLINEAR ANALYSIS OF AORTIC FLOW IN LIVING DOGS
S C Ling, H B Atabek and W G 04Patel Letzing D J Aug 1973 35 p Submitted for publication
(Grants NGL-09-005-067, HE-12083-05)
(NASA-CR-142085 PB-235997/4, NIH/NHLI/ATHERO-73-1) Avail NTIS HC $3 75 CSCL 06P

A nonlinear theory which considered the convective accelerations of blood and the nonlinear elastic behavior and taper angle of the vascular wall was used to study the nature of blood flow in arteries of living dogs The theory predicts velocity profiles wall friction, and discharge wave from locally measured input data about the pressure-gradient wave and the arterial distention Computer programs for performing the data reduction and calculation are presented GRA

N75-17079# Advisory Group for Aerospace Research and Development Paris (France)
SURVEY OF CURRENT CARDIOVASCULAR AND RESPIRATORY EXAMINATION METHODS IN MEDICAL SELECTION AND CONTROL OF AIRCREW
A Scano (Scoula Militare di Sanita Aeronautica, Roma) Dec 1974 138 p refs
(AGARD-AG-196, AGARDograph-196) Avail NTIS HC $5 75

Procedures for conducting the physical examination of aircrew personnel to determine the condition of cardiovascular and respiratory systems are discussed The examination methods are identified by the country in which performed Charts are developed which summarize the procedures with respect to (1) the method used, (2) the aim, (3) the techniques for implementation, (4) the limits of reliability, (5) the weight conferred on each test, *and (6) an evaluation of the results* P N F

N75-17080*# National Aeronautics and Space Administration Lyndon B Johnson Space Center, Houston, Tex
SKYLAB MEDICAL DATA CENTER AND ARCHIVES
Fred R Spross Dec 1974 13 p
(NASA-TM-X-58148, JSC-09293) Avail NTIS HC $3 25 CSCL 06E

The founding of the Skylab medical data center and archives as a central area to house medical data from space flights is described Skylab program strip charts, various daily reports and summaries, experiment reports and logs status report on Skylab data quality, raw data digital tapes, processed data microfilm, and other Skylab documents are housed in the data center In addition this memorandum describes how the data center acted as a central point for the coordination of preflight and postflight baseline data and how it served as coordinator for all data processing through computation and analysis Also described is a catalog identifying Skylab medical experiments and all related data currently archived in the data center Author

N75-17081*# Texas A&M Univ College Station Engineering Experiment Station
RADIATION EFFECTS CONTROL EYES, SKIN Final Report, 1 Oct. 1969 - 31 Dec 1974
Dan Hightower and J B Smathers Dec 1974 148 p
(Contract NAS9-9053)
(NASA-CR-141612) Avail NTIS HC $5 75 CSCL 06R

Adverse effects on the lens of the eye and the skin due to exposure to proton radiation during manned space flight were evaluated Actual proton irradiation which might be encountered in space was simulated Irradiation regimes included single acute exposures daily fractionated exposures and weekly fractionated exposures Animals were exposed and then maintained and examined periodically until data sufficient to meet the objective were obtained No significant skin effects were noted and no serious sight impairment was exhibited Author

N75-17082*# Battelle Memorial Inst, Richland, Wash Physics and Instrumentation Dept
STUDY OF BONE MINERAL METABOLISM Final Report, 1 Jul - 31 Dec 1974
H E Palmer 13 Jan 1975 17 p refs
(Contract NAS9-14248)
(NASA-CR-141608) Avail NTIS HC $3 25 CSCL 06P

The use of Sr-85 as an indicator of the skeletal location and relative amount of bone demineralization which occurs during immobilization of the body or body parts, bed-rest or space flight was studied The bone mineral replacement which occurs after immobilization was measured rather than the bone loss which occurs during immobilization In a study with two adult beagle dogs, the Sr-85 uptake in a leg which had been immobilized for two months was 400 percent higher than the uptake in the legs in regular use This increased uptake probably resulted from only a few percent loss in bone mineral and indicates that losses less than one percent can be easily detected and located The sensitivity, simplicity, and low radiation dose associated with the use of this method indicates that it should receive consideration for use on humans in bed-rest and space flight studies Methods for measuring changes in total body nitrogen and in assisting the Johnson Space Center in calibrating a whole body counter *for total body potassium measurements were also investigated* Author

N75-17083*# Battelle Memorial Inst, Richland, Wash Physics and Instrumentation Dept
CONTINUED INVESTIGATION OF KINETIC ASPECTS OF BONE MINERAL METABOLISM Final Report, 1 Feb 1973 - 28 Feb. 1974
H E Palmer 26 Feb 1974 29 p refs
(Contract NAS9-13235)
(NASA-CR-141607) Avail NTIS HC $3 75 CSCL 06P

The total body calcium in humans was determined by measuring expired Ar-37 after neutron irradiation The excretion of Ar-37 from humans was found to be much slower than the *excretion from rats and dogs, and to be related to the age of a* person A study of the uniformity of the Ar-37 production throughout the thickness of the body was studied using phantoms The results indicate that it should be possible to obtain a uniformity within plus or minus 3% for the production of Ar-37 per unit of calcium by using a bilateral irradiation New low background,

large volume proportional counters were developed and constructed, for more sensitive measurement of Ar-37 in the expired air from patients A new irradiation enclosure was developed for measuring total body calcium in rats by the Ar-37 method With this enclosure the Ar-37 production per gram of calcium is constant with a standard deviation of plus or minus 2 8% for any size rat between 100 and 500 grams The use of Na-22 as measure of bone replacement in the fractured femur of a dog was not successful Author

N75-17084*# Colorado State Univ, Fort Collins Dept of Mechanical Engineering
DEVELOPMENT OF ULTRASONIC METHODS FOR HEMODYNAMIC MEASUREMENTS Progress Report
M B Histand, C W Miller, M K Wells, F D Mcleod E R Greene and D Winter 1 Feb 1975 115 p refs
(Grant NsG-2009)
(NASA-CR-141235) Avail NTIS HC $5 25 CSCL 06D

A transcutanous method to measure instantaneous mean blood flow in peripheral arteries of the human body was defined Transcutanous and implanted cuff ultrasound velocity measurements were evaluated and the accuracies of velocity, flow, and diameter measurements were assessed for steady flow Performance criteria were established for the pulsed Doppler velocity meter (PUDVM) and performance tests were conducted Several improvements are suggested N E R

N75-17085*# Kanner (Leo) Associates, Redwood City Calif
SPACE MISSION IN TASHKENT
A Tankhelson and Sh Zaynutdinov Washington NASA Feb 1975 7 p Transl into ENGLISH from Pravda Vostoka (USSR), 3 Nov 1974 p 4
(Contract NASw-2481)
(NASA-TT-F-16161) Avail NTIS HC $3 25 CSCL 06E

An account of the fifth conference of the joint Soviet-American Working Group on Space Biology and Medicine, held at Tashkent is presented Topics discussed the spaceflight results of Soviet research methods, and exchange of research reports Author

N75-17086*# Scientific Translation Service Santa Barbara, Calif
A SCIENTIFIC CONFERENCE ON THE PROBLEM, HYPOXIA DURING PATHOLOGICAL PROCESSES CAUSED BY EXTREME FACTOR, DEVOTED TO THE 80TH BIRTHDAY OF ACADEMICIAN OF THE ACADEMY OF MEDICAL SCIENCES OF THE USSR
Ye V Gubler Ye V Gubler, N V Korostovtseva V K Kulagin, and B R Yaremenko Washington NASA Feb 1975 11 p Transl into ENGLISH from Patol Fiziol Eksp Ter (USSR), no 5, Sep - Oct 1974 p 92-94
(Contract NASw-2483)
(NASA-TT-F-16159) Avail NTIS HC $3 25 CSCL 06E

A description is given of a scientific conference held in Leningrad on the topic of hypoxia during pathological processes The conference was divided into four sessions, and the subjects of each session are itemized and discussed Author

N75-17087# Civil Aeromedical Inst, Oklahoma City, Okla
INDEX TO FAA OFFICE OF AVIATION MEDICINE REPORTS 1961 THROUGH 1973
J Robert Dille and Marcia H Grimm Mar 1974 30 p
(AD-779353, FAA-AM-74-1) Avail NTIS HC $3 25

An index to Office of Aviation Medicine Reports (1964-73) and Civil Aeromedical Institute Reports (1961-63) is presented as a quick reference for those engaged in aviation medicine and related activities It provides a listing of all FAA aviation medicine reports published from 1961 through 1973 by year, number, author, subject and title Author

N75-17088# Oak Ridge National Lab Tenn
POPULATION EXPOSURES PROCEEDINGS OF THE 8TH MIDYEAR TOPICAL SYMPOSIUM OF THE HEALTH PHYSICS SOCIETY
J C Hart, ed, R H Ritchie, ed, and B S Varnadore, ed Oct 1974 446 p refs Symp held at Knoxville, Tenn, 21-24 Oct 1974, sponsored by Comparative Animal Res Lab, Oak Ridge Associated Univ TVA, Union Carbide Corp Nuclear Div, AEC, and Tennessee Univ Sponsored by AEC
(Conf-741018) Avail NTIS HC $11 25

Abstracts of the papers presented at the conference of the Health Physics Society are presented Topics discussed include (1) potential adverse effects that the nuclear power industry may have on the environment (2) pathways of various radionuclides in the biosphere, (3) other radiological hazards, and (4) environmental problems associated with alternatives fossil fuel production F O S

N75-17089# Professional Staff Association of the Rancho Los Amigos Hospital, Inc Downey, Calif
PHYSIOLOGICAL EFFECTS OF AIR POLLUTANTS IN HUMANS SUBJECTED TO SECONDARY STRESS Final Report, 1 Jan 1973 - 30 Jun 1974
Jack D Hackney Sep 1974 178 p refs
(Contract ARB-2-372)
(PB-236151/7 ARB-R-2-372-74-25) Avail NTIS HC $7 00 CSCL 06P

Adult male volunteers were exposed to purified air or to ozone, alone or in combination with nitrogen dioxide and carbon monoxide, in an investigation of physiological effects of photochemical air pollution Exposure conditions simulated those of a smoggy Southern California summer, including the secondary stresses of heat, exercise and repeated exposure Pulmonary function blood biochemistry, psychomotor performance capability and symptoms experienced by the subjects were evaluated Ozone exposures similar to those expected during pollution episodes produced significant decrement in pulmonary function, symptoms sufficient to restrict normal activity, and oxidative changes in erythrocytes Psychomotor tracking ability and measures of attention were adversely affected by heat, but not by ozone exposure Subjects with a history of cough, chest discomfort, or wheezing associated with allergy or exposure to air pollution were more reactive than subjects without such a history Author

N75-17090# Naval Postgraduate School, Monterey, Calif
A STATISTICAL EVALUATION OF THE THEORY OF BIORHYTHMS M S Thesis
Louis John Giannotti Sep 1974 75 p refs
(AD-787377) Avail NTIS CSCL 06/16

The thesis presents an interpretation of the theory of biorhythms and develops a combined statistical model for a statistical calidation of the theory The model is then used to investigate a set of intellectual data and a set of accident data The intellectual data is based upon 112 academic grades taken from four postgraduate school students over a 14 month period The accident data taken from insurance abstracts, consists of 66 accidents which occurred at a pulp plant in British Columbia, Canada Author (GRA)

N75-17091 British Library Lending Div Boston Spa (England)
THE EFFECT OF DISTURBING ACOUSTIC SOURCES ON SOME PSYCHOLOGICAL FUNCTIONS
I Franaszczuk Mar 1974 14 p refs Transl into ENGLISH from Prace Central Inst Ochrony Pracy (Warsaw), v 21, no 71, 1971 p 335-342
(RTS-8831) Avail British Library Lending Div, Boston Spa, Engl £1 30, 4 BLL photocopy coupons

The results obtained from experimental tests on the effect of noise of various physical kinds on the psychomotor capabilities of man, as measured under laboratory conditions, It is found that (1) A band of white noise of mean frequency 4000 Hz prolongs the time of the simple reaction, (2) this noise impairs perceptive capability, (3) in certain conditions a noise of level not over 85 db and not containing predominant high frequency tones can be activating factors, and (4) in disturbing noise man compensates his lowered efficiency by additional effort

N75-17092*# Columbia Univ New York Noise Research Unit
ANNOYANCE AND ACCEPTABILITY JUDGEMENTS OF NOISE PRODUCED BY THREE TYPES OF AIRCRAFT BY

RESIDENTS LIVING NEAR JFK AIRPORT
Paul N Borsky 1 Dec 1974 111 p refs
(Grant NGL-33-008-118)
Avail NTIS HC $5 25 CSCL 05E

A random sample of selected communities near JFK Airport were interviewed Subsamples, with differing feelings of fear of aircraft crashes and different locations of residence were invited to participate in a laboratory experiment The subjects were exposed to tape recordings of simulated flyovers of aircraft in approach and departure operations at nominal distances from the airport The subjects judged the extent of noise annoyance and acceptability of the aircraft noises Results indicate that level of noise is most significant in affecting annoyance judgements Subjects with feelings of high fear report significantly more annoyance and less acceptability of aircraft noise than subjects with feelings of low fear Author

N75-17093*# Kanner (Leo) Associates, Redwood City, Calif
MOTION PERCEPTION. REPORT 1 PERCEPTION OF MINUTE MOVEMENTS
A Basler Washington NASA Feb 197b 25 p refs Transl into ENGLISH FROM Pfluegers Arch Gesam Physiol (West Germany) v 115 1906 p 582-601
(Contract NASw-2481)
(NASA-TT-F-16186) Avail NTIS HC $3 25 CSCL 05E

The object of this study was to determine how small a displacement may be perceived as movement Subjects observed minute displacements of a lever, mounted on a metal sheet and visible through a slit in a covering sheet It was found that in the macula lutea a movement through a visual angle of 20 sec is perceived, even though two points less than 50 sec apart are not distinguished as separate Subjects considerably overestimated minute movements especially when the moving object was close to the eye Motion perception decreases toward the periphery most rapidly as one moves upward from the macula lutea Speed of motion and total lighting also had an effect Author

N75-17094# Civil Aeromedical Inst, Oklahoma City Okla
PERSONALITY AND PHYSIOLOGICAL CORRELATES OF PERFORMANCE DECREMENT ON A MONOTONOUS TASK REQUIRING SUSTAINED ATTENTION
Richard I Thackray, Karen N Jones and Robert M Touchstone Dec 1973 18 p refs
(AD-777825, FAA-AM-73-14) Avail NTIS HC $3 00

The reductions in task load resulting from the increasing automation of air traffic control may actually increase the requirement for controllers to maintain high levels of sustained attention in order to detect infrequent system malfunctions A previous study indicated that individuals scoring high on a distractibility scale found it difficult to maintain sustained attention on a monotonous, but perceptually demanding task The present study used the same serial reaction task to study other possible personality as well as physiological correlates of individual differences in performance decrement under low task-load conditions Sixty subjects performed the task continuously for 40 minutes Extraverted subjects showed increasing lapses of attention while introverted subjects failed to show any evidence of a decline in attention Of the two extraversion components (impulsivity and sociability), impulsivity was the component responsible for the obtained decrement Heart-rate variability showed a significant relationship with performance decrement while mean heart rate did not Author

N75-17095# Civil Aeromedical Inst Oklahoma City Okla
PHYSIOLOGICAL RESPONSES
C E Melton J M McKenzie B David Polis (NADC) Marlene *Hoffmann and J T Saldivar, Jr Dec 1973 24 p refs*
(AD-777838 FAA-AM-73-21) Avail NTIS HC $3 00

Biochemical and physiological indices of stress showed that the level of stress of 16 air traffic controllers at the Houston Intercontinental Airport Tower was indistinguishable from that of control populations While the level of stress was lower than that among O Hare Tower controllers both groups showed about the same degree of adaptation Day work (heavy traffic load) at Houston was characterized by elevated levels of all stress indicators as compared with the mid-shift (light traffic) epinephrine excretion increased significantly during the last half of the mid-shift as compared with the first half Urinary stress indicators (17-ketogenic steroids epinephrine, norepinephrine) were all significantly elevated during day sleep as compared with night sleep indicating less effective rest during day sleep The data support the practice of controllers moving from high-stress high-density locations to lower-density facilities when either air safety or the controller s well-being is in question Author

N75-17096# Royal Aircraft Establishment Farnborough (England) Engineering Physics Dept
HUMAN ENGINEERING STUDIES OF HIGH SPEED PEDESTRIAN CONVEYORS Final Report
A C Browning London Aeron Res Council 1974 56 p refs Supersedes RAE-TR-71104 ARC-34179
(ARC-CP-1278 RAE-TR-71104 ARC-34179) Avail NTIS HC $4 25 HSMO 95p, PHI $3 90

The tolerance of pedestrians to motion of the accelerator or decelerator their ability to transfer between conveyors and safety in general were experimented on 1000 subjects A motion simulator was devised in the form of a wooden trolley towed by a battery electric tractor ESRO

N75-17097*# Hamilton Standard Div, United Aircraft Corp Windsor Locks Conn
DESICCANT HUMIDITY CONTROL SYSTEM Final Report, 21 Jun 1971 - 21 Jun 1972
Peter J Lunde and Frank L Kester Jun 1975 350 p
(Contract NAS9-11971)
(NASA-CR-115568 SVHSER-6040) Avail NTIS HC $9 50 CSCL 06K

A water vapor and carbon dioxide sorbent material (designated HS-C) was developed for potential application to the space shuttle and tested at full scale Capacities of two percent for carbon dioxide and four percent for water vapor were achieved using space shuttle cabin adsorption conditions and a space vacuum for desorption Performance testing shows that water vapor can be controlled by varying the air process flow, while maintaining the ability to remove carbon dioxide A 2000 hour life test was successfully completed as were tests for sensitivity to cleaning solvent vapors, vibration resistance and flammability A system design for the space shuttle shows a 200 pound weight advantage over competitive systems and an even larger advantage for longer missions Author

N75-17098*# Beckman Instruments Inc, Anaheim Calif Advanced Technology Operations
FLUID INFUSION SYSTEM Final Report
J C Hammond Jan 1975 14 p
(Contract NAS9-14080)
(NASA-CR-141579, FR-1185-101) Avail NTIS HC $3 25 CSCL 06B

Development of a fluid infusion system was undertaken in response to a need for an intravenous infusion device operable under conditions of zero-g The initial design approach, pursued in the construction of the first breadboard instrument was to regulate the pressure of the motive gas to produce a similar regulated pressure in the infusion liquid This scheme was not workable because of the varying bag contact area and a major design iteration was made A floating sensor plate in the center of the bag pressure plate was made to operate a pressure regulator built into the bellows assembly effectively making liquid pressure the directly controlled variable Other design changes were made as experience was gained with the breadboard Extensive performance tests were conducted on both the breadboard and the prototype device accurately regulated flows from 6 ml/min to 100 ml/min were achieved All system functions were shown to operate satisfactorily Author

N75-17099*# Jet Propulsion Lab, Calif Inst of Tech, Pasadena
TELEOPERATOR/ROBOT TECHNOLOGY CAN HELP SOLVE BIOMEDICAL PROBLEMS
E Heer and A Bejczy 1 Jan 1975 20 p refs
(Contract NAS7-100)

(NASA-CR-142089 JPL-TM-33-721) Avail NTIS HC $3 25 CSCL 05H

Teleoperator and robot technology appears to offer the possibility to apply these techniques to the benefit for the severely handicapped giving them greater self reliance and independence Major problem areas in the development of prostheses and remotely controlled devices for the handicapped are briefly discussed, and the parallelism with problems in the development of teleoperator/robots identified A brief description of specific ongoing and projected developments in the area of remotely controlled devices (wheelchairs and manipulators) is provided

Author

N75-17100*# Jet Propulsion Lab Calif Inst of Tech Pasadena

MAN-MACHINE INTERACTIVE IMAGING AND DATA PROCESSING USING HIGH-SPEED DIGITAL MASS STORAGE

H Alsberg and R Nathan 15 Jan 1975 16 p refs

(Contract NAS7-100)

(NASA-CR-142088, JPL-TM-33-717) Avail NTIS HC $3 25 CSCL 05H

The role of vision in teleoperation has been recognized as an important element in the man-machine control loop In most applications of remote manipulation, direct vision cannot be used To overcome this handicap the human operator s control capabilities are augmented by a television system This medium provides a practical and useful link between workspace and the control station from which the operator perform his tasks Human performance deteriorates when the images are degraded as a result of instrumental and transmission limitations Image enhancement is used to bring out selected qualities in a picture to increase the perception of the observer A general purpose digital computer, an extensive special purpose software system is used to perform an almost unlimited repertoire of processing operations

Author

N75-17101*# McDonnell-Douglas Astronautics Co , Huntington Beach, Calif Biotechnology and Space Sciences Dept

COST ANALYSIS OF LIFE SCIENCES EXPERIMENTS AND SUBSYSTEMS

M M Yakut Feb 1975 193 p

(Contract NAS8-28377)

(NASA-CR-120604 MDC-G5713) Avail NTIS HC $7 00 CSCL 06G

Cost estimates for experiments and subsystems flown in the Spacelab were established Ten experiments were cost analyzed Estimated cost varied from $650,000 for the hardware development of the SPE water electrolysis experiment to $78,500 000 for the development and operation of a representative life sciences laboratory progra u The cost of subsystems for thermal, atmospheric and trace contaminants control of the Spacelab internal atmosphere was also estimated Subsystem cost estimates were based on the utilization of existing components developed in previous space programs whenever necessary

Author

N75-17102*# National Aeronautics and Space Administration Pasadena Office, Calif

MINIATURE MUSCLE DISPLACEMENT TRANSDUCER Patent Application

Cyril Feldstein (JPL), Jules V Osher (JPL), Gilbert W Lewis (JPL) Robert H Silver (JPL) and Edward N Duran inventors (to NASA) (JPL) Filed 27 Dec 1974 13 p

(Contract NAS7-100)

(NASA-Case-NPO-13519-1 US-Patent-Appl-SN-536761) Avail NTIS HC $3 25 CSCL 06B

A miniature transducer is described for use in sensing muscle displacement Essentially this invention consists of a curved beam of high elastic compliance The beam is connected at its ends to two prongs, which have sharpened tips insertable into a muscle A very sensitive strain gauge is bonded to the beam at the point of greatest curvature As the muscle contracts or expands the spacing between the prongs changes thereby changing the beam curvature which produces changes in the output signal across output lines of the strain gauge

NASA

N75-17103# Joint Publications Research Service, Arlington Va

CERTAIN PECULIARITIES OF MODELING GROUP ACTIVITIES OF OPERATORS

B A Smirnov 3 Jan 1975 12 p refs Transl into ENGLISH from Probl Bioniki (Kharkov), no 7, 1971 p 75-80

(JPRS-63789) Avail NTIS HC $8 50

The positive and negative effects of operator activities are investigated monitoring human performance Operators of modern control systems are described Models are presented showing probabilities of error-free work of operators

M C F

N75-17104*# URS/Matrix Co , Houston, Tex Life and Environmental Sciences Div

DEVELOPMENT OF AN EVA SYSTEMS COST MODEL. VOLUME 2 SHUTTLE ORBITER CREW AND EQUIPMENT TRANSLATION CONCEPTS AND EVA WORKSTATION CONCEPT DEVELOPMENT AND INTEGRATION Final Report

Jan 1975 103 p refs

(Contract NAS9-13790)

(NASA-CR-141635) Avail NTIS HC $5 25 CSCL 06K

EVA crewman/equipment translational concepts are developed for a shuttle orbiter payload application Also considered are EVA workstation systems to meet orbiter and payload requirements for integration of workstations into candidate orbiter payload worksites

Author

N75-17105*# URS/Matrix Co Houston Tex Life and Environmental Sciences Div

DEVELOPMENT OF AN EVA SYSTEMS COST MODEL. VOLUME 3 EVA SYSTEMS COST MODEL Final Report

Jan 1975 86 p refs

(Contract NAS9-13790)

(NASA-CR-141636) Avail NTIS HC $4 75 CSCL 06K

The EVA systems cost model presented is based on proposed EVA equipment for the space shuttle program General information on EVA crewman requirements in a weightless environment and an EVA capabilities overview are provided

Author

N75-17106*# URS/Matrix Co Houston Tex Life and Environmental Sciences Div

MANNED MANEUVERING UNIT MISSION DEFINITION STUDY VOLUME 1 MMU APPLICATIONS ANALYSIS AND PERFORMANCE REQUIREMENTS Final Report

Jan 1975 80 p refs 3 Vol

(Contract NAS9-13790)

(NASA-CR-141631) Avail NTIS HC $4 75 CSCL 06K

Applications of Manned Maneuvering Units (MMU S) to the space shuttle program are identified and described The applications analyses included studies of the shuttle orbiter orbiter subsystems, and both Sortie and Automated Payloads Based on practicable MMU applications general performance and control requirements for shuttle supporting maneuvering units are defined and compared to units evaluated on Skylab The results of the MMU applications analyses and the general MMU performance and control requirements are presented To describe a versatile utility-type maneuvering unit, conceptual designs of MMU support subsystems and ancillary equipment were prepared Concepts for attaching and securing the MMU crewman to various vehicles, structure configurations, and resuce systems were developed Concepts for ancillary provisions are reported

Author

N75-17107*# URS/Matrix Co Houston, Tex Life and Environmental Sciences Div

MANNED MANEUVERING UNIT MISSION DEFINITION STUDY VOLUME 2 APPENDICES TO THE MMU APPLICATIONS ANALYSIS Final Report

Jan 1975 328 p refs 3 Vol

(Contract NAS9-13790)

(NASA-CR-141632) Avail NTIS HC $9 50 CSCL 06K

Information used in identifying representative Manned Maneuvering Unit (MMU) from the many Automated and Sortie Payloads and orbiter subsystems is presented Representative

missions were selected to represent typical MMU applications across all payloads and orbiter subsystems Data analysis sheets are provided with other applicable information Calculations used in defining MMU general performance and control requirements to satisfy eleven space missions are included Author

N75-17108*# URS/Matrix Co Houston Tex Life and Environmental Sciences Div
MANNED MANEUVERING UNIT MISSION DEFINITION STUDY VOLUME 3 MMU ANCILLARY SUPPORT EQUIPMENT AND ATTACHMENT CONCEPTS Final Report
Jan 1975 129 p refs 3 Vol
(Contract NAS9-13790)
(NASA-CR-141633) Avail NTIS HC $5 75 CSCL 06K

An analysis of Manned Maneuvering Units (MMU) ancillary support equipment and attachment concepts is presented The major objectives of the study are defined as (1) identifying MMU applications which would supplement space shuttle safety and effectiveness, (2) to define general MMU performance and control requirements to satisfy candidate shuttle applications, (3) to develop concepts for attaching MMUs to various worksites and equipment, and (4) to identify requirements and develop concepts for MMU ancillary equipment Author

N75-17109*# Hamilton Standard Div United Aircraft Corp , Windsor Locks Conn
ICE PACK HEAT SINK SUBSYSTEM, PHASE 2 Final Report
George J Roebelen, Jr and Jordan D Kellner Jan 1975 210 p refs
(Contract NAS2-7011)
(NASA-CR-137611, SVHSER-6525) Avail NTIS HC $7 25 CSCL 06K

The report describes the design development, fabrication, and test at one gravity of a prototype ice pack heat sink subsystem to be used eventually for astronaut cooling during manned space missions, the investigation of thermal storage material with the objective of uncovering materials with heats of fusion and/or solution in the range of 300 Btu/lb (700 kilojoules/kilogram), and the planned procedure for implementing an ice pack heat sink subsystem flight experiment In normal use, excess heat in the liquid cooling garment (LCG) coolant is transferred to a reusable/regenerable ice pack heat sink For emergency operation, or for extension of extravehicular activity mission time after all the ice has melted, water from the ice pack is boiled to vacuum thereby continuing to remove heat from the LCG coolant This subsystem incorporates a quick disconnect thermal interface between the ice pack heat sink and the subsystem heat exchanger Author

N75-17110# Physics International Co San Leandro Calif
DEVELOPMENT OF AN IMPLANTABLE PIEZOELECTRIC DRIVING SYSTEM FOR A CIRCULATORY ASSIST DEVICE Final Report, 31 Oct 1970 - 1 May 1971
Parker Smiley 1 May 1971 84 p refs
(Contract PHS-69-2253)
(PB-236446/1, PIFR-169, NIH/NHLI-69-2253-2) Avail NTIS HC $4 75 CSCL 06B

A bench-model piezoelectric-driver system for a circulatory assist device was designed built, and tested This system consists of an electronic pulser, high-pressure piezoelectric pump, a hydraulic converter and a circulatory assist device The piezoelectric pump completes one stroke for each beat of a natural heart The driver system coupled to an IECO Mark VII blood pump, delivers 5 to 11 liters per minute at freq rencies of 60 to 150 pulses per minute, while requiring 12 to 28 watts mean power to the pulser A compact implantable model of this system was designed so that the pulser and piezoelectric pump would fit into a 1-liter package GRA

N75-17111*# Kanner (Leo) Associates, Redwood City Calif
INHABITED SPACE, PART 1
B P Konstantinov, ed and V D Pekelis ed Washington NASA Feb 1975 270 p refs Transl into ENGLISH of the book Naselennyy Kosmos ' Moscow Nauka Press, 1972 214 p
(Contract NASw-2481)
(NASA-TT-F-819) Avail NTIS HC $8 50 CSCL 06C

Preliminary results are presented of work on prebiology, exobiology, the possibility of life on other planets, cosmic influences on animal and plant life on earth planetary chemistry, exobiology, and the problem of defining life on other than a carbon basis The authors are mostly Soviet, with several Western and European authorities included, as well as some American experts Author

N75-17213* Telecare Inc , Houston, Tex
THE PROCESSING AND TRANSMISSION OF EEG DATA

A E Schulze *In* Chamber of Commerce Proc of the 1st 1974 Technol Transfer Conf 1974 p 267-272 refs

CSCL 06E

Interest in sleep research was stimulated by the discovery of a number of physiological changes that occur during sleep and by the observed effects of sleep on physical and mental performance and status The use of the relatively new methods of EEG measurement, transmission and automatic scoring makes sleep analysis and categorization feasible Sleep research involving the use of the EEG as a fundamental input has the potential of answering many unanswered questions involving physical and mental behavior drug effects circadian rhythm and anesthesia Author

N75-17214* Southwest Research Inst , San Antonio, Tex
MEDICAL BENEFITS FROM THE NASA BIOMEDICAL APPLICATIONS PROGRAM
John L Sigmon *In* Chamber of Commerce Proc of the 1st 1974 Technol Transfer Conf 1974 p 273-280

CSCL 06E

To achieve its goals the NASA Biomedical Applications Program performs four basic tasks (1) identification of major medical problems which lend themselves to solution by relevant aerospace technology, (2) identification of relevant aerospace technology which can be applied to those problems (3) application of that technology to demonstrate the feasibility as real solutions to the identified problems, and, (4) motivation of the industrial community to manufacture and market the identified solution to maximize the utilization of aerospace solutions to the biomedical community Author

N75-17215* Texas Univ Houston
HYPOBARIC CHAMBER FOR THE STUDY OF ORAL HEALTH PROBLEMS IN A SIMULATED SPACECRAFT ENVIRONMENT
Lee R Brown *In* Chamber of Commerce Proc of the 1st 1974 Technol Transfer Conf 1974 p 281-286

CSCL 06B

A hypobaric chamber was constructed to house two marmo-sets simultaneously in a space-simulated environment for periods of 14, 28 and 56 days which coincided with the anticipated Skylab missions This report details the fabrication operation, and performance of the chamber and very briefly reviews the scientific data from nine chamber trials involving 18 animals The possible application of this model system to studies unrelated to oral health or space missions is discussed Author

N75-17216* Baylor Univ Houston, Tex
IMAGE PROCESSING OF ANGIOGRAMS A PILOT STUDY
L E Larsen, R A Evans, and J O Roehm, Jr *In* Chamber of Commerce Proc of the 1st 1974 Technol Transfer Conf 1974 p 287-291 refs
CSCL 06B

The technology transfer application this report describes is the result of a pilot study of image-processing methods applied to the image enhancement coding and analysis of arteriograms Angiography is a subspecialty of radiology that employs the introduction of media with high X-ray absorption into arteries in order to study vessel pathology as well as to infer disease of the organs supplied by the vessel in question Author

N75-17217* Texas Heart Inst Houston
INTERDISCIPLINARY STUDIES ON THE DEVELOPMENT OF NUCLEAR-FUELED CIRCULATORY SUPPORT SYSTEMS COLLABORATION OF INDUSTRY AND ACADEME
John C Norman *In* Chamber of Commerce Proc of the 1st 1974 Technol Transfer Conf 1974 p 293-319 refs

CSCL 06B
The purpose of this report is to acquaint the Houston community with specific areas of available technology, both public and private to demonstrate to industry how this technology may be acquired and put to use to provide new and useful services for man Much of the technology utilized in the development of nuclear-fueled circulatory support systems in our laboratories has evolved from industry, NASA and AEC, our projects involve radiation biology, thermodynamics energy transfers hemodynamics hematology pathology and surgery Author

N75-17218* National Aeronautics and Space Administration Lyndon B Johnson Space Center Houston, Tex
SPACE TECHNOLOGY IN REMOTE HEALTH CARE
Norman Belasco *In* Chamber of Commerce Proc of the 1st 1974 Technol Transfer Conf 1974 p 321-333

CSCL 06E
A program for an earth-based remote health service system is discussed as a necessary step for the development and verification of a remote health services spacecraft capability This demonstration program is described to provide data for developing health care for future manned space missions M C F

N75-17222* National Aeronautics and Space Administration Lyndon B Johnson Space Center Houston Tex
THE TECHNOLOGY APPLICATION PROCESS AS APPLIED TO A FIREFIGHTER'S BREATHING SYSTEM
Pat B McLaughlan *In* Chamber of Commerce Proc of the 1st 1974 Technol Transfer Conf 1974 p 391-402

CSCL 06Q
The FBS Program indicated that applications of advanced technology can result in an improved FBS that will satisfy the requirements defined by municipal fire departments To accomplish this technology transfer, a substantial commitment of resources over an extended period of time has been required This program has indicated that the ability of NASA in terms of program management such as requirement definition system analysis and industry coordination may play as important a role as specific sources of hardware technology As a result of the FBS program, a sequence of milestones was passed that may have applications as generalized milestones and objectives for any technical application program Author

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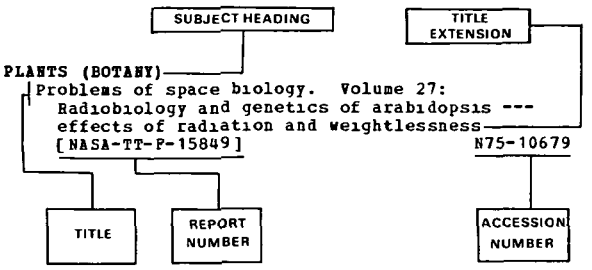

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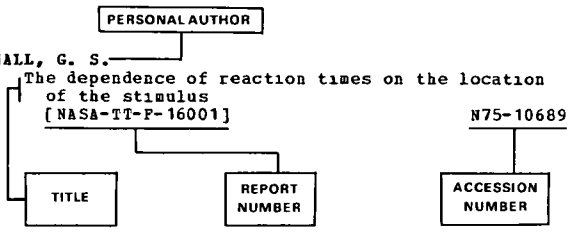

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1. Report No.	2. Government Accession No.	3 Recipient's Catalog No.
NASA SP-7011 (141)		

4 Title and Subtitle	5. Report Date
AEROSPACE MEDICINE AND BIOLOGY A Continuing Bibliography (Supplement 141)	May 1975
	6. Performing Organization Code
7. Author(s)	8. Performing Organization Report No.
	10 Work Unit No.
9 Performing Organization Name and Address National Aeronautics and Space Administration Washington, DC 20546	11 Contract or Grant No.
	13. Type of Report and Period Covered
12. Sponsoring Agency Name and Address	14. Sponsoring Agency Code

15 Supplementary Notes

16 Abstract

This bibliography lists 267 reports, articles, and other documents introduced into the NASA scientific and technical information system in April 1975.

17. Key Words (Suggested by Author(s))	18. Distribution Statement
Aerospace Medicine Bibliographies Biological Effects	Unclassified - Unlimited

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price*
Unclassified	Unclassified	84	$4.00 HC

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