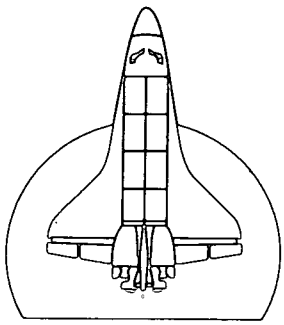
NASA

Aerospace Medicine and Biology
A Continuing Bibliography with Indexes

NASA SP-7011(218)
April 1981



National Aeronautics and Space Administration

Aerospace Medicine & Biology

ACCESSION NUMBER RANGES

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

STAR (N-10000 Series)	N81-13914 – N81-15967
IAA (A-10000 Series)	A81-16481 – A81-19672

This bibliography was prepared by the NASA Scientific and Technical Information Facility operated for the National Aeronautics and Space Administration by PRC Data Services Company.

NASA SP-7011(218)

AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES

(Supplement 218)

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 March 1981 in

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

NASA Scientific and Technical Information Branch 1981
National Aeronautics and Space Administration
Washington, DC

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

This supplement is available as NTISUB/123/093 from the National Technical Information Service (NTIS), Springfield, Virginia 22161 at the price of $7.00 domestic; $14.00 foreign.

INTRODUCTION

This Supplement to *Aerospace Medicine and Biology* (NASA SP-7011) lists 161 reports, articles and other documents announced during March 1981 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA)*. The first issue of the bibliography was published in July 1964; since that time, monthly supplements have been issued.

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

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

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

An annual index will be prepared at the end of the calendar year covering all documents listed in the 1980 Supplements.

AVAILABILITY OF CITED PUBLICATIONS

IAA ENTRIES (A81-10000 Series)

All publications abstracted in this Section are available from the Technical Information Service, American Institute of Aeronautics and Astronautics, Inc. (AIAA), as follows: Paper copies of accessions are available at $7.00 per document up to a maximum of 40 pages. The charge for each additional page is $0.25. Microfiche [1] of documents announced in *IAA* are available at the rate of $3.00 per microfiche on demand, and at the rate of $1.25 per microfiche for standing orders for all *IAA* microfiche. The price for the *IAA* microfiche by category is available at the rate of $1.50 per microfiche plus a $1.00 service charge per category per issue. Microfiche of all the current AIAA Meeting Papers are available on a standing order basis at the rate of $1.50 per microfiche.

Minimum air-mail postage to foreign countries is $1.00 and all foreign orders are shipped on payment of pro-forma invoices.

All inquiries and requests should be addressed to AIAA Technical Information Service. Please refer to the accession number when requesting publications.

STAR ENTRIES (N81-10000 Series)

One or more sources from which a document announced in *STAR* is available to the public is ordinarily given on the last line of the citation. The most commonly indicated sources and their acronyms or abbreviations are listed below. If the publication is available from a source other than those listed, the publisher and his address will be displayed on the availability line or in combination with the corporate source line.

Avail: NTIS. Sold by the National Technical Information Service. Prices for hard copy (HC) and microfiche (MF) are indicated by a price code followed by the letters HC or MF in the *STAR* citation. Current values for the price codes are given in the tables on page vii.

Documents on microfiche are designated by a pound sign (#) following the accession number. The pound sign is used without regard to the source or quality of the microfiche.

Initially distributed microfiche under the NTIS SRIM (Selected Research in Microfiche) is available at greatly reduced unit prices. For this service and for information concerning subscription to NASA printed reports, consult the NTIS Subscription Section, Springfield, Va. 22161.

NOTE ON ORDERING DOCUMENTS: When ordering NASA publications (those followed by the * symbol), use the N accession number. NASA patent applications (only the specifications are offered) should be ordered by the US-Patent-Appl-SN number. Non-NASA publications (no asterisk) should be ordered by the AD, PB, or other *report* number shown on the last line of the citation, not by the N accession number. It is also advisable to cite the title and other bibliographic identification.

Avail: SOD (or GPO). Sold by the Superintendent of Documents, U.S. Government Printing Office, in hard copy. The current price and order number are given following the availability line. (NTIS will fill microfiche requests, at the standard $3.50 price, for those documents identified by a # symbol.)

(1) A microfiche is a transparent sheet of film, 105 by 148 mm in size, containing as many as 60 to 98 pages of information reduced to micro images (not to exceed 26:1 reduction).

Avail: NASA Public Document Rooms. Documents so indicated may be examined at or purchased from the National Aeronautics and Space Administration, Public Documents Room (Room 126), 600 Independence Ave., S.W., Washington, D.C. 20546, or public document rooms located at each of the NASA research centers, the NASA Space Technology Laboratories, and the NASA Pasadena Office at the Jet Propulsion Laboratory.

Avail: DOE Depository Libraries. Organizations in U.S. cities and abroad that maintain collections of Department of Energy reports, usually in microfiche form, are listed in *Energy Research Abstracts*. Services available from the DOE and its depositories are described in a booklet, *DOE Technical Information Center - Its Functions and Services* (TID-4660), which may be obtained without charge from the DOE Technical Information Center.

Avail: Univ. Microfilms. Documents so indicated are dissertations selected from *Dissertation Abstracts* and are sold by University Microfilms as xerographic copy (HC) and microfilm. All requests should cite the author and the Order Number as they appear in the citation.

Avail: USGS. Originals of many reports from the U.S. Geological Survey, which may contain color illustrations, or otherwise may not have the quality of illustrations preserved in the microfiche or facsimile reproduction, may be examined by the public at the libraries of the USGS field offices whose addresses are listed in this introduction. The libraries may be queried concerning the availability of specific documents and the possible utilization of local copying services, such as color reproduction.

Avail: HMSO. Publications of Her Majesty's Stationery Office are sold in the U.S. by Pendragon House, Inc. (PHI), Redwood City, California. The U.S. price (including a service and mailing charge) is given, or a conversion table may be obtained from PHI.

Avail: BLL (formerly NLL): British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. Photocopies available from this organization at the price shown. (If none is given, inquiry should be addressed to the BLL.)

Avail: Fachinformationszentrum, Karlsruhe. Sold by the Fachinformationszentrum Energie, Physik, Mathematik GMBH, Eggenstein Leopoldshafen, Federal Republic of Germany, at the price shown in deutschmarks (DM).

Avail: Issuing Activity, or Corporate Author, or no indication of availability. Inquiries as to the availability of these documents should be addressed to the organization shown in the citation as the corporate author of the document.

Avail: U.S. Patent and Trademark Office. Sold by Commissioner of Patents and Trademarks, U.S. Patent and Trademark Office, at the standard price of 50 cents each, postage free.

Other availabilities: If the publication is available from a source other than the above, the publisher and his address will be displayed entirely on the availability line or in combination with the corporate author line.

SUBSCRIPTION AVAILABILITY

This publication is available on subscription from the National Technical Information Service (NTIS). The annual subscription rate for the monthly supplements, excluding the annual cumulative index, is $65.00 domestic; $130.00 foreign. All questions relating to the subscriptions should be referred to NTIS.

ADDRESSES OF ORGANIZATIONS

American Institute of Aeronautics
and Astronautics
Technical Information Service
555 West 57th Street, 12th Floor
New York, New York 10019

British Library Lending Division,
Boston Spa, Wetherby, Yorkshire,
England

Commissioner of Patents and
Trademarks
U.S. Patent and Trademark Office
Washington, D.C. 20231

Department of Energy
Technical Information Center
P.O. Box 62
Oak Ridge, Tennessee 37830

ESA-Information Retrieval Service
ESRIN
Via Galileo Galilei
00044 Frascati (Rome) Italy

Fachinformationszentrum Energie, Physik,
Mathematik GMBH
7514 Eggenstein Leopoldshafen
Federal Republic of Germany

Her Majesty's Stationery Office
P.O. Box 569, S.E. 1
London, England

NASA Scientific and Technical Information
Facility
P.O. Box 8757
B. W. I. Airport, Maryland 21240

National Aeronautics and Space
Administration
Scientific and Technical Information
Branch (NST-41)
Washington, D.C. 20546

National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

Pendragon House, Inc.
899 Broadway Avenue
Redwood City, California 94063

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

University Microfilms
A Xerox Company
300 North Zeeb Road
Ann Arbor, Michigan 48106

University Microfilms, Ltd.
Tylers Green
London, England

U.S. Geological Survey
1033 General Services Administration
Building
Washington, D.C. 20242

U.S. Geological Survey
601 E. Cedar Avenue
Flagstaff, Arizona 86002

U.S. Geological Survey
345 Middlefield Road
Menlo Park, California 94025

U.S. Geological Survey
Bldg. 25, Denver Federal Center
Denver, Colorado 80225

NTIS PRICE SCHEDULES

Schedule A

STANDARD PAPER COPY PRICE SCHEDULE

(Effective January 1, 1981)

Price Code	Page Range	North American Price	Foreign Price
A01	Microfiche	$ 3.50	$ 7.00
A02	001-025	5.00	10.00
A03	026-050	6.50	13.00
A04	051-075	8.00	16.00
A05	076-100	9.50	19.00
A06	101-125	11.00	22.00
A07	126-150	12.50	25.00
A08	151-175	14.00	28.00
A09	176-200	15.50	31.00
A10	201-225	17.00	34.00
A11	226-250	18.50	37.00
A12	251-275	20.00	40.00
A13	276-300	21.50	43.00
A14	301-325	23.00	46.00
A15	326-350	24.50	49.00
A16	351-375	26.00	52.00
A17	376-400	27.50	55.00
A18	401-425	29.00	58.00
A19	426-450	30.50	61.00
A20	451-475	32.00	64.00
A21	476-500	33.50	67.00
A22	501-525	35.00	70.00
A23	526-550	36.50	73.00
A24	551-575	38.00	76.00
A25	576-600	39.50	79.00
	601-up	-- 1/	-- 2/

A99 - Write for quote

1/ Add $1.50 for each additional 25 page increment or portion thereof for 601 pages up.

2/ Add $3.00 for each additional 25 page increment or portion thereof for 601 pages and more.

Schedule E

EXCEPTION PRICE SCHEDULE

Paper Copy & Microfiche

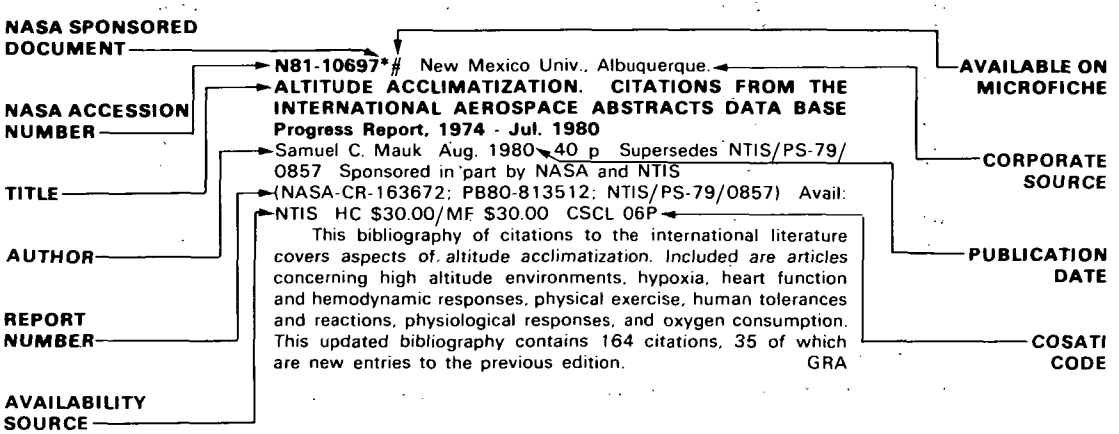
Price Code	North American Price	Foreign Price
E01	$ 5.50	$ 11.50
E02	6.50	13.50
E03	8.50	17.50
E04	10.50	21.50
E05	12.50	25.50
E06	14.50	29.50
E07	16.50	33.50
E08	18.50	37.50
E09	20.50	41.50
E10	22.50	45.50
E11	24.50	49.50
E12	27.50	55.50
E13	30.50	61.50
E14	33.50	67.50
E15	36.50	73.50
E16	39.50	79.50
E17	42.50	85.50
E18	45.50	91.50
E19	50.50	100.50
E20	60.50	121.50

E99 - Write for quote

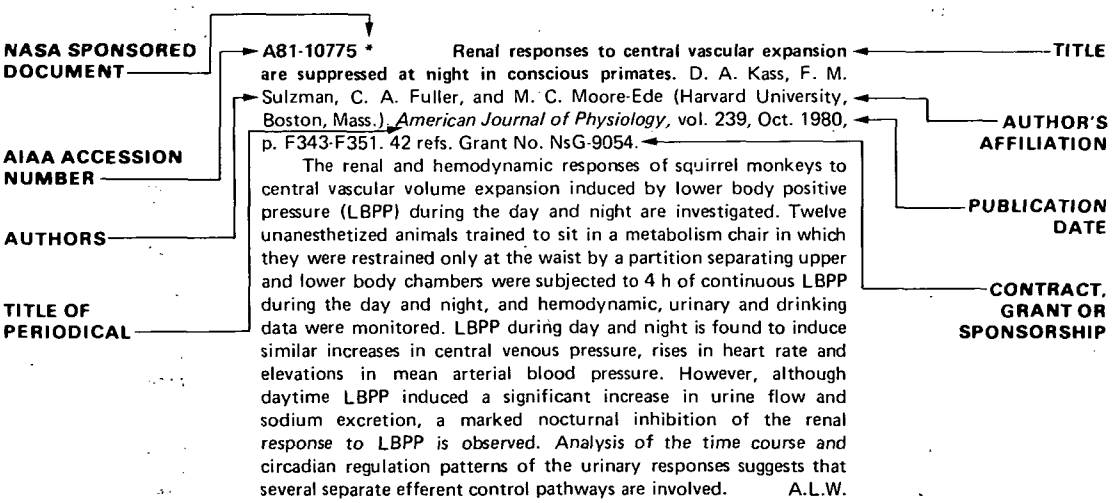
N01	28.00	40.00

TABLE OF CONTENTS

TYPICAL CITATION AND ABSTRACT FROM *STAR*



TYPICAL CITATION AND ABSTRACT FROM *IAA*



AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 134)

APRIL 1981

IAA ENTRIES

A81-16505 Electromagnetic-energy deposition in an inhomogeneous block model of man for near-field irradiation conditions. I. Chatterjee, M. J. Hagmann, and O. P. Gandhi (Utah, University, Salt Lake City, Utah). *(Institute of Electrical and Electronics Engineers, International Microwave Symposium, Washington, D.C., May 28-30, 1980.) IEEE Transactions on Microwave Theory and Techniques,* vol. MTT-28, Dec. 1980, p. 1452-1459. 23 refs. NSF Grant No. ENG-79-01669.

A81-16594 # Psychophysiological aspects of the superslow rhythmic activity of the brain (Psikhofiziologicheskie aspekty sverkhmedlennoi ritmicheskoi aktivnosti golovnogo mozga). N. A. Aladzhalova. Moscow, Izdatel'stvo Nauka, 1979. 214 p. 170 refs. In Russian.

The psychophysiological aspects of the superslow frequency oscillations in brain bioelectrical activity observed in man and animals are examined. Following a brief review of the classification of periodic brain phenomena, including superslow rhythms with periods from 2 sec to 6 h, results of experiments demonstrating the origins of superslow potentials in animal brains are presented, with attention given to their spectra in humans, their role in the organization of neuronal interactions, slow traces of previous activity, and the variability of the functional connections between brain components. Brain rhythms and their variations during human activities such as sleep, mental tasks, changing states of conciousness and automatized mental activity are then examined, and practical applications of the analysis of superslow brain rhythms are considered. A.L.W.

A81-16598 * Modeling of exposure to carbon monoxide in fires. D. E. Cagliostro (NASA, Ames Research Center, Chemical Research Projects Office, Moffett Field, Calif.). *Journal of Combustion Toxicology,* vol. 7, Nov. 1980, p. 231-242. 11 refs.

A mathematical model is developed to predict carboxyhemoglobin concentrations in regions of the body for short exposures to carbon monoxide levels expected during escape from aircraft fires. The model includes the respiratory and circulatory dynamics of absorption and distribution of carbon monoxide and carboxyhemoglobin. Predictions of carboxyhemoglobin concentrations are compared to experimental values obtained for human exposures to constant high carbon monoxide levels. Predictions are within 20% of experimental values. For short exposure times, transient concentration effects are predicted. The effect of stress is studied and found to increase carboxyhemoglobin levels substantially compared to a rest state. (Author)

A81-16599 Generation of constant concentrations of thermal decomposition products in inhalation chambers - A comparative study with a method according to DIN 53 436. I - Measurement of carbon monoxide and carbon dioxide in inhalation chambers. H.-J. Klimisch (Badische Anilin- und Soda-Fabrik AG, Ludwigshafen am Rhein, West Germany), H. W. M. Hollander (Hoechst AG, Frankfurt am Main, West Germany), and J. Thyssen (Bayer AG, Wuppertal, West Germany). *Journal of Combustion Toxicology,* vol. 7, Nov. 1980, p. 243-256.

This paper examines the possibility of producing constant concentrations of decomposition products in inhalation chambers for toxicological combustion studies. A 125 cu dm inhalation chamber to study whole body exposure is presented along with a 10 cu dm chamber for head and nose exposure, and a 1 cu dm volume tube inhalation system. Carbon monoxide and carbon dioxide concentrations are measured by infra-red analyzers in the vicinity of the breathing zone of the test animals. The relation between the volume of the inhalation chamber and the concentration of the diluted decomposition products is considered theoretically and in practice. The time required to approach almost a stationary condition is highly dependent on the quotient of the chamber volume and the rate of flow of the inlet stream. R.C.

A81-16600 Generation of constant concentrations of thermal decomposition products in inhalation chambers - A comparative study with a method according to DIN 53 436. II - Measurement of concentrations of total volatile organic substances in inhalation chambers. H.-J. Klimisch (Badische Anilin- und Soda-Fabrik AG, Ludwigshafen am Rhein, West Germany). *Journal of Combustion Toxicology,* vol. 7, Nov. 1980, p. 257-263. 6 refs.

A81-16624 An estimate of the steady magnetic field strength required to influence nerve conduction. J. P. Wikswo, Jr. and J. P. Barach (Vanderbilt University, Nashville, Tenn.). *IEEE Transactions on Biomedical Engineering,* vol. BME-27, Dec. 1980, p. 722, 723. 6 refs. Research supported by Vanderbilt University.

The effects of a steady magnetic field on current conduction in a nerve cell are analyzed. Effects due to axial, transverse and perpendicular magnetic fields are distinguished, and the field strength required to produce the largest effect, a reduction in conductivity perpendicular to the field, is estimated. Based on an analysis of ion transport in an electric field, it is shown that the minimum magnetic field required to produce observable effects is quite large, amounting to 24 T or more to produce a 10% deflection under the most favorable conditions of ion drift velocity. It is thus concluded that experiments seeking to observe magnetic effects from steady fields will have to make use of the strongest dc fields available. A.L.W.

A81-16625 * A bandpass filter for the enhancement of an X-ray reconstruction of the tissue in the spinal canal. I. S. Reed (Southern California, University, Los Angeles, Calif.), W. V. Glenn, Y. S. Kwoh (Memorial Hospital, Medical Center, Long Beach, Calif.), and T. K. Truong (California Institute of Technology, Jet Propulsion Laboratory, Communications Systems Research Section, Pasadena, Calif.). *IEEE Transactions on Biomedical Engineering,* vol. BME-27, Dec. 1980, p. 736-738. 6 refs. Research supported by the Memorial Children's Medical Center Foundation; Grant No. AF-AFOSR-80-0151; Contract No. NAS7-100.

In this communication, a new bandpass reconstruction filter is developed to partially remove the low spatial frequencies of the bone and the soft tissue in an X-ray reconstruction of a lumbar spine. This partial removal of the low frequencies suppresses the bony vertebral body and the soft tissue components within the projections of actual clinical data. It also has the effect of enhancing the sharp edges of

the fatty tissue surrounding the spinal cord region. The intent of this effort is to directly visualize the spinal cord without the need for water-soluble contrast (e.g., metrizamide) to be installed through lumbar punctures. (Author)

A81-16651 Cross-sectional echocardiography - Physical principles, anatomic planes, limitations and pitfalls. A. N. DeMaria, W. Bommer, J. A. Joye, and D. T. Mason (California, University, Davis; California, University, Medical Center, Sacramento, Calif.). *American Journal of Cardiology,* vol. 46, Dec. 18, 1980, p. 1097-1108. 18 refs. Research supported by the American Heart Association.

The principles, advantages and limitations of two-dimensional echocardiography are discussed. The techniques developed to reconstruct an image of the heart from several individual discrete B mode ultrasonic scan lines are considered, including linear array, mechanical sector scanner, and phased array scanner systems. Means of obtaining two-dimensional echocardiograms in the three standard orthogonal planes (long axis, short axis and four chamber) are examined, together with those for the two chamber apical, subcostal or subxiphoid and suprasternal views. Limitations to two-dimensional echocardiography posed by the size of the transducer, the reduced sampling rate available, the videotape display format, the lessened resolution, and the inability of the technique to encompass routinely the entire left ventricular endocardium are noted, and artifacts of the two-dimensional technique which simulate cardiac mass lesions are pointed out. It is concluded that the ability to examine a wide area of the heart in real time provided by two-dimensional echocardiography represents a significant advance in the diagnosis and management of cardiac diseases, and will play an increasing role in clinical practice. A.L.W.

A81-16652 Cardiac nuclear imaging - Principles, instrumentation and pitfalls. H. W. Strauss, K. A. McKusick, and J. B. Bingham (Massachusetts General Hospital, Boston, Mass.). *American Journal of Cardiology,* vol. 46, Dec. 18, 1980, p. 1109-1116. 36 refs.

Nuclear methods of cardiac imaging require a radiolabeled tracer, a collimator to assure interaction of photons from specific areas of the heart with the imaging device, equipment which converts gamma photon energy into an electrical signal which can be displayed, and a computer to record and quantify the data. Nuclear imaging is based on the averaging of many cardiac cycles, while nuclear probes supply information which can be analyzed only on a beat-by-beat basis; imaging data can be reviewed visually and quantitatively. It is concluded that nuclear cardiac imaging can detect abnormal functions at rest or after interventions, and can be used both for outpatients and acutely ill persons in intensive care units. A.T.

A81-16653 Evaluation of the left ventricle with two dimensional echocardiography. R. Stack and J. Kisslo (Duke University, Medical Center, Durham, N.C.). *American Journal of Cardiology,* vol. 46, Dec. 18, 1980, p. 1117-1124. 40 refs. Grants No. PHS-HL-12715; No. PHS-HL-17670.

Two dimensional echocardiography, because of its wide field of view, has been shown to be superior to the M mode approach for ultrasonic evaluation of the left ventricle. The use of this technique for determination of ventricular volume estimates and detection of asynergy has been promising but is limited by compromised image quality found in many patients with ischemic heart disease. Because it supplies cross-sectional information about the ventricular chamber and wall thickness simultaneously, this new technique lends itself to the anatomic localization of changes in regional performance that accompany ischemic heart disease. It allows simultaneous study of regional dynamic changes in chamber circumference, wall thickness and motion characteristics that give practical information on coronary artery disease and acute myocardial infarction. (Author)

A81-16654 Monitoring cardiac function with nuclear techniques. G. P. Leitl, J. W. Buchanan, and H. N. Wagner (Johns Hopkins Medical Institutions, Baltimore, Md.). *American Journal of Cardiology,* vol. 46, Dec. 18, 1980, p. 1125-1132. 64 refs.

Noninvasive imaging with radioactive tracers has become widely used since its introduction in the early 1970s. Improvements continue to be made in the techniques and the clinical applications. Much of the information provided by these techniques is new. The first transit studies are used mainly in the evaluation of pulmonary transit time, detection of intracardiac shunting, evaluation of right ventricular function, measurement of ejection fraction and detection of wall motion abnormalities at rest and after exercise. The gated blood pool study is found to be most useful in assessment of global left ventricular function, regional wall motion, valve regurgitation and right ventricular function. The techniques of nuclear cardiac imaging are noninvasive, simple, and successfully performed in almost 100% of cases. They are easy to interpret, able to be quantified and able to be almost totally automated. Their use is likely to become more widespread in the future. (Author)

A81-16655 Ventricular aneurysm - Cross-sectional echocardiographic approach. M. J. Barrett, Y. Charuzi, E. Corday, and P. Sullivan (Pennsylvania, Medical College, Philadelphia, Pa.; Cedars Sinai Medical Center, Los Angeles, Calif.). *American Journal of Cardiology,* vol. 46, Dec. 18, 1980, p. 1133-1137. 16 refs.

Current angiographic indexes of ventricular function have proved inadequate for prognostication in patients with ventricular aneurysm. Cross-sectional echocardiography can visualize residual myocardium in all four walls of the left ventricle. A new echocardiographic technique of calculating residual myocardium is presented. The echocardiographic technique yielded identical information to that of contrast angiography ($r = 0.97$). An index of residual myocardium was generated from the cross-sectional echocardiogram that correlated with the clinical state of the patients. In patients treated medically it predicted those patients likely to die within six months (p less than 0.005). Preliminary observations in patients having aneurysmectomy revealed that there were good surgical results in those with an index of residual myocardium of 0.42 or greater, but more patients are necessary to establish the lower limit of a surgically acceptable level of residual myocardium. (Author)

A81-16656 Current status of radionuclide imaging in valvular heart disease. C. A. Boucher, R. D. Okada, and G. M. Pohost (Massachusetts General Hospital, Boston, Mass.). *American Journal of Cardiology,* vol. 46, Dec. 18, 1980, p. 1153-1163. 165 refs.

The current state-of-the-art in radionuclide imaging of valvular heart disease is based on different angiographic patterns in three left-sided valve abnormalities: pressure overload, volume overload, and inflow obstruction. In pressure overload, the left ventricle has normal dimensions or is minimally dilated; the volume overload involves a left ventricular dilatation with a normal or reduced ejection fraction at rest; the left ventricular function in inflow obstruction is normal, but in some cases may be depressed. Radionuclide angiography evaluates the effect of a valve abnormality on cardiac chamber and function; thallium-201 imaging diagnoses regional myocardial blood flow and cell integrity and can evaluate the associated coronary artery disease. A.T.

A81-16657 Two dimensional echocardiography in mitral, aortic and tricuspid valve prolapse - The clinical problem, cardiac nuclear imaging considerations and a proposed standard for diagnosis. J. Morganroth, R. H. Jones, C. C. Chen, and M. Naito (Lankenau Hospital; Thomas Jefferson University, Philadelphia, Pa.; Duke University, Medical Center, Durham, N.C.). *American Journal of Cardiology,* vol. 46, Dec. 18, 1980, p. 1164-1177. 100 refs.

The mitral valve prolapse syndrome may present with a variety of clinical manifestations and has proved to be a common cause of nonspecific cardiac symptoms in clinical practice. Primary and secondary forms must be distinguished. Myxomatous degeneration appears to be the common denominator of the primary form. The diagnostic standard of this form has not previously been defined because the detection of mitral leaflet tissue in the left atrium (prolapse) on physical examination or angiography is nonspecific. M

mode echocardiography has greatly enhanced the recognition of this syndrome but has not proved to be the best diagnostic standard because of its limited view of mitral valve motion. The advent of two-dimensional echocardiography has provided the potential means for specific identification of the mitral leaflet motion in systole and can be considered the diagnostic standard for this syndrome. Primary myxomatous degeneration with leaflet prolapse is not localized to the mitral valve. Two-dimensional echocardiography has detected in preliminary studies tricuspid valve prolapse in up to 50% and aortic valve prolapse in about 20% of patients with idiopathic mitral valve prolapse. (Author)

A81-16658 Echocardiographic detection of coronary artery disease. J. Morganroth, C. C. Chen, D. David, M. Naito, and T. J. Mardelli (Lankenau Hospital; Thomas Jefferson University, Philadelphia, Pa.). *American Journal of Cardiology,* vol. 46, Dec. 18, 1980, p. 1178-1187. 47 refs.

M mode and cross-sectional echocardiographic studies at rest have been used to detect regional left ventricular wall motion abnormalities as a sign of hemodynamically significant coronary artery disease. These techniques have proved to be fairly specific but not highly sensitive. Detection of new regional wall motion abnormalities with cross-sectional echocardiography during exercise appeared practical in 80% of patients in preliminary studies; the finding of such abnormalities is highly specific for the presence of coronary artery disease and, with this approach, the sensitivity of echocardiography is improved. Thus, patients with anatomically severe coronary artery disease on angiography may not manifest an echocardiographic abnormality in regional wall motion even during exercise. The direct noninvasive detection of the left main coronary artery in up to 90% of patients studied with cross-sectional echocardiography using the short axis or apical approach, or both, has been well defined. A high sensitivity and specificity of detecting anatomically severe left main coronary artery disease using the criteria of both luminal impingement and the presence of high intensity echoes have been confirmed. Further advances in imaging techniques may allow for better definition of the coronary arterial tree. (Author)

A81-16659 Exercise radionuclide imaging approaches to coronary artery disease. R. D. Okada, C. A. Boucher, H. W. Strauss, and G. M. Pohost (Massachusetts General Hospital, Boston, Mass.). *American Journal of Cardiography,* vol. 46, Dec. 18, 1980, p. 1188-1204. 141 refs. Grant No. NIH-HL-21751-02.

Exercise thallium-201 myocardial imaging and exercise radionuclide angiography are the two techniques of nuclear cardiology most widely used for the diagnosis of cornary artery disease. Each of these tests provides information of diagnostic and functional value. The diagnostic accuracy and clinical utility of these two tests for the detection of coronary artery disease are compared. The strengths and weaknesses of each approach are discussed. A clinical approach to the detection and evaluation of coronary artery disease using these radionuclide exercise techniques is presented. (Author)

A81-16660 Echocardiography in acute and remote myocardial infarction. A. F. Parisi, P. F. Moynihan, E. D. Folland, W. E. Strauss, G. V. R. K. Sharma, and A. A. Sasahara (West Roxbury Veterans Administration Medical Center; Peter Bent Brigham Hospital; Harvard University, Boston, Mass.). *Americal Journal of Cardiology,* vol. 46, Dec. 18, 1980, p. 1205-1214. 32 refs. Research supported by the U.S. Veterans Administration.

Two dimensional echocardiography is just beginning to be used to characterize cardiac damage in patients with acute myocardial infarction. The two dimensional approach allows for a more comprehensive evaluation of cardiac anatomy and is able to detect with high sensitivity changes in regional wall motion that previously were sometimes missed or only found with difficulty using M mode echocardiography. Two dimensional echocardiography appears to offer a basis for quantifying the extent of myocardial damage in acute myocardial infarction and thus may permit objective assessment of therapeutic modalities and prognosis. In addition, the technique facilitates recognition of specific complications in acute myocardial infarction. In particular, the technique offers the ability to distinguish true from false ventricular aneurysm, postinfarction ventricular septal defect from papillary muscle dysfunction and rupture, and right ventricular infarction from cardiac tamponade. (Author)

A81-16661 Value and limitations of two dimensional echocardiography in assessment of cardiomyopathy. A. N. DeMaria, W. Bommer, G. Lee, and D. T. Mason (California, University, Davis; California, University, Medical Center, Sacramento, Calif.). *American Journal of Cardiology,* vol. 46, Dec. 18, 1980, p. 1224-1231. 29 refs. Research supported by the American Heart Association.

Advantages and limitations of two-dimensional echocardiography in the evaluation of patients with cardiomyopathy are considered. It is pointed out that M mode cardiography has proven itself to be a useful means of detecting and distinguishing between congestive, hypertrophic and restrictive cardiomyopathy, which is important in identifying the exact cause of the myocardial process. Although two-dimensional echocardiography has been found capable of distinguishing between specific forms of congestive and restrictive cardiomyopathy, its most significant contribution has been in the evaluation of hypertrophic cardiomyopathy, where the greater field of view and spatial orientation afforded by the two-dimensional technique have enabled the clarification of the diagnosis in patients with an equivocal M-mode echocardiogram. Specifically, two-dimensional echocardiography has been used in the determination of the pattern of septal hypertrophy in patients with hypertrophic cardiomyopathy, the location of systolic anterior motion, the evaluation of changes in left ventricular geometry, and the assessment of the efficacy of septal myectomy. A.L.W.

A81-16662 Value of radionuclide imaging techniques in assessing cardiomyopathy. M. R. Goldman (Massachusetts General Hospital, Boston, Mass.) and C. A. Boucher (Harvard University, Boston, Mass.). *American Journal of Cardiology,* vol. 46, Dec. 18, 1980, p. 1232-1236. 32 refs. Grant No. NIH-HL-21751.

Radionuclide imaging techniques add an important dimension to the diagnosis, classification and management of myocardial disease. The gated blood pool scan provides information allowing determination of the functional type of cardiomyopathy (congestive, restrictive or hypertrophic) as well as evaluation of ventricular performance. Myocardial perfusion imaging with thallium-201 is useful in distinguishing congestive cardiomyopathy from severe coronary artery disease and also in depicting septal abnormalities in hypertrophic cardiomyopathy. Radionuclide techniques also prove useful in following progression of disease and in evaluating the efficacy of therapeutic interventions. (Author)

A81-16663 Two dimensional echocardiography in congenital heart disease. M. N. Kotler, G. S. Mintz, W. R. Parry, and B. L. Segal (Hahnemann Medical College and Hospital, Philadelphia, Pa.). *American Journal of Cardiology,* vol. 46, Dec. 18, 1980, p. 1237-1246. 35 refs.

The use of two-dimensional echocardiography in the evaluation of patients with congenital heart disease by the visualization of anatomic relations and structural defects is discussed. The various cross-sectional planes employed in the evaluation of congenital heart disease are indicated, with particular attention given to the subcostal approach, and the three basic steps in the two-dimensional echocardiography are outlined, which include the assessment of great arterial relations, ventricular situs and the relation of the great arteries to ventricles, atrioventricular valves and the septum. Examples of clinical applications of echocardiographic approaches are then presented for the evaluation of tetralogy of Fallot, truncus arteriosus, double outlet right ventricle, the d-transposition of the great arteries, congenitally corrected l-transposition of the great arteries, a straddling tricuspid valve, atrial and ventricular septal defects, patent ductus arteriosis, endocardial cushion defects, Ebstein's anomaly of the tricuspid valve, and subvalvular, valvular and supravalvular aortic stenosis. A.L.W.

A81-16664 **Doppler echocardiography - Applications, limitations and future directions.** A. S. Pearlman, J. G. Stevenson, and D. W. Baker (Washington, University, Seattle, Wash.). *American Journal of Cardiology*, vol. 46, Dec. 18, 1980, p. 1256-1262. 23 refs. Grants No. NIH-HL-07293; No. NIH-RR-05432.

On the basis of principles that are similar to (but differ slightly from) those that underlie M mode and two dimensional techniques, pulsed Doppler echocardiography permits evaluation of intracardiac blood flow noninvasively. This technique is helpful in the diagnosis and management of patients with valvular and congenital heart disease, and in some circumstances provides information not available from M mode or two dimensional imaging. Despite several notable limitations, pulsed Doppler echocardiography is a useful diagnostic technique whose clinical application is likely to increase as future technologic improvements occur. (Author)

A81-16665 **Evaluation of ischemic heart disease with a prototype volume imaging computed tomographic /CT/ scanner - Preliminary experiments.** J. G. Scanlan, D. E. Gustafson, P. A. Chevalier, R. A. Robb, and E. L. Ritman (Mayo Clinic, Rochester, Minn.). *American Journal of Cardiology*, vol. 46, Dec. 18, 1980, p. 1263-1268. 9 refs. Grants No. NIH-HL-04664; No. NIH-RR-0007.

A81-16666 **Regional myocardial blood flow, metabolism and function assessed noninvasively with positron emission tomography.** H. R. Schelbert, M. E. Phelps, E. Hoffman, S.-C. Huang, and D. E. Kuhl (California, University, Los Angeles, Calif.). *American Journal of Cardiology*, vol. 46, Dec. 18, 1980, p. 1269-1277. 49 refs. Contract No. DE-AM06-76SF-000012; Grant No. NIH-7-R01-GM-24839-01.

A81-16667 **Nuclear magnetic resonance imaging - Potential cardiac applications.** M. R. Goldman, G. M. Pohost, J. S. Ingwall, and E. T. Fossel (*Massachusetts General Hospital; Peter Bent* Brigham Hospital; Harvard University, Boston, Mass.). *American Journal of Cardiology*, vol. 46, Dec. 18, 1980, p. 1278-1283. 19 refs.

Potential clinical applications of nuclear magnetic resonance (NMR) imaging are discussed with particular emphasis on cardiac studies. The principles of NMR spectroscopy and the reconstruction of images from NMR data obtained in a magnetic field gradient are reviewed, and the sensitive point technique of Hinshaw et al. (1977) for producing three dimensional images is introduced. Possible uses of NMR imaging in the study of intact functional biological systems are then considered, including the differentiation of ischemic tissue areas including myocardial injuries by the proton NMR imaging of water, and metabolic studies of myocardial ischemia and infarction by P-31 imaging of ATP, creatine phosphate and inorganic phosphorus. Unresolved problems in the application of NMR imaging to clinical studies are pointed out, and possible solutions which would enable the development of the technique as a powerful aid in diagnosing disease are suggested. A.L.W.

A81-16676 **Changes in Beta-adrenergic responsiveness of rats during chronic cold exposure.** C. C. Barney, M. J. Katovich, M. J. Fregly, and P. E. Tyler (Florida, University, Gainesville, Fla.). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 49, Dec. 1980, p. 923-929. 30 refs. Contract No. N00014-75-C-0199.

A81-16677 **Plasma renin activity, vasopressin concentration, and urinary excretory responses to exercise in men.** C. E. Wade and J. R. Claybaugh (U.S. Army, Tripler Army Medical Center, Honolulu, Hawaii). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 49, Dec. 1980, p. 930-936. 29 refs. Army-supported research; Grant No. NIH-HL-23434-01.

A81-16678 **Thermal effects of injecting norepinephrine into hypothalamus of the rat during rest and exercise.** C. V. Gisolfi and J. V. Christman (Iowa, University, Iowa City, Iowa). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 49, Dec. 1980, p. 937-941. 25 refs. Contract No. N00014-75-C-0597.

Norepinephrine (NE) was injected bilaterally through implanted guide cannulas into the anterior hypothalamus (AH) of male Sprague-Dawley rats at rest and before treadmill exercise. Colonic (T sub c), tail-skin (T sub s), and ambient (T sub a) temperatures were monitored by a telethermometer; intrahypothalamic injections of NE produced a dose-dependent hypothermia with a 3-5 C rise in T sub s at rest, but NE injected 2 min before exercise raised the T sub s and reduced the T sub c by 0.9 C below resting levels during exercise. The results show that (1) 0.5-40.0 microgram amounts of NE injected into the AH produce only hypothermia, (2) alpha-adrenergic receptors in the AH play a role in heat dissipation when the thermoregulatory system is subjected to the endogenous stress of exercise, and (3) exercise provides a nonthermal input to the temperature regulatory system which increases heat dissipation. A.T.

A81-16679 **Effects of repeated heat exposure on hypothalamic sensitivity to norepinephrine.** J. V. Christman and C. V. Gisolfi (Iowa, University, Iowa City, Iowa). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 49, Dec. 1980, p. 942-945. 21 refs. Contract No. N00014-75-C-0597.

Bilateral stainless steel guide tubes were stereotaxically implanted above the anterior hypothalamus (AH) of 12 male Sprague-Dawley rats; norepinephrine (NE) was injected into the AH daily at increasing depths below the guide tubes until colonic temperature fell to 0.8 C. The effects of a subsequent treadmill exercise at 21.5 m/min for three weeks at 22 and 35 C on the magnitude of the NE-induced hypothermia showed that the reductions in colonic temperatures resulted from sharp increases in tail-skin temperature. It was concluded that repeated heat exposure increased the sensitivity of the AH to exogenous NE. A.T.

A81-16680 **Pseudorandom testing of ventilatory response to inspired carbon dioxide in man.** S. Sohrab and S. M. Yamashiro (Southern California, University, Los Angeles, Calif.). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 49, Dec. 1980, p. 1000-1009. 25 refs. Grant No. NIH-GM-23732.

A new method of testing the transient ventilatory response to inspired CO2 in humans has been developed in an attempt to improve the resolution and reproducibility of measures of peripheral chemoreceptor-mediated dynamics. The test input consisted of varying the level of inspired CO2 between 0 and 6-8% on a pseudorandom breath-by-breath basis. Cross-correlating this input with responses of end-tidal CO2, tidal volume, durations of inspiration and expiration, and respiratory rate yielded estimates of impulse responses. Computer simulation results and data collected in two subjects showed that reliable estimates of circulatory time lags and rapid dynamics are possible with this method. In one subject, the response dynamics observed were consistent with peripheral chemoreceptor rate sensitivity or adaptation. The rapid changes in inspiratory and expiratory durations also observed are probably mediated by peripheral chemoreceptors and appear to depend on the phase of the breathing cycle at which the CO2 stimulus arrives. (Author)

A81-16681 **Platelet count in temporary residents of high altitude.** S. C. Sharma (Military Hospital, Jubbulpore, India). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 49, Dec. 1980, p. 1047, 1048. 7 refs.

Platelet count was estimated in 65 lowlanders temporarily staying at altitudes above 3000 m. They were divided in subgroups according to the length of their continuous stay. For comparison, 51 highlanders who were born and reared at high altitude and 48 lowlanders who had never been to an altitude of more than 1000 m were also studied. Gradually rising counts becoming highly significant (P less than 0.001) as compared to the lowlanders after 31 days of stay and stabilizing close to the values in highlanders after 181 days were noted. (Author)

A81-16682 **Pathophysiology of inner ear dysfunction in the squirrel monkey in rapid decompression.** J. P. Landolt, K. E. Money, E. D. L. Topliff, A. D. Nicholas, J. Laufer, and W. H. Johnson (Defence and Civil Institute of Environmental Medicine, Downsview, Ontario; Toronto, University, Toronto, Canada). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 49, Dec. 1980, p. 1070-1082. 47 refs. Contract No. N00014-77-G-0077.

A81-16686 **The continuous recording of ECGs by the Holter method /Technical, details/ (Enregistrement continu de l'E.C.G. selon la méthode de Holter /Modalité techniques/).** G. Leguay (Hôpitaux des Armées; Service de Santé des Armées, Paris, France) and A. Seigneuric (Hôpitaux des Armées, Paris, France). *Médecine Aéronautique et Spatiale, Médecine Subaquatique et Hyperbare*, vol. 19, 3rd Quarter, 1980, p. 174-178. 14 refs. In French.

Practical aspects of the recording of continuous ECGs by the Holter method are discussed in light of the potential usefulness of the technique for the monitoring of flight personnel. Possible uses of the Holter method in aeronautical medicine are considered, including the study of the cardiac behavior of pilots, the definition of normality criteria, the study of the physical adaptation of the pilot to his task, and the diagnosis of cardiac disorders. The components of a continuous ECG recording system, consisting of a recorder, a reader and an information system for automatic data analysis, are examined, and their use is indicated. It is noted that the choice of system to be employed must depend on the specific application (research or clinical) and the abilities of the users. A.L.W.

A81-16687 **A polygraph study of the effects of microwaves on sleep in the rat (Etude polygraphique des effets des microondes sur le sommeil du rat).** M. J. Klein, C. L. Milhaud, J. G. Nathie, M. Dayt, D. Bucaille, and C. Roussilhon (Centre d'Etudes et de Recherches de Médecine Aérospatiale, Paris, France). *(Symposium International sur les Applications Energétiques des Microondes, 14th, Monaco, June 1979.) Médecine Aéronautique et Spatiale, Médecine Subaquatique et Hyperbare*, vol. 19, 3rd Quarter, 1980, p. 178-184. 34 refs. In French. Direction des Recherches, Etudes et Techniques Contract No. 78-1002.

Daily polygraphic sleep monitoring of the Sprague-Dawley rat reveals no pharmacological type major effect after microwave radiation of 2.45 GHz, CW, 5 plus or minus 2 mW/sq cm applied 12 hours a day for 30 days. The analysis of sleep recordings for 12 subjects (6 controls, 6 experimental rats) shows in the irradiated animals only fewer sleep cycles, a fractionated wake-sleep cycle, increased slow-wave sleep and relative stability of paradoxical sleep which although reduced was not suppressed. Contrarily to psychotropic drugs, microwaves have no characteristic effects on paradoxical sleep (PS). Increased drowsiness, not associated with parallel changes in PS may be interpreted, not as a true hypersomnia but rather as a cortical hypersynchronization, or as the recovery from a specific deficit in slow wave sleep during irradiation. (Author)

A81-16690 **Morphological and cardiovascular data concerning student pilots of the French air force (Données morphologiques et cardiovasculaires concernant les élèves pilotes de l'armée de l'air).** G. Vernon and J. Bremond *Médecine Aéronautique et Spatiale, Médecine Subaquatique et Hyperbare*, vol. 19, 3rd Quarter, 1980, p. 190-196. 9 refs. In French.

A statistical analysis was done of medical data collected during pilot admission examinations, and concerning five years of recruitment (1970-1974): morphological (height, weight, segmental values) and cardiovascular characteristics (blood pressure, pulse, cardiac axis, Flack test). These data were factor analyzed and compared with ones relating to previous populations of the Air Force and other branches. (Author)

A81-16691 **The sickle cell trait and aviation with regard to six carriers of the sickle cell trait among the technical flight personnel of the Air Mali Company (Trait drépanocytaire et aviation à propos de 6 porteurs du trait drépanocytaire personnel navigant technique de la Compagnie Air-Mali).** A. G. Rhaly Abdoulayeo (Service de Médecine Aéronautique, Bamako, Mali). *Médecine Aéronautique et Spatiale, Médecine Subaquatique et Hyperbare*, vol. 19, 3rd Quarter, 1980, p. 198, 199. 14 refs. In French.

A81-16692 **The importance of retinal electrophysiology in the monitoring of prolonged treatment with synthetic antimalarial agents (L'intérêt de l'électrophysiologie rétinienne dans la surveillance du traitement prolongé par les antipaludéens de synthèse).** G. Perdriel and J. P. Chevaleraud (Service de Santé pour l'Armée de l'Air, Ecole d'Application, Paris, France). *Médecine Aéronautique et Spatiale, Médecine Subaquatique et Hyperbare*, vol. 19, 3rd Quarter, 1980, p. 200-202. In French.

The use of electroocular techniques in the monitoring of patients taking large, anti-inflammatory doses of chloroquine derivatives over extended periods of time is discussed. It is noted that daily doses of over 2.50 mg of 4-aminoquinolines have been observed to cause retinal lesions in from 1 to 20 percent of treated patients, due to the buildup of aminoquinone derivatives in the retina. Means for detecting and monitoring the development of these lesions, which progress in three stages to an irreversible state, are then considered, with attention given to the various possible subjective tests and the objective tests represented by electroretinography and electrooculography. It is concluded that the electrophysiological techniques, particularly electroretinography, represent a useful diagnostic and prognostic technique which should be practiced routinely in order to prevent the development of irreversible retinal lesions in patients taking large doses of chloroquines. A.L.W.

A81-16693 **The effects of hyperbaric oxygen /HBO/ on the qualitative and quantitative brain fatty acid compositions of normal and vitamin E-deficient mice (Effets de l'oxygène hyperbare /OHB/ sur la composition qualitative et quantitative en acides gras du cerveau de souris, carencées ou non en vitamine E).** C. Dumas, P. Joanny, and F. Brue (Centre d'Etudes et de Recherches de Biophysiologie Appliquée à la Marine, Toulon-Naval; Aix-Marseille II, Université, Marseille, France). *Médecine Aéronautique et Spatiale, Médecine Subaquatique et Hyperbare*, vol. 19, 3rd Quarter, 1980, p. 226-229. 17 refs. In French.

A81-16694 **Increase in the turn-over rate of cerebral dopamine, noradrenaline and serotonin under hyperbaric oxygen (Augmentation de la vitesse de renouvellement de la dopamine de la noradrénaline et de la sérotonine cérébrales sous oxygène hyperbare).** F. Brue, A. Chaumont, and C. Dumas (Centre d'Etudes et de Recherches de Biophysiologie Appliquée à la Marine, Toulon-Naval, France). *Médecine Aéronautique et Spatiale, Médecine Subaquatique et Hyperbare*, vol. 19, 3rd Quarter, 1980, p. 230-234. 12 refs. In French.

A81-16707 * **A theory for the origin of a self-replicating chemical system. I - Natural selection of the autogen from short, random oligomers.** D. H. White (Santa Clara, University, Santa Clara, Calif.). *Journal of Molecular Evolution*, vol. 16, Dec. 1980, p. 121-147. 60 refs. Research supported by the Research Corp.; Grants No. NCA2-OR-685-708; No. NCA2-OR-685-806.

A general theory is presented for the origin of a self-replicating chemical system, termed an autogen, which is capable of both crude replication and translation (protein synthesis). The theory requires the availability of free energy and monomers to the system, a significant background low-yield synthesis of kinetically stable oligopeptides and oligonucleotides, the localization of the oligomers, crude oligonucleotide selectivity of amino acids during oligopeptide synthesis, crude oligonucleotide replication, and two short peptide families which catalyze replication and translation, to produce a localized group of at least one copy each of two protogenes and two protoenzymes. The model posits a process of random oligomerization, followed by the random nucleation of functional components and the rapid autocatalytic growth of the functioning autogen to macroscopic amounts, to account for the origin of the first

self-replicating system. Such a process contains steps of such high probability and short time periods that it is suggested that the emergence of an autogen in a laboratory experiment of reasonable time scale may be possible. A.L.W.

A81-16900 **Man in the state of low gravity - Physiological problems, clinical aspects, and measures for prevention and protection (Der Mensch im Zustand der Schwerelosigkeit - Physiologische Probleme, klinische Aspekte, Vorbeugung und Schutzmassnahmen).** H. S. Fuchs. *(Hermann-Oberth-Gesellschaft, Raumfahrtkongress, 29th, Feucht, West Germany, June 25-29, 1980.) Astronautik,* vol. 17, no. 4, 1980, p. 96-100. In German.

This paper examines the various effects of gravity and low gravity on humans. Investigating the influence of gravity on human physiology is complicated by the constant gravity experienced on the earth. Research with long term bedridden patients and water tank immersion is considered, along with experiments carried out by the Skylab and Salyut missions. With low gravity, an increase in body length and a loss of body mass are observed. A decrease in volume in the lower extremities is characterized by a fluid shift in the circulatory system and a loss of muscle mass. The various effects of low gravity on the heart, skeleton, musculature, blood, and endocrine system are investigated. The problem of flight sickness during short term space flights is also examined. R.C.

A81-17050 # **Efficiency of the rat heart and muscular system following physical training and hypokinesia (O koeffitsiente poleznogo deistviia serdtsa i myshechnoi sistemy krys posle fizicheskoi trenirovki i gipokinezii).** Iu. S. Aliukhin and A. F. Davydov (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR,* vol. 66, Nov. 1980, p. 1660-1665. 10 refs. In Russian.

A81-17076 # **Changes in human memory during adaptation to climatogeographic conditions following transmeridional flight (Izmenenie pamiati cheloveka pri adaptatsii klimato-geograficheskim usloviiam posle transmeridional'nogo pereleta).** R. Iu. Il'iuchenok, V. P. Leutin, N. V. Vol'f, S. B. Tsvetovskii, and E. I. Nikolaeva (Akademiia Meditsinskikh Nauk SSSR, Novosibirsk, USSR). *Fiziologiia Cheloveka,* vol. 6, Nov.-Dec. 1980, p. 970-977. 22 refs. In Russian.

Changes in memory during the period of adaptation to new environmental conditions following transmeridional flight are investigated in eight subjects flown from Novosibirsk to Iuzhno Kuril'sk on a flight lasting 17 h. On three occasions prior to the flight and on the second, third, fourth, eleventh and twenty-first days following it, subjects were tested on their ability to memorize a list of 20 two-syllable words, and their physiological functions were monitored by EEG, EKG, skin-galvanic response, seismoactogram and phonogram. On the first days of adaptation to the new environment, a decrease in the stability of the physiological functions and indicators of memory is observed, together with a deterioration of short-term memory. At later stages of adaptation, an increase in the activity of the central nervous system and a recovery in work reproduction are obtained. Neural mechanisms for the variation in mental ability are discussed. A.L.W.

A81-17077 # **Comparative evaluation of the changes in the human organism during antiorthostatic hypokinesia and immersion (Sravnitel'naia otsenka izmenenii v organizme cheloveka pri antiortostaticheskoi gipokinezii i immersii).** K. I. Gogolev, E. A. Aleksandrova, and E. B. Shul'zhenko. *Fiziologiia Cheloveka,* vol. 6, Nov.-Dec. 1980, p. 978-983. 17 refs. In Russian.

The physiological effects of two ground-based experimental models of weightlessness, antiorthostatic hypokinesia and immersion, are compared. Water balance, blood hydrocolloid content and leg muscle pliancy were monitored in subjects undergoing seven days of antiorthostatic hypokinesia at an inclination of -6 deg or unsupported dry immersion. Changes in water balance, hematocrit and circulating blood volume similar to those observed in the acute phase of weightlessness are found in both groups of subjects, with immersion leading to more marked changes over a longer period. In addition, a significant increase in muscle pliancy, due to changes in regional blood circulation, is observed during immersion, similar to the results obtained under actual flight conditions. It is thus concluded that human physiological reactions to weightlessness are more closely modeled under conditions of immersion than under antiorthostatic hypokinesia. A.L.W.

A81-17078 # **Evaluation of the effectiveness of increased energy expenditure during heat adaptation (Otsenka effektivnosti povysheniia energotrat pri teplovoi adaptatsii).** G. N. Novozhilov (Voenno-Meditsinskaia Akademiia, Leningrad, USSR). *Fiziologiia Cheloveka,* vol. 6, Nov.-Dec. 1980, p. 984-988. 22 refs. In Russian.

The physiological efficiency of the initial increase in energy exchange seen during heat adaptation and attributed to the need for increased sweat production and peripheral blood flow is examined. Eight subjects were exposed to environmental chamber temperatures of 37.7-38.5 C at a relative humidity of 45-60% daily for four hours over the course of 10 days while they were at rest or engaged in light physical exercise, and body temperature, oxygen consumption and carbon dioxide output were monitored. A decrease and eventual stabilization in body temperature were observed over the first seven days of the experiment, although the rate of energy exchange as indicated by oxygen consumption and heat loss from sweat remained elevated with respect to control conditions throughout the experiment. The observed increase in metabolic level, however, was observed to be more than compensated for by the increase in heat loss, indicating the effectiveness of the thermoregulatory mechanisms during the initial stages of heat adaptation. A.L.W.

A81-17079 # **A comparison of respiratory regulation during transient and steady-state muscular work and in the presence of supplementary resistance (Sravnenie reguliatsii dykhaniia v perekhodnom i ustoichivom rezhimakh myshechnoi raboty i pri deistvii dobavochnogo soprotivleniia).** I. S. Breslav, G. G. Isaev, and A. M. Shmeleva (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR). *Fiziologiia Cheloveka,* vol. 6, Nov.-Dec. 1980, p. 989-996. 24 refs. In Russian.

Human respiratory regulation at various intensities of muscular work and in the presence of supplementary airway resistance is compared. Lung ventilation, inspiratory occlusion pressure and the work performed by the breathing musculature were measured in four healthy subjects performing three levels of work on a bicycle ergometer and breathing through a perforated diaphragm. Analysis of the results obtained indicates the dominant role of neurogenic factors in the regulation of respiration during discontinuous periods of increased physical activity and in the presence of increased airway resistance, which factors interact positively with chemoreceptor stimuli. A.L.W.

A81-17080 # **Hemodynamics of the healthy man under moderate physical loads in the lying and sitting positions (Gemodinamika zdorovogo cheloveka pri umerennykh fizicheskikh nagruzkakh, vypolniaemykh v polozheniiakh 'lezha' i 'sidia').** B. S. Katkovskii, V. P. Buzulina, and Iu. D. Pometov. *Fiziologiia Cheloveka,* vol. 6, Nov.-Dec. 1980, p. 1009-1013. 17 refs. In Russian.

The hemodynamic characteristics of healthy men engaged in a moderate level of physical activity in the lying and sitting positions are investigated. Circulatory minute volume, heart stroke volume, heart rate oxygen demand, and CO2 output were monitored in 30 volunteers performing 100 V of work on a bicycle ergometer while orthostatically stable in the lying or sitting positions. No differences in minute volume, stroke volume or heart rate are observed between the two positions, although at rest significant differences in heart rate and stroke volume were obtained. In addition, a significant increase in stroke volume is observed during physical activity with respect to the rest state in either position. Possible experimental

reasons for the discrepancies between the present results and previous results in which a greater minute circulation volume during work in the lying position and no increase in stroke volume during exercise were found, are discussed. A.L.W.

A81-17081 # **Variations in blood plasma cholesterol content in young people under the influence of physical loads (Izmeneniia soderzhaniia kholesterina v plazme krovi pod vliianiem fizicheskoi nagruzki u molodykh lits).** V. P. Bashmakov, A. Ia. Fomkin, B. S. Parnov, and V. N. Kolmakov (Leningradskii Sanitarno-Gigienicheskii Meditsinskii Institut, Leningrad, USSR). *Fiziologiia Cheloveka,* vol. 6, Nov.-Dec. 1980, p. 1020-1022. 24 refs. In Russian.

A81-17082 # **The concept of type in electroencephalogram classification (Poniatie tipa v klassifikatsii elektroentsefalogramm).** E. A. Zhirmunskaia and V. S. Losev (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Fiziologiia Cheloveka,* vol. 6, Nov.-Dec. 1980, p. 1039-1047. 27 refs. In Russian.

A system for the classification of electroencephalograms into 20 groups (subtypes) of five major types is presented. The system was developed on the basis of electroencephalograms recorded of the left and right hemispheres of 260 healthy and ill (nervous system disorders) subjects, which were classified according to major components, the amplitude of the major component, alpha activity characteristics, zonal differences, the presence of low-frequency beta activity and the characteristics of theta and delta activity. The numerical code obtained in this manner for each EEG allows it to be classified unambiguously and is suitable for computer analysis. Changes in EEG groups may also be used to monitor patient bioelectrical activity in changing physiological and pathological states. A.L.W.

A81-17083 # **Investigation of psychophysiological manifestations of emotionality in 18- to 20-year olds (Issledovanie psikhofiziologicheskikh proiavlenii emotsional'nosti u lits 18-20-letnego vozrasta).** A. A. Shaburian (Ministerstvo Zdravookhraneniia SSSR, Institut Gigieny Detei i Podrostkov, Moscow, USSR). *Fiziologiia Cheloveka,* vol. 6, Nov.-Dec. 1980, p. 1067-1075. 28 refs. In Russian.

The psychophysiological characteristics of highly emotional individuals between the ages of 18 and 20 are investigated. Following a preliminary screening of 100 individuals by means of electrocardiography, skin-galvanic response, the Rabinovich questionnaire, the Cattell F3 test and evaluation of production plan fulfillment under highly emotional circumstances, 18 subjects who indicated high emotional activity were selected and monitored according to reaction times, EEG characteristics and E waves. Such individuals are found to exhibit low indicators of nervous system strength (reaction time), enhanced galvanic skin responses, variations in background EKGs, a hypersynchronous EEG type and a peculiar slow negative wave form. A.L.W.

A81-17084 # **The accuracy of motor reaction as an indicator of the functional condition of the central nervous system (Tochnost' dvigatel'noi reaktsii kak pokazatel' funktsional'nogo sostoianiia tsentral'noi nervnoi sistemy).** Z. V. Dubrovina, L. T. Blinova, and L. P. Makarova (Nauchno-Issledovatel'skii Institut Gigieny Truda i Professional'nykh Zabolevanii, Leningrad, USSR). *Fiziologiia Cheloveka,* vol. 6, Nov.-Dec. 1980, p. 1076-1084. 21 refs. In Russian.

The stability of the reactions to a moving object of individuals with time is investigated in relation to the use of this reaction in the evaluation of the functional condition of the central nervous system. Reactions to moving objects were monitored in 134 young people initially aged 15-16 years over the course of three years, who were asked to fix a rotating arrow on a given division of a circular scale. The results obtained reveal a considerable variability in all aspects of the motor response, reflecting the state of the central nervous system. The most informative parameters of the reaction for the determination of deviations from the norm and individual differences are found to be the mean response error, the relations between the number and magnitude of delayed and advanced reactions, and the statistical characteristics of the error distribution. In addition, oscillations of the magnitude of the moving object response are obtained which are attributed to spontaneous oscillations in the central nervous system. A.L.W.

A81-17085 # **Sleep and mental work capacity (Son i umstvennaia rabotosposobnost').** I. S. Kandror (Vsesoiuznyi Nauchno-Issledovatel'skii Institut Zheleznodorozhnoi Gigieny, Moscow, USSR) and V. S. Rotenberg (I Moskovskii Meditsinskii Institut, Moscow, USSR). *Fiziologiia Cheloveka,* vol. 6, Nov.-Dec. 1980, p. 1094-1101. 38 refs. In Russian.

The relationship between the factors of motivation and attentiveness, which determine the level of mental work capacity, and the incidence, duration and quality of sleep obtained is discussed. Following a review of current understandings of the structure and function of sleep, results of sleep deprivation and curtailment experiments are presented which demonstrate the importance of the structural organization of sleep in the maintenance of normal levels of human work capacity, taking into account individual differences and differences in the kind of task performed. The importance of circadian sleep rhythms to both work capacity and general health is also pointed out. Aspects of the relationship between the sleep-wake cycle and human work capacity requiring further investigation are indicated, including the extension of the studies to persons performing stressful mental work. A.L.W.

A81-17086 # **Blood changes during adaptation to large physical loads (Izmeneniia krovi pri adaptatsii k fizicheskim nagruzkam bol'shogo ob'ema).** A. M. Efimenko, V. V. Shiriaev, and V. I. Kuprienko (Simferopol'skii Gosudarstvennyi Universitet, Simferopol, Ukrainian SSR). *Fiziologiia Cheloveka,* vol. 6, Nov.-Dec. 1980, p. 1117-1122. 33 refs. In Russian.

Changes in blood properties brought about by large physical loads of variable intensity are investigated. Blood analyses were performed in 10 bicyclists before and after a ride of 230 km at an average speed of 35 km/h. Measurements indicate that the physical activity resulted in increases in blood specific weight, hematocrit and hemoglobin content for an unchanged number of erythrocytes in 1 cu mm of blood. The mean volume and hemoglobin content of the erythrocytes are also found to increase, resulting in no variation in mean hemoglobin concentration. The reticulocyte content of a given blood volume is observed to increase dramatically, along with erythrocyte resistance to glycerin lysis, indicating a replacement of old erythrocytes with new. Changes in the structure of the hemoglobin are indicated by differential temperature spectroscopy. Increased leukocyte, neutrophile and thrombocyte concentrations and thrombocyte aggregation are observed, together with a decrease in albumin content and insignificant shifts in the acid-base balance. The changes in blood properties provoked by extended physical work are thus found to contribute to homoestasis under the extreme conditions. A.L.W.

A81-17087 # **The sensitivity of the auditory and tactile sensory systems upon separate and simultaneous stimulation (Chuvstvitel'nost' slukhovoi i taktil'noi sensornykh sistem pri ikh razdel'noi i sovmestnoi stimuliatsii).** N. Iu. Alekseenko (Akademiia Nauk SSSR, Institut Vysshei Nervnoi Deiatel'nosti i Neirofiziologii, Moscow, USSR). *Fiziologiia Cheloveka,* vol. 6, Nov.-Dec. 1980, p. 1131-1133. 14 refs. In Russian.

A81-17088 # **Changes in the rate of verbal reactions to the separate visual stimulation of the right and left visual fields (Izmeneniia skorosti verbal'nykh reaktsii na zritel'noe razdrazhenie razdel'no pravogo i levogo polei zreniia).** S. B. Tsvetovskii and N. V. Vol'f (Akademiia Meditsinskikh Nauk SSSR, Novosibirsk, USSR). *Fiziologiia Cheloveka,* vol. 6, Nov.-Dec. 1980, p. 1134-1137. 9 refs. In Russian.

Changes in the functional asymmetry of the brain during adaptation to different climatic and geographic conditions are investigated based on measurements of the rate of verbal responses to visual stimuli presented separately to the right and left visual fields.

Twelve subjects were asked to identify numerals appearing 13 deg to either side of a central visual fixation point during a control period in Novosibirsk and on the second, third, fourth, eleventh and twenty-first days of adaptation to mountain conditions (Altai, altitude 2600 m). During the initial stage of adaptation, an increase in the mean reaction time for stimuli presented in the right visual field is observed with respect to that obtained under control conditions, while the reaction times for stimuli presented in the left field remained essentially unchanged, resulting in a reversal of the asymmetry index. Results thus indicate the activation of the right cerebral hemisphere and the weakening of the left during the period of adaptation to changes in climate and geography, which may be explained by the connection of the right hemisphere with visceral and vegetative functions. A.L.W.

A81-17116 # **Investigation of the biological effect of lunar soil as a result of its intratracheal introduction (Issledovanie biologicheskogo deistviia lunnogo grunta pri ego intratrakheal'nom vvedenii).** V. V. Kustov, V. I. Belkin, K. P. Bugar', and V. V. Zharov. *Kosmicheskie Issledovaniia,* vol. 18, Nov.-Dec. 1980, p. 947-949. 9 refs. In Russian.

A81-17117 # **Effect of space flight factors on the prophase in microspores of Tradescantia paludosa (Vliianie faktorov kosmicheskogo poleta na profazu v mikrosporakh Tradescantia paludosa).** N. L. Delone, V. V. Antipov, and B. I. Davydov. *Kosmicheskie Issledovaniia,* vol. 18, Nov.-Dec. 1980, p. 949-951. 15 refs. In Russian.

A81-17145 # **Effects of vibrations on the human organism (Gli effetti delle vibrazioni sull'organismo umano).** G. B. Raffi and F. Morisi (Bologna, Università, Bologna; Consorzio Socio-Sanitario di Corpi-Novi, Modena, Italy). *Ingegneria,* Sept.-Oct. 1980, p. 269-272. 22 refs. In Italian.

A81-17161 Quantifying an internal model of target motion in a manual tracking task. D. L. Kleinman, K. R. Pattipati, and A. R. Ephrath (Connecticut, University, Storrs, Conn.). *IEEE Transactions on Systems, Man, and Cybernetics,* vol. SMC-10, Oct. 1980, p. 624-636. 14 refs. Grant No. AF-AFOSR-77-3126.

Present research has sought to expand the understanding of human information processing and control behavior in target tracking tasks. Specifically, it has focused on the problem of quantifying the human's 'internal' model that characterizes his perception of short-term target motion, and on the development of noncomitant adaptive schemes for generating estimates of target velocity and acceleration using these models. A combined experimental and analytic program has studied simulated target tracking performance as modified by short periods (about 1 s) of target blanking. The blankings occur at pseudorandom times during a run. During the blanking period, human operator performance is governed almost entirely by his internal model representation of the target motion. Ensemble data from these blanking experiments have been used to suitably refine the optimal control model, including the target submodel. The resulting model represents the state of the art with regard to human operator modeling in dynamic antiaircraft-artillery (AAA) systems. (Author)

A81-17162 Pilot workload during an instrument approach. A. R. Ephrath (Bell Telephone Laboratories, Inc., Piscataway, N.J.). *IEEE Transactions on Systems, Man, and Cybernetics,* vol. SMC-10, Oct. 1980, p. 676-678. 9 refs.

The changes in the instantaneous workload of a pilot executing an instrument landing system approach are documented empirically. The results show a marked increase in the pilot's workload (measured by a subsidiary task) as distance to touchdown decreases. This increase in workload is present to different degrees both during coupled (automatic) and manually flown approaches. (Author)

A81-17197 # **Mechanisms of cardiovascular system adaptation to hypoxia /Review/ (Mekhanizmy adaptatsii serdechno-sosudistoi sistemy k usloviiam gipoksii /Obzor/).** N. A. Stepochkina (Leningradskii Korablestroitel'nyi Institut, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR,* vol. 66, Oct. 1980, p. 1433-1445. 133 refs. In Russian.

Results of investigations concerning the mechanisms by which the circulatory system adapts to hypoxic conditions such as those encountered at high altitudes are reviewed. Hemodynamic changes observed during hypoxia are pointed out, and causes of the observed changes in heart output and peripheral vascular resistance under the influences of hypoxia, hypoxia training and training for physical work are considered. Mechanisms for the effects of oxygen insufficiencies and excesses on the cardiovascular system are then surveyed, with attention given to reflex activities, the role of carbon dioxide, the effects of hormones and metabolites, and the action of oxygen on vascular smooth muscles, which is argued to be the most likely cause of vasoconstriction during hyperoxia and vasodilation during hypoxia, which in turn lead to complementary changes in hemodynamic parameters. Mechanisms for the chronic effects of hypoxia on the cardiovascular system are also discussed in terms of the stimulation of cellular energy production mechanisms. A.L.W.

A81-17198 # **The influence of an elevation of the partial pressure of oxygen on the regulatory function of the blood-brain barrier (Vliianie povyshennogo partsial'nogo davleniia kisloroda na reguliatornuiu funktsiiu gemato-entsefalicheskogo bar'era).** I. A. Sapov and A. I. Lupanov. *Fiziologicheskii Zhurnal SSSR,* vol. 66, Oct. 1980, p. 1516-1521. 20 refs. In Russian.

A81-17199 # **The effects of high altitude on the thermoregulatory system (Vliianie vysokogor'ia na sistemu termoreguliatsii).** Iu. I. Bazhenov (Akademiia Nauk Kirgizskoi SSR, Institut Fiziologii i Eksperimental'noi Patologii Vysokogor'ia, Frunze, Kirgiz SSR) and M. I. Bocharov (Kirgizskii Gosudarstvennyi Institut Fizicheskoi Kul'tury, Frunze, Kirgiz SSR). *Fiziologicheskii Zhurnal SSSR,* vol. 66, Oct. 1980, p. 1541-1548. 23 refs. In Russian.

The effects of residing at high altitude on human thermoregulatory responses are investigated. Body temperature and muscle activity responses to temperatures from 11.9 to 51.9 C were monitored for men residing at altitudes of 760 and 2400 m above sea level. The onset of thermoregulatory responses (shivering and sweat production) is observed to occur more quickly in mountain inhabitants than in persons acclimated to sea level, corresponding to a narrower temperature range within which thermoregulatory responses begin. Observations also indicate that the directivity as well as the absolute magnitude of skin temperature changes influence the specific thermoregulatory response, and that mountain inhabitants exhibit a greater number of functioning cold and hot points, which, however, respond more slowly to changes in skin temperature. It is proposed that extended exposure to a high-altitude climate lowers the resistance of the organism to environmental temperature oscillations. A.L.W.

A81-17200 # **Variation in the general resistance of rats under the influence of repetitive hypoxic-hypercapnia (Izmenenie obshchei rezistentnosti krys pod vliianiem povtoriaiushchikhsia gipoksicheski-giperkapnicheskikh vozdeistvii).** E. E. Zver'kova (Akademiia Nauk Kazakhskoi SSR, Institut Fiziologii, Alma-Ata, Kazakh SSR). *Fiziologicheskii Zhurnal SSSR,* vol. 66, Oct. 1980, p. 1575-1578. 14 refs. In Russian.

The effects of repeated exposures to hypoxic hypercapnic conditions on the general level of resistance of rats as indicated by body weight and altitude tolerance are investigated. Three groups of 20 rats each were exposed daily for 30 days to normal, hypoxic, or hypoxic hypercapnic atmospheric compositions at ground-level atmospheric temperatures and pressures for periods of up to 1 h 40 min. Increases in body weight and tolerance times at a simulated altitude of 12,000 m following training under hypoxic and hypoxic-hypercapnic conditions indicate that training under conditions of

increasing hypoxic hypercapnia is more effective in increasing the general resistance of animals than training under hypoxia alone.
A.L.W.

A81-17239 * Free fall - A partial unique motion environment. A. Graybiel (U.S. Naval Aerospace Medical Center, Aerospace Medical Research Laboratory, Pensacola, Fla.). *Acta Astronautica,* vol. 7, Dec. 1980, p. 1477-1481. 14 refs. NASA Order T-3384-G.

Conditions leading to the elicitation of motion sickness have been divided into two main categories: partial motion environments, in which head movements are required to elicit motion sickness, and complete motion environments, in which independent movements of the head are not required for the production of symptoms. It is postulated that, according to this categorization, free fall constitutes a partial motion environment. In support of this hypothesis evidence is reviewed from Skylab missions, experiments in parabolic flight, and ground-based studies. (Author)

A81-17240 Visual orientation by motion-produced blur patterns - Detection of divergence. T. L. Harrington, M. K. Harrington, C. A. Wilkins, and Y. O. Koh (Nevada, University, Reno, Nev.). *Perception and Psychophysics,* vol. 28, no. 4, Oct. 1980, p. 293-305. 70 refs. Research supported by the University of Nevada; Contract No. N00014-76-C-0398.

Blur patterns are physiological 'streaks' of photochemical and neural activity that occur whenever an observer and his visual environment are in relative motion. When retinal velocities are high, the impression of visual 'flow' gives way to one of a field of 'blur lines' whose patterns are rich with information about the motions and the optical textures that produced them. Simulated blur patterns were produced and thresholds measured for the detection of divergence at nine retinal loci. Sensitivity was somewhat greater in the central retina. Thresholds remained the same despite variations in pattern velocity, number of elements, and the presence or absence of an internal velocity gradient. Observers were able to orient above-threshold patterns, but consistently underestimated the amount of slant. (Author)

A81-17241 Direct and indirect perception of size. J. Norman (Haifa, University, Haifa, Israel). *Perception and Psychophysics,* vol. 28, no. 4, Oct. 1980, p. 306-314. 22 refs. Research supported by the University of Haifa.

A set of three experiments designed to differentiate between direct (stimulus-bound) and indirect (mediational inference) theories for the visual perception of size constancy at variable object distances is presented. In the experiments, reaction times were measured as subjects attempted to determine the relative sizes of two objects at different distances in a well illuminated and richly textured environment, and in a gray textureless environment. The distance of a square of standard size and distance and the presence of a textured background were not found to affect the pattern of reaction times measured, while an interaction between the objective sizes of the objects and the distance on reaction times was found. It is thus concluded that both direct and indirect size perception occur, with direct discriminization predominating when the perception is easiest and not relying on texture occlusion or interception. A.L.W.

A81-17497 * Flight-deck automation - Promises and problems. E. L. Wiener (Miami, University, Coral Gables, Fla.) and R. E. Curry (NASA, Ames Research Center, Moffett Field, Calif.). *Ergonomics,* vol. 23, Oct. 1980, p. 995-1011. 31 refs.

The paper analyzes the role of human factors in flight-deck automation, identifies problem areas, and suggests design guidelines. Flight-deck automation using microprocessor technology and display systems improves performance and safety while leading to a decrease in size, cost, and power consumption. On the other hand negative factors such as failure of automatic equipment, automation-induced error compounded by crew error, crew error in equipment set-up, failure to heed automatic alarms, and loss of proficiency must also be taken into account. Among the problem areas discussed are automation of control tasks, monitoring of complex systems, psychosocial aspects of automation, and alerting and warning systems. Guidelines are suggested for designing, utilising, and improving control and monitoring systems. Investigation into flight-deck automation systems is important as the knowledge gained can be applied to other systems such as air traffic control and nuclear power generation, but the many problems encountered with automated systems need to be analyzed and overcome in future research. B.R.K.

A81-17739 # Electrocardiogram made on ascending the Mount Qomolangma from 50 m a. s. l. Z. Shi, X. Ning, S. Zhu, D. Zhao, P. Huang (Academia Sinica, Physiology Institute, Shanghai, Communist China), S. Yang, Y. Wang (People's Liberation Army, IV Hospital, Communist China), and Z. Dong (Chinese Army, IV Medical College, Communist China). *Scientia Sinica,* vol. 23, Oct. 1980, p. 1316-1325. 8 refs.

A81-17923 * Theoretical foundations for quantitative paleogenetics. III - The molecular divergence of nucleic acids and proteins for the case of genetic events of unequal probability. R. Holmquist and D. Pearl (California, University, Berkeley, Calif.). *Journal of Molecular Evolution,* vol. 16, Dec. 1980, p. 211-267. 40 refs. NSF Grant No. PCM-76-18627; Grant No. NGR-05-003-460.

Theoretical equations are derived for molecular divergence with respect to gene and protein structure in the presence of genetic events with unequal probabilities: amino acid and base compositions, the frequencies of nucleotide replacements, the usage of degenerate codons, the distribution of fixed base replacements within codons and the distribution of fixed base replacements among codons. Results are presented in the form of tables relating the probabilities of given numbers of codon base changes with respect to the original codon for the alpha hemoglobin, beta hemoglobin, myoglobin, cytochrome c and parvalbumin group gene families. Application of the calculations to the rabbit alpha and beta hemoglobin mRNAs and proteins indicates that the genes are separated by about 425 fixed based replacements distributed over 114 codon sites, which is a factor of two greater than previous estimates. The theoretical results also suggest that many more base replacements are required to effect a given gene or protein structural change than previously believed.
A.L.W.

A81-17983 * Are sulfur isotope ratios sufficient to determine the antiquity of sulfate reduction. D. Ashendorf (Boston University, Boston, Mass.). *Origins of Life,* vol. 10, Dec. 1980, p. 325-333. 43 refs. Research supported by the Boston University and California Institute of Technology; Grant No. NGR-22-004-025.

Possible limitations on the use of sulfur isotope ratios in sedimentary sulfides to infer the evolution of microbial sulfate reduction are discussed. Current knowledge of the ways in which stable sulfur isotope ratios are altered by chemical and biological processes is examined, with attention given to the marine sulfur cycle involving various microbial populations, and sulfur reduction processes, and it is noted that satisfactory explanations of sulfur isotope ratios observed in live organisms and in sediments are not yet available. It is furthermore pointed out that all members of the same genus of sulfate reducing bacteria do not always fractionate sulfur to the same extent, that the extent of sulfur fractionation by many sulfate-reducing organisms has not yet been determined, and that inorganic processes can also affect sulfur isotope fractionation values. The information currently available is thus concluded to be insufficient to determine the time of initial appearance of biological sulfate reduction. A.L.W.

A81-17987 A similarity ring for amino acids based on their evolutionary substitution rates. E. Argyle (Dominion Radio Astrophysical Observatory, Penticton, British Columbia, Canada). *Origins of Life,* vol. 10, Dec. 1980, p. 357-360.

A similarity ring for amino acids is derived from a transition probability matrix constructed for amino acid substitutions in 12 families of modern proteins. The original matrix is transformed into a probability matrix in which the variance of the elements from the main diagonal, representing amino acid conservation, is minimized by means of a computer program serving to interchange matrix rows and columns. The minimum variance matrix indicates that the amino acid substitution probabilities must obey at least two independent similarity principles, which are inferred to be hydrophilic/hydrophobic and molecular weight on the basis of a diagram displaying the amino acids in cyclic order of minimum variance. Such a similarity ring may have significance for the origin of life and the origin and evolution of the genetic code. A.L.W.

A81-17988 Compartmentalization of self-reproducing machineries - Multiplication of microsystems with self-instructing polymerization of amino acids. K. Matsuno (Nagaoka, Technological University, Nagaoka, Japan). *Origins of Life,* vol. 10, Dec. 1980, p. 361-370. 14 refs.

A theoretical model is presented for the autonomous compartmentalization of the multiplication process of macromolecules within a microsystem (protocell) separated in phase from a solution of thermal polyamino acids. It is shown that both protocellular and macromolecular multiplication and evolution can be accounted for by the law of mass conservation, in that any material system acts by itself to remove any disequilibrium between incoming (free amino acid polymerization) and outgoing (polyamino acid degradation) flows. Accordingly, the compartmentalized machinery of macromolecular multiplication cannot reach a stationary state but instead is multiplied and alternates with states with either faster rates of multicellular multiplication or slower rates of macromolecular degradation. The modelled process also allows for the fixing of polynucleotides in the autocatalytic amino acid machinery if they act to increase polymerization or decrease macromolecule degradation. A.L.W.

A81-17990 * Chemical evolution and the origin of life - Bibliography supplement 1978. L. G. Pleasant (George Washington University, Medical Center, Washington, D.C.) and C. Ponnamperuma (Maryland, University, College Park, Md.). *Origins of Life,* vol. 10, Dec. 1980, p. 379-404. 478 refs. Contract No. NASw-3165; Grant No. NGR-21-002-317.

A81-18005 # Microwave radiation - Biological effects and exposure standards. I. R. Lindsay (RAF, Institute of Naval Medicine, Alverstoke, Hants., England). *SUNSAT Energy Council and Centre National d'Etudes Spatiales, International Symposium on Solar Power Satellites, Toulouse, France, June 25-27, 1980, Paper.* 5 p. 14 refs.

The thermal and nonthermal effects of exposure to microwave radiation are discussed and current standards for microwave exposure are examined in light of the proposed use of microwave power transmission from solar power satellites. Effects considered include cataractogenesis at levels above 100 mW/sq cm, and possible reversible disturbances such as headaches, sleeplessness, irritability, fatigue, memory loss, cardiovascular changes and circadian rhythm disturbances at levels less than 10 mW/sq cm. It is pointed out that while the United States and western Europe have adopted exposure standards of 10 mW/sq cm, those adopted in other countries are up to three orders of magnitude more restrictive, as they are based on different principles applied in determining safe limits. Various aspects of the biological effects of microwave transmissions from space are considered in the areas of the protection of personnel working in the vicinity of the rectenna, interactions of the transmitted radiation with cardiac pacemakers, and effects on birds. It is concluded that thresholds for biological effects from short-term microwave radiation are well above the maximal power density of 1 mW/sq cm projected at or beyond the area of exclusion of a rectenna. A.L.W.

A81-18049 * Microfossil-like objects from the Archaean of Greenland - A cautionary note. D. Bridgwater, J. H. Allaart (Greenland, Geological Survey, Copenhagen, Denmark), J. W. Schopf, M. R. Walter (California, University, Los Angeles, Calif.), C. Klein (California, University, Los Angeles, Calif.; Indiana University, Bloomington, Ind.), E. S. Barghoorn, P. Strother (Harvard University, Cambridge, Mass.), A. H. Knoll (Oberlin College, Oberlin, Ohio), and B. E. Gorman (Western Ontario, University, London, Canada). *Nature,* vol. 289, Jan. 8, 1981, p. 51-53. 26 refs. Research supported by the Natural Sciences and Engineering Research Council of Canada; Grant No. NATO-949; NSF Grants No. 77-22518; No. 79-21777; No. EAR-78-24237; No. EAR-76-11740; Grants No. NGR-05-007-407; No. NsG-7489; No. NGL-22-007-067.

Recent reports have described 'yeast-like microfossils' (Isuasphaera isua Pflug) in 3,800-million year old metaquartzites from the Isua supracrustal belt of south-west Greenland. A biogenic interpretation of these objects is inconsistent with the tectonic history of the Isua region, with the petrology of the metaquartzites, and with the morphology of the microstructures themselves. The putative microfossils are indistinguishable from limonite-stained fluid inclusions: microstructures which are demonstrably inorganic and post-depositional in origin. As such, it is contended that these objects should not be regarded as evidence of early Archaean life forms. (Author)

A81-18050 * Amino acids and hydrocarbons approximately 3,800-Myr old in the Isua rocks, southwestern Greenland. B. Nagy, M. H. Engel, J. E. Zumberge, H. Ogino, and S. Y. Chang (Arizona, University, Tucson, Ariz.). *Nature,* vol. 289, Jan. 8, 1981, p. 53-56. 31 refs. Grant No. NGR-03-002-171.

Results of an analysis of amino acids and hydrocarbons found in the Isua banded iron formation, which contains the oldest known rocks on earth, are discussed. Similarities are pointed out between the relative amino acid abundances of the Isua rocks and those of lichens found on their surfaces, and a lack of substantial racemization indicated by the low D/L ratios in the 3800-million year old rock samples is noted. Experimental results showing the possibility of amino acid diffusion from lichens into the rocks are presented. Comparisons of the Isua rock amino acid D/L ratios with those reported for samples from other regions indicates that none of the Isua amino acids are older than a few tens of thousands to a few hundred thousand years. Analyses of the saturated hydrocarbons of the Isua samples reveals no odd carbon number preference, which may indicate antiquity, however laboratory experiments have shown that amino acids and aromatic and saturated aliphatic hydrocarbons could not have survived the metamorphic history of the Isua rocks. The evidence presented thus suggests that the amino acids and hydrocarbons found are not of the age of the sediments. A.L.W.

A81-18288 On the modification of orthostatic tolerance by athletic training and its relation with the physical fitness. H. Saiki, M. Nakaya, M. Sudoh, M. Abe, and Y. Taketomi (Jikei University, Tokyo, Japan). *International Astronautical Federation, International Astronautical Congress, 31st, Tokyo, Japan, Sept. 22-28, 1980, Paper 80-C-117.* 8 p. 10 refs.

The effects of athletic training and level of physical fitness on orthostatic tolerance following water immersion are investigated. Fourteen healthy male subjects classified as nonathletes, quasi-athletes and athletes on the basis of maximal oxygen uptakes were subjected to six hours of water immersion followed by tilt table tests to determine orthostatic condition both before and after a 2-4 week program of vigorous athletic training. Indicators such as maximal oxygen uptake, flicker fusion and pituitary-adrenal reactivity are found to reveal an increase in the physical fitness of the nonathletes after training with no decrease in orthostatic tolerance levels, while for the athletes, tolerance is observed to increase or decrease after training, but always to levels well below those of the nonathletes. Water immersion is found to cause a decrease in orthostatic tolerance both before and after training at any fitness level, with athletes'

tolerance again extremely low. Measurements of noradrenaline excretion are also interpreted as suggesting the role of the sympathetic nervous system in the decrease of athlete orthostatic tolerance. A.L.W.

A81-18289 The influence of weightlessness on skeletal muscles and neuro-muscular plates. S. Baranski, W. Baranska, and M. Marciniak (Instytut Medycyny Lotniczej; Akademia Medyczna, Warsaw, Poland). *International Astrononautical Federation, International Astronautical Congress, 31st, Tokyo, Japan, Sept. 22-28, 1980, Paper 80-C-119.* 7 p. 10 refs.

The effects of weightlessness on the ultrastructural morphology of skeletal muscle fibers and the axonal endings of neuromuscular junctions are investigated. Electron microscopic examination and morphometric evaluation were performed on samples of the soleus muscle taken from rats upon their return from space flight in the biosatellite Cosmos 936. The muscle fibers are found to exhibit decreased sarcomer volumes and mitochondria numbers, as well as an accumulation of glycogen granules. In the axonal endings, the mean number of synaptic vesicles is observed to have decreased while the mitochondria are greatly swollen compared to control specimens. The ultrastructural changes observed are interpreted in terms of metabolic disturbances and activity limitations leading to tissue degeneration. A.L.W.

A81-18290 Effect of weightlessness on sympathetic-adrenomedullary activity of rats during space flight on the biosatellites 'COSMOS'. R. Kvetnansky, T. Torda, L. Macho (Slovenska Akademia Vied, Ustav Eksperimentalnej Endokrinologie, Bratislava, Czechoslovakia), R. A. Tigranian, L. Serova, and A. M. Genin (Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR). *International Astronautical Federation, International Astronautical Congress, 31st, Tokyo, Japan, Sept. 22-28, 1980, Paper 80-C-120.* 14 p. 26 refs.

The tissue and plasma catecholamines (CA), CA-synthesizing enzymes tyrosine hydroxylase (TH) and dopamine-beta-hydroxylase (DBH) - and catechol-O-methyltransferase (COMT) indicators of the sympathetic-adrenomedullary system (SAS) of rats were determined during 20 days on board the COSMOS 782, COSMOS 936, and COSMOS 1129 biosatellites. A significant increase was found in heart CA, the indicator 1 that is usually decreased after stress; heart and plasma CA were greater in groups in the weightless state and in a centrifuge, showing that prolonged weightlessness is not a stressful stimulus for the SAS. The animals exposed after the COSMOS 1129 flight to repeated immobilization stress on earth showed a decrease in adrenal epinephrine and an increase in adrenal TH activity compared to stressed animals that were not in space. A.T.

A81-18291 Hypertension and orthostatic hypotension in applicants for spaceflight training and spacecrew - Medical investigation, clinical assessment, and evaluation for spaceflight duties. H. S. Fuchs (Giessen, Universität, Giessen, West Germany). *International Astronautical Federation, International Astronautical Congress, 31st, Tokyo, Japan, Sept. 22-28, 1980, Paper 80-C-124.* 14 p. 10 refs.

The roles of blood pressure standards and hypotensive orthostatic tolerance in the selection of individuals for space flight duties are discussed. The predisposing role of hypertension in the development of cardiovascular disease is pointed out, and the various definitions of hypertension adopted for persons of different ages are examined together with means of reliably assessing them. Considerations of the general cardiovascular and endocrine changes induced by weightlessness and individual responses to space flights are then presented which lead to the conclusion that the health and operational career of a payload specialist will not be affected by moderate hypertension, and that if there is no evidence of other physical impairments, persons age 40 or over with labile or essential hypertension up to 180 mm Hg systolic and 110 mm Hg diastolic may be accepted for space flight duties as payload specialists or space station technicians. On the other hand, it is noted that hypotensive orthostatic intolerance will disqualify an applicant or returning crew member, since the sensitive individual will not be able to withstand the forces posed by the operational space flight environment. A.L.W.

A81-18292 * The Shuttle and its importance to space medicine. A. Nicogossian, S. Pool, and P. Rambaut (NASA, Washington, D.C.). *International Astronautical Federation, International Astronautical Congress, 31st, Tokyo, Japan, Sept. 22-28, 1980, Paper 80-C-126.* 16 p. 10 refs.

The physiological effects of space flights on humans are reviewed, and the opportunities offered by frequent and repetitive Space Shuttle flights for space medical research are discussed. The most significant changes encountered in the vestibular, cardiopulmonary, musculoskeletal and hematopoietic systems during and after past space missions are indicated, and the time courses of the physiological shifts associated with space acclimatization and readaptation to a 1-g environment are summarized. Effects directly attributable to the absence of gravity, including postural changes and fluid shifts, are considered, and additional contributing factors to physiological changes imposed by the spacecraft operational environment are pointed out. Differences between the Space Shuttle missions and all previous missions in the areas of reentry profiles and varied crew composition are discussed, and results of experiments on the relative acceleration tolerances of men and women of different ages and the usefulness of the anti-g suit are presented. Directions for future research in space medicine available with the Shuttle are examined, with particular emphasis on the neurovestibular system cardiopulmonary dynamics, calcium metabolism, the erythropoietic system and the effects of space radiation. A.L.W.

A81-18293 Inflight diagnosis of the space crew cardiovascular system through echocardiography. U. Gebhardt (Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, Institut für Flugmedizin, Bonn, West Germany), E. Grube, V. Sarrasch (Bonn, Universität, Bonn, West Germany), and W. Steinborn (Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, Cologne, West Germany). *International Astronautical Federation, International Astronautical Congress, 31st, Tokyo, Japan, Sept. 22-28, 1980, Paper 80-C-127.* 7 p.

Detailed cardiac measurements during the initial zero gravity (better described as microgravity) situation in the spacecraft are not available today. An echocardiography experiment for the first German Spacelab (D1) is proposed. The preliminary preparations include two simulation methods (bed rest with head-down tilt, water immersion) which induce cardiovascular changes similar to space flight; a preliminary choice of echocardiography devices has been made. Further simulations will be done to develop the D1 echocardiography experiment protocol. (Author)

A81-18294 Correlation between vestibular sensitization and leg muscle relaxation under weightlessness simulated by water immersion. G. Mitarai, Y. Yamazaki (Nagoya University, Nagoya, Japan), and T. Mano (Hamamatsu University, Hamamatsu, Japan). *International Astronautical Federation, International Astronautical Congress, 31st, Tokyo, Japan, Sept. 22-28, 1980, Paper 80-C-128.* 9 p. 5 refs. Ministry of Education Grant No. 337007.

Experiments were concerned with the contribution of the leg muscle relaxation to the sensitization of vestibular function under weightlessness. Neuromuscular unit (NMU) discharges were continuously recorded with microelectrodes from the antigravitational soleus muscle and its antagonist, tibialis anterior, in man while he was standing upright on the flat floor of dry water tank, immersed gradually in water up to his neck and buoyed up with an airtube under the armpit. In each of these states, caloric nystagmus were evoked and analyzed, comparing with the NMU discharge and also subjective symptoms associated with the nystagmus. The results indicated that the nystagmogenic activity had a significant correlation with the appearance of active NMU in the soleus, and suggested that the reduction of ascending signals from the antigravity muscles should be one of the cause of atypical vestibular responses found in weightlessness. (Author)

A81-18295 **Validity of physical restraint as a tool for simulating weightlessness estimated by changes in heat balance and cardiovascular functions.** T. Nagasaka, K. Hirata, Y. Sugano, and H. Shibata (Kanazawa University, Kanazawa, Japan). *International Astronautical Federation, International Astronautical Congress, 31st, Tokyo, Japan, Sept. 22-28, 1980, Paper 80-C-131.* 11 p. 21 refs.

Measurements of the effects of physical restraint on the metabolic and cardiovascular functions of rats showed increased heat production, heart rate, and heat loss from the body. The heat storage became positive and colonic temperature was elevated in thermo-neutral environments; cardiac output measured by the reference sample method using Sr-85-labelled microspheres decreased. Changes in body weight, muscle mass, adrenal cortical activity, and cardiac functions in physically restrained rats may closely imitate changes in other weightlessness simulations such as partial body supporting, but the method of hypokinesia by confining the animal in a cage does not decrease the heat production. A.T.

A81-18296 **Applicability of silicone membrane as a lung for a fish incubator in space life science research.** S. Mori, A. Takabayashi, and G. Mitarai (Nagoya University, Nagoya, Japan). *International Astronautical Federation, International Astronautical Congress, 31st, Tokyo, Japan, Sept. 22-28, 1980, Paper 80-C-132.* 8 p.

A fish incubator which functions under zero-gravity and permits the keeping of large fish is an urgent need in neuroscientific space research. The feasibility of applying a silicone membrane developed for improving an artificial lung system for heart surgery to an incubator such as an oxygenator was examined. A membrane 1.6 sq m in surface area was used for the lung and an adult carp weighing 400-500 g as the oxygen consumer. A mathematical simulation applied to the system was found to correspond closely to the actual relation between the oxygen consumption by the carp and the oxygen uptake through the membrane under various water flow rates. Efficiency of the membrane improved linearly with increase of the water flow through it at a flow rate higher than 1 l/min. It was concluded that this membrane would theoretically suffice to sustain four adult carp in a space environment. (Author)

A81-18652 # **Accessible region and synthesis of robot arms.** Y. C. Tsai and A. H. Soni (Oklahoma State University, Stillwater, Okla.). *American Society of Mechanical Engineers, Design Engineering Technical Conference, Beverly Hills, Calif., Sept. 28-Oct. 1, 1980, Paper 80-DET-101.* 9 p. 6 refs. Members, $1.50; nonmembers, $3.00.

Design charts are prepared by deriving the loci-curves traced by a two-link robotic arm to determine the accessible regions of two- and three-link robotic arms. A synthesis procedure is developed to compute the dimensions and the location of the robot arm which will enclose the design points within its accessible region; the procedure can also be used for a closed-loop mechanism for point-path generation. The synthesis can be extended from the four-bar system to a cam-follower consisting of a two-link robotic arm and to an analysis of the dual-cam mechanisms derived from the Stephenson six-link arrangement. A.T.

A81-18653 # **Motion simulation of an articulated robotic arm subjected to static forces.** A. G. Patwardhan and A. H. Soni (Oklahoma State University, Stillwater, Okla.). *American Society of Mechanical Engineers, Design Engineering Technical Conference, Beverly Hills, Calif., Sept. 28-Oct. 1, 1980, Paper 80-DET-102.* 10 p. 22 refs. Members, $1.50; nonmembers, $3.00.

A three-dimensional motion simulation model of an open-loop kinematically constrained mechanical system is developed to simulate the motion response of a robotic arm to externally applied static loads. The general system consists of N rigid bodies connected together by (N-1) kinematic pairs. The class and type of kinematic pairs may be selected from a set of twelve physically realizable kinematic pairs. Six equations of force equilibrium are written for an ith body. A variational method is used to linearize these equations for incremental values of displacement and to incorporate the generalized parameters of the kinematic pairs and characteristics of the internal driving forces. Five applications of the proposed simulation model are discussed. (Author)

A81-18655 # **The workspaces of a mechanical manipulator.** A. Kumar (Wisconsin, University, Platteville, Wis.) and K. J. Waldron (Ohio State University, Columbus, Ohio). *American Society of Mechanical Engineers, Design Engineering Technical Conference, Beverly Hills, Calif., Sept. 28-Oct. 1, 1980, Paper 80-DET-107.* 8 p. Members, $1.50; nonmembers, $3.00. NSF Grant No. ENG-77-22747.

A new theory and a resulting algorithm for tracing the bounding surfaces of mechanical manipulator workspaces is presented. The natures of the numerous singular configurations and means of accommodating them within the algorithm are also studied. In order to sort surfaces of interest from the large number of possible solutions, a numerically implementable labelling technique is also presented. The algorithm is applicable to all practicable manipulator configurations with three, or more, degrees of freedom. (Author)

A81-18656 # **The basic motion regulation system for a quadruped walking vehicle.** S. Hirose and Y. Umetani (Tokyo Institute of Technology, Tokyo, Japan). *American Society of Mechanical Engineers, Design Engineering Technical Conference, Beverly Hills, Calif., Sept. 28-Oct. 1, 1980, Paper 80-DET-34.* 6 p. 18 refs. Members, $1.50; nonmembers, $3.00.

The mechanical model of the quadruped walking vehicle having special leg mechanisms called three-dimensional Cartesian coordinates pantographic mechanism has already been constructed. The walking vehicle has eight tactile sensors and a posture detector and can be controlled by microcomputer. This paper discusses the overall structure of the controlling system for the walking vehicle and elaborates in detail the principles and practical instrumentations of the basic motion regulation subsystem. The validity of the above considerations is verified by the successful walking experiments of the constructed quadruped walking vehicle. (Author)

A81-19341 **The objectives of space medicine and biology (Objectifs de la médecine et de la biologie spatiales).** R. Bost (Centre National d'Etudes Spatiales, Paris, France). *L'Aéronautique et l'Astronautique,* no. 84, 1980, p. 17-19. In French.

The role of the life sciences in the development of space technology is discussed, and the goals of biological and medical studies in space are outlined. It is shown that whereas the opportunities for biological studies offered by the first space missions were not taken advantage of significantly due to the political goals of space flight, recent developments in technology as represented by the Viking Mars mission, Skylab, the Salyut space stations and the Cosmos biosatellites and the planned Spacelab-Shuttle mission have led to the fuller development of biology in space. The possible directions of life science studies in space are then considered, with attention given to the search for extraterrestrial life and intelligence, the observation of the collective life processes of the earth from space, and the study of the behavior of living terrestrial organisms, including man, in the space environment, particularly in regard to the influence of weightlessness on homeostasis and evolution. A.L.W.

A81-19472 **Loss of consciousness in high performance fighters - What to do about it.** P. R. Nash (USAF, Hospital, Davis-Monthan AFB, Ariz.). *Society of Experimental Test Pilots, Technical Review,* vol. 15, no. 1, 1980, p. 50-52.

New generation fighter aircraft with their low wing loading, high thrust to weight ratios, and rapid G onset rates have exceeded the ability of the human body to withstand positive G loads. If a crew member is subjected to a sufficiently high +G load, especially if it is of very rapid onset, the usual warning signs of grayout and blackout are bypassed and loss of consciousness can occur. The obvious solution for the problem of loss of consciousness is to increase the ability of the pilot to withstand rapid onset, high G loading. This can be done through conditioning and training of the aircrews, and through better life support equipment. P.T.H.

A81-19570 **The effects of spatial frequency and target type on perceived duration.** G. M. Long and R. J. Beaton (Villanova University, Villanova, Pa.). *Perception and Psychophysics,* vol. 28, no. 5, Nov. 1980, p. 413-421. 51 refs.

Two experiments are reported that attempt to demonstrate a critical role played by sensory persistence on a standard perceived-duration task employing brief visual stimuli. Experiment 1 examined the effect on perceived duration of varying the spatial frequency of a target. For both 40- and 70-msec flashes, increased spatial frequency resulted in reduced estimates of perceived duration. These results were contrasted with predictions derived from cognitive processing models of duration perception. In Experiment 2, three typical types of target employed in current research (an outlined circle, a 'noise'-filled circle, and a completely filled circle) were shown to differ significantly in their perceived duration and in their sensitivity to increases in physical duration. The results were discussed in terms of variable degrees of retinal persistence produced by the three types of targets. The possible implications for specific discrepancies in the literature and across-study comparisons in general were enumerated. (Author)

A81-19571 **The contribution of visual persistence to the perceived duration of brief targets.** G. M. Long and R. J. Beaton (Villanova University, Villanova, Pa.). *Perception and Psychophysics,* vol. 28, no. 5, Nov. 1980, p. 422-430. 38 refs.

Two experiments were conducted to examine the role of sensory persistence on tasks of perceived duration employing very brief visual stimuli. Using a standard temporal judgment task, the first experiment replicated both the 'size effect' and 'empty-filled' illusion reported by previous investigators. However, entirely comparable results were also found with a probe-matching task, which theoretically assesses the degree of persistence exhibited by a stimulus. The second experiment examined the effect of target luminance on perceived duration. Consistent with a sensory persistence interpretation, judgments of duration increased with increasing luminance. The results from the two experiments were discussed in terms of varying degrees of retinal persistence produced by different stimuli. This view was contrasted with currently dominant interpretations that postulate changes in perceived duration to reflect different information-processing requirements across stimulus conditions. (Author)

A81-19572 * **The visual accommodation response during concurrent mental activity.** F. V. Malmstrom (Southern California, University, Los Angeles, Calif.), R. J. Randle (NASA, Ames Research Center, Moffett Field, Calif.), J. S. Bendix (Amherst College, Amherst, Mass.), and R. J. Weber (Oklahoma State University, Stillwater, Okla.). *Perception and Psychophysics,* vol. 28, no. 5, Nov. 1980, p. 440-448. 30 refs. NASA-USAF-supported research; NSF Grant No. 74-20208.

The direction and magnitude of the human visual accommodation response during concurrent mental activity are investigated. Subject focusing responses to targets at distances of 0.0 D, 3.0 D and an indeterminate distance were monitored by means of an optometer during the performance of a backwards counting task and a visual imagery task (thinking near and thinking far). In both experiments a shift in accommodation towards the visual far point is observed particularly for the near target, which increases with the duration of the task. The results can be interpreted in terms of both the capacity model of Kahneman (1973) and the autonomic arousal model of Hess and Polt (1964), and are not inconsistent with the possibility of an intermediate resting position. A.L.W.

Preceding Page Blank

STAR ENTRIES

N81-14146*# Spar Aerospace Products Ltd., Toronto (Ontario). RMS Div.
SHUTTLE REMOTE MANIPULATOR SYSTEM HARDWARE TEST FACILITY
C. G. Wagner-Bartak, J. A. Middleton, and J. A. Hunter (National Research Council of Canada, Ottawa) *In* NASA. Johnson Space Center The 11th Space Simulation Conf. 1980 p 79-94 refs

Avail: NTIS HC A19/MF A01 CSCL 05H

The shuttle remote manipulator (RMS) is designed and built for operations in a zero gravity environment. As such, the ground test facility for the integrated RMS must simulate conditions which support verification of the overall system performance. In order to allow ground test operations, a test facility was constructed with an area of 60 ft. x 120 ft. and extremely tight tolerances on floor flatness and slope. An air bearing support structure was designed for the RMS to operate with 4 degrees of freedom. The RMS system test facility and systems tests conducted to date are described. E.D.K.

N81-14147*# Spar Aerospace Products Ltd., Toronto (Ontario).
THE ROLE OF THE REAL-TIME SIMULATION FACILITY, SIMFAC, IN THE DESIGN, DEVELOPMENT AND PERFORMANCE VERIFICATION OF THE SHUTTLE REMOTE MANIPULATOR SYSTEM (SRMS) WITH MAN-IN-THE-LOOP
J. R. McCllough, A. Sharpe, and K. H. Doetsch (National Research Council of Canada, Ottawa) *In* NASA. Johnson Space Center The 11th Space Simulation Conf. 1980 p 94-112 refs

Avail: NTIS HC A19/MF A01 CSCL 05H

The SIMFAC has played a vital role in the design, development, and performance verification of the shuttle remote manipulator system (SRMS) to be installed in the space shuttle orbiter. The facility provides for realistic man-in-the-loop operation of the SRMS by an operator in the operator complex, a flightlike crew station patterned after the orbiter aft flight deck with all necessary man machine interface elements, including SRMS displays and controls and simulated out-of-the-window and CCTV scenes. The characteristics of the manipulator system, including arm and joint servo dynamics and control algorithms, are simulated by a comprehensive mathematical model within the simulation subsystem of the facility. Major studies carried out using SIMFAC include: SRMS parameter sensitivity evaluations; the development, evaluation, and verification of operating procedures; and malfunction simulation and analysis of malfunction performance. Among the most important and comprehensive man-in-the-loop simulations carried out to date on SIMFAC are those which support SRMS performance verification and certification when the SRMS is part of the integrated orbiter-manipulator system. E.D.K.

N81-14151*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
AN INTEGRATIVE APPROACH TO SPACE-FLIGHT PHYSIOLOGY USING SYSTEMS ANALYSIS AND MATHEMATICAL SIMULATION
Joel I. Leonard (Management and Technical Services, Houston, Tex.), Ronald J. White (Management and Technical Services, Houston, Tex.), and John A. Rummel *In its* The 11th Space Simulation Conf. 1980 p 149-162 refs

(Contracts NAS9-11657; NAS9-12932; NAS9-14192; NAS9-14523; NAS9-15487)
Avail: NTIS HC A19/MF A01 CSCL 06P

An approach was developed to aid in the integration of many of the biomedical findings of space flight, using systems analysis. The mathematical tools used in accomplishing this task include an automated data base, a biostatistical and data analysis system, and a wide variety of mathematical simulation models of physiological systems. A keystone of this effort was the evaluation of physiological hypotheses using the simulation models and the prediction of the consequences of these hypotheses on many physiological quantities, some of which were not amenable to direct measurement. This approach led to improvements in the model, refinements of the hypotheses, a tentative integrated hypothesis for adaptation to weightlessness, and specific recommendations for new flight experiments. Author

N81-14605* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
MICRO-FLUID EXCHANGE COUPLING APPARATUS Patent
John E. Johnson, Jr. (San Francisco Univ.) and Paul F. Swartz, inventors (to NASA) Issued 15 Jul. 1980 6 p Filed 16 Oct. 1978 Supersedes N78-33717 (16 - 24, p 3257)
(NASA-Case-ARC-11114-1; US-Patent-4,212,297; US-Patent-Appl-SN-951422; US-Patent-Class-128-207.14; US-Patent-Class-128-204.18; US-Patent-Class-128-207.28; US-Patent-Class-128-DIG.26; US-Patent-Class-128-236; US-Patent-Class-128-DIG.6; US-Patent-Class-128-DIG.9; US-Patent-Class-128-DIG.12; US-Patent-Class-128-DIG.16)
Avail: US Patent and Trademark Office CSCL 06B

In a macro-fluid exchange, a hollow needle, such as a syringe needle, is provided for penetrating the fluid conduit of the animal. The syringe needle is coupled to a plenum chamber having an inlet and outlet port. The plenum chamber is coupled to the syringe needle via the intermediary of a standard quick disconnect coupling fitting. The plenum chamber is carried at the end of a drive rod which is coupled to a micrometer drive head. The micrometer drive head is slidably and pivotably coupled to a pedestal for adjusting the height and angle of inclination of the needle relative to a reference base support. The needle is positioned adjacent to the incised trachea or a blood vessel of a small animal and the micrometer drive head is operated for penetrating the fluid conduit of the animal.

Official Gazette of the U.S. Patent and Trademark Office

N81-14606*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
NALOXONE INHIBITS AND MORPHINE POTENTIATES, THE ADRENAL STEROIDOGENIC RESPONSE TO ACTH
John P. Heybach and Joan Vernikos Dec. 1980 17 p refs
(NASA-TM-81253; A-8416) Avail: NTIS HC A02/MF A01 CSCL 06P

The adrenal actions were stereospecific since neither the positve stereoisomer of morphine, nor that of naloxone, had any effect on the adrenal response to exogenous adrenocorticotrophic hormone (ACTH). The administration of human beta endorphin to phyophysectomized rats had no effect on the adrenal corticosterone concentration nor did it alter the response of the adrenal gland to ACTH. These results indicate that morphine can potentiate the action of ACTH on the adrenal by a direct, stereospecific, dose dependent mechanism that is prevented by naloxone pretreatment and which may involve competition for ACTH receptors on the corticosterone secreting cells of the adrenal cortex. Author

N81-14607# Martin Marietta Corp., Baltimore, Md.
PHOTOCHEMISTRY AND ENZYMOLOGY OF PHOTOSYNTHESIS Progress Report, 1 Nov. 1979 - 31 Mar. 1980
Richard Radmer, John Golbeck, and Bruno Velthuys Apr. 1980 11 p
(Contract DE-AC02-76ER-3326)
(DOE/ER-03326/90) Avail: NTIS HC A02/MF A01

Several specific topics concerning the photochemistry and enzymology of photosynthesis are discussed. Results from experiments investigating light harvesting and electron transport in C4 plants affirm that bundle sheath chloroplasts are deficient in photosystem 2 compared to those of the mesophyll. In addition, the use of a mass spectrometer inlet system to study photosynthetic O2 evolution with O-18 labeled substrates is described. An investigation of action of the copper chelator, salicylaldoxime, on electron transport reactions is also discussed. Finally, the extraction of two enzymes containing polyphenol oxidase activity from the thylakoid membranes of spinach chloroplasts is reported. M.G.

N81-14608# Woods Hole Oceanographic Institution, Mass.
BIOENGINEERING ASPECTS OF INORGANIC CARBON SUPPLY TO MASS ALGAL CULTURES Final Report
Joel C. Goldman Jun. 1980 104 p refs
(Contract DE-AC02-78ET-20604)
(DOE/ET-20604/1) Avail: NTIS HC A06/MF A01

The inorganic carbon requirements of microalgae under mass culture conditions are discussed. A literature review on the inorganic carbon chemical system in relation to algal growth requirements is given and the kinetics of inorganic carbon-limited growth of two freshwater chlorophytes is discussed including the effect of carbon limitation on cellular chemical composition. M.G.

N81-14609# InterTechnology Solar Corp., Warrenton, Va.
PRESSURE HARVESTING OF MICROALGAE Final Report
30 May 1980 34 p refs
(Grant NSF DAR-79-17457)
(PB80-221781; ITC/S-300580; NSF/RA-800151) Avail: NTIS HC A03/MF A01 CSCL 08M

The feasibility of widespread usage of microalgae for food material, wastewater reclamation, energy conversion, and fertilizer production depends upon the development of an efficient, low cost harvesting method. Consequently, the application or reduction of pressure in a closed system to concentrate the algae was examined, especially because some types of algae have vacuoles of gas. Upon increasing or decreasing the pressure, these vacuoles are either compressed of expanded like a bubble, thereby moving the algae to near the bottom or the top of the container, where a concentrated stream could be drawn off. To determine the applicability of this technique, preliminary basic tests were performed. GRA

N81-14610# Michigan Univ., Dearborn. Great Lakes Research Div.
PHYTOPLANKTON COMPOSITION AND ABUNDANCE IN SOUTHERN LAKE HURON Final Report, 1974 - 1976
E. F. Stoermer and R. G. Kreis, Jr. Jul. 1980 398 p refs
(Grant EPA-R-803086)
(PB80-216013; EPA-600/3-80-061) Avail: NTIS HC A17/MF A01 CSCL 08H

Southern Lake Huron contains a diversity of phytoplankton assemblage types ranging from assemblages characteristic of oligotrophic waters to those which usually occur under highly eutrophic conditions. The offshore waters are generally characterized by oligotrophic associations and most eutrophic associations are associated with the Saginaw Bay interface waters. Under certain conditions, populations which are generated within Saginaw Bay are found mixed with offshore assemblages, apparently as a result of passive dispersal. The most widely dispersed populations include nuisance producing blue green algae such as Aphanizomenon flos-aquae. During the period of study, floristic modification resulting from inputs from Saginaw Bay was usually found along the Michigan coast south of the bay, but cases were noted where greatest effect was found at stations north of the bay or eastward into the open lake. GRA

N81-14612* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
SUBCUTANEOUS ELECTRODE STRUCTURE Patent
Gordof F. Lund, inventor (to NASA) (NAS-NRC) Issued 26 Aug. 1980 5 p Filed 16 Jan. 1979 Supersedes N79-15576 (17-06, p 0765) Sponsored by NASA
(NASA-Case-ARC-11117-1; US-Patent-4,219,027; US-Patent-Appl-SN-003693; US-Patent-Class-128-642) Avail: US Patent and Trademark Office CSCL 06B

A subcutaneous electrode structure suitable for a chronic implant and for taking a low noise electrocardiogram of an active animal, comprises a thin inflexible, smooth disc of stainless steel having a diameter as of 5 to 30 mm, which is sutured in place to the animal being monitored. The disc electrode includes a radially directed slot extending in from the periphery of the disc for approximately 1/3 of the diameter. Electrical connection is made to the disc by means of a flexible lead wire that extends longitudinally of the slot and is woven through apertures in the disc and held at the terminal end by means of a spot welded tab. Within the slot, an electrically insulative sleeve, such as silicone rubber, is placed over the wire. The wire with the sleeve mounted thereon is captured in the plane of the disc and within the slot by means of crimping tabs extending laterally of the slot and over the insulative wire. The marginal lip of the slot area is apertured and an electrically insulative potting material such as silicone rubber, is potted in place overlaying the wire slot region and through the apertures.

Official Gazette of the U.S. Patent and Trademark Office

N81-14613* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
INDOMETH ACIN-ANTIHISTAMINE COMBINATION FOR GASTRIC ULCERATION CONTROL Patent
Patricia A. Brown (San Jose State Univ.) and Joan Vernikos, inventors (to NASA) (San Jose State Univ.) Issued 28 Oct. 1980 8 p Filed 29 Dec. 1978 Supersedes N79-14755 (17 - 05, p 0646) Continuation-in-part of US Patent Appl. SN-850504, filed 10 Nov. 1977 Sponsored by NASA
(NASA-Case-ARC-11118-2; US-Patent-4,230,717; US-Patent-Appl-SN-974476; US-Patent-Appl-SN-850504; US-Patent-Class-424-274) Avail: US Patent and Trademark Office CSCL 06E

An anti-inflammatory and analgesic composition containing indomethacin and an H2 histamine receptor antagonist in an amount sufficient to reduce gastric distress caused by the indomethacin was developed. Usable antagonists are metiamide and cimetidine.

Official Gazette of the U.S. Patent and Trademark Office

N81-14614*# Technology, Inc., Houston, Tex. Life Sciences Div.
METABOLIC RATE MEASUREMENT SYSTEM
Kenneth Koester and William Crosier 3 Jun. 1980 61 p
(Contract NAS9-14880)
(NASA-CR-160893) Avail: NTIS HC A04/MF A01 CSCL 06B

The Metabolic Rate Measurement System (MRMS) is an uncomplicated and accurate apparatus for measuring oxygen consumption and carbon dioxide production of a test subject. From this one can determine the subject's metabolic rate for a variety of conditions, such as resting or light exercise. MRMS utilizes an LSI/11-03 microcomputer to monitor and control the experimental apparatus. Author

N81-14615*# California Univ., San Francisco. Dept. of Radiology.
COMPUTERIZED TOMOGRAPHIC DETERMINATION OF SPINAL BONE MINERAL CONTENT Final Report
Christopher E. Cann and Harry K. Genant 14 Sep. 1980 24 p refs
(Contract NAS9-15887)
(NASA-CR-160891) Avail: NTIS HC A02/MF A01 CSCL 06P

The aims of the study were three-fold: to determine the magnitude of vertebral cancellous mineral loss in normal subjects during bedrest, to compare this loss with calcium balance and mineral loss in peripheral bones, and to use the vertebral measurements as an evaluative criterion for the C12MDP treatment and compare it with other methods. The methods used are described and the results from 14 subjects are presented. T.M.

N81-14616# National Physical Lab., Teddington (England). Acoustics Unit.

TABLES RELATING PURE-TONE AUDIOMETRIC THRESHOLD TO AGE

M. S. Shipton Nov. 1979 107 p refs
(NPL-AC-94) Avail: NTIS HC A06/MF A01

Data from the literature on presbyacusis were critically evaluated and a formula was derived for generating the age effect of otologically screened groups of males and females for pure tone frequencies from 0.125 to 12 kHz. Tables show the age correction for males and females in one year steps from 20 to 70 years of age for the fractiles 0.01 to 0.99 at the audiometric frequencies 0.125 to 8 kHz. A.R.H.

N81-14617# Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Applied Mathematics.

NERVE IMPULSE PROPAGATION IN A BRANCHING NERVE SYSTEM: A SIMPLE MODEL

J. P. Pauwelussen Jul. 1980 55 p refs Submitted for publication
(MC-TW-203/80) Avail: NTIS HC A04/MF A01; Stichting Math. Centrum, Amsterdam FL 6

Local spatial changes of nerve axon geometry such as diameter increase and branching, may cause that action potential waves approaching a region of geometric change fail to propagate beyond it. This effect was examined for a special kind of nonuniformity within the framework of a simple model: an initial value problem for a single nonlinear diffusion equation on an unbounded domain. Author

N81-14618# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany). Abt. Experimentalle Atmosphaerenphysik 2.

A LITERATURE STUDY ON VISUAL MOTION ACCUITY (MINIMUM PERCEPTIBLE MOVEMENT)

Ruediger H. Buell Apr. 1980 130 p refs In GERMAN; ENGLISH summary
(DFVLR-Mitt-80-06) Avail: NTIS HC A07/MF A01; DFVLR, Cologne DM 22.80

On flights according to visual flight rules, minimum visual perceptible movement is in certain conditions an important factor for a pilot's estimation of the danger of collision. Many single results are presented. The dependence of minimum perceptible movement on the following parameters is dominating: angular distance between direction to test object and line of sight, environmental structure, movement exposure time, luminance. Author

N81-14619# Air Force Academy, Colo. Dept. of Behavioral Sciences and Leadership.

PROCESSING OF SEQUENTIAL AND HOLISTIC STIMULI IN LEFT AND RIGHT VISUAL FIELDS

Eugene H. Galluscio, David A. Deras, and Daniel Plavney Oct. 1980 26 p refs
(AD-A091588; USAFA-TR-80-19) Avail: NTIS HC A03/MF A01 CSCL 05/10

The two halves of the brain differ in their functional capabilities. This research project evaluates the ability of two sides of the brain to process information presented in the visual periphery. Visual stimuli requiring parallel and serial processing were viewed parafoveally. The subjects were required to respond using either a manual response button or a bite switch. The data show that the response mode affects which processing style is used which in turn determines which half of the brain is used to process the information. The data suggest that with the bite switch response mode stimuli presented in the right visual field are processed more rapidly and accurately than in the left field. With a manual response, the opposite field effects were seen. The data are discussed as they relate to visual processing in complex work environments, such as aircraft cockpits. GRA

N81-14620# School of Aerospace Medicine, Brooks AFB, Tex. Aerospace Medical Div.

CREW STRESS AND FATIGUE IN THE PAVE Final Report, Jun. 1978 - Dec. 1979

Patrick J. Dowd and Frank H. Brunstetter (ARRS/SG, Scott AFB, Ill.) Jul. 1980 35 p refs
(AF Proj. 7930)
(AD-A091668; SAM-TR-80-26) Avail: NTIS HC A03/MF A01 CSCL 06/19

The purpose of the PAVE LOW III system is to demonstrate that helicopter crews can perform combat rescue at night and in marginal weather conditions. This report discusses the PAVE LOW III system crew stress and fatigue and human factors problems encountered during combat simulated exercises. From the subjective fatigue (SF) data and self-report rating scales it appears that the system significantly stressed experienced test pilots. Workload was extremely demanding of pilot attention, skill, and alertness during terrain following/terrain avoidance, approach to hovering, and hovering maneuvers. It is recommended that the maximum flying time should be no more than 6 hours for these types of missions, and there should be at least 8 hours of uninterrupted sleep or 12 hours of crew rest between missions. Attention should be given to improving the following features: seating, acoustic insulation, display illumination, maps and holders, and communication and ventilation systems. GRA

N81-14621# Los Alamos Scientific Lab., N. Mex.

AUTOMATED MEDICAL INFORMATION SYSTEM OF THE LOS ALAMOS SCIENTIFIC LABORATORY

Gerald D. Eagan and Robert S. Grier 1980 5 p refs Presented at Symp. on Computer Applications in Medical Care, Washington, D. C., 7-8 Nov. 1980
(LA-UR-80-2160; CONF-801109-1) Avail: NTIS HC A02/MF A01

The Medical Information System (MIS) at the Los Alamos Scientific Laboratory automates the acquisition, storage, and retrieval of medical information concerning the nine thousand project connected personnel. The MIS incorporates an on-line, interactive medical history questionnaire, mark sense form processing, and automated coronary risk assessment in the medical evaluation process. Also, MIS has created the ability for long-term study and comparison of employee health as well as made the physican's time more effective. DOE

N81-14622# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Hamburg (West Germany). Abt. Luftfahrtpsychologie.

CHANGES OF PSYCHOMETRIC COEFFICIENTS AND FACTOR STRUCTURE AS A FUNCTION OF TEST PRACTICE Ph.D. Thesis - Hamburg Univ.

Klaus-Martin Goeters Apr. 1980 153 p refs In GERMAN; ENGLISH summary Report will also be announced as translation (ESA-TT-686)
(DFVLR-FB-80-15; TT-686) Avail: NTIS HC A08/MF A01; DFVLR, Cologne DM 30.50

The performance increments generated by practice, result in changes of the mean which are coupled with similar changes of variance. Depending on the type of scale the changes showed systematic increment (e.g., with number of correct answers as measurement) or systematic decrement (e.g., with solution time as measurement). Coefficients of variation were mostly constant. In every case the reliability increased. It was also shown that the specific factor which is extracted by taking Fleishman's paradigm is no practice factor in the sense of new factorial variance. This factor seems to be a methodological artifact, because test variance stayed relatively homogeneous with practice. Author

N81-14623*# New Mexico Univ., Albuquerque. Technology Application Center.

STRESS FACTORS ON PILOT PERFORMANCE. CITATIONS FROM THE INTERNATIONAL AEROSPACE ABSTRACTS DATA BASE Progress Report, 1974 - May 1980

Gerald F. Zollars Jul. 1980 59 p Supersedes NTIS/PS-79/0506 Sponsored by NASA and NTIS
(NASA-CR-163836; PB80-814023; NTIS/PS-79/0506) Avail: NTIS HC $30.00/MF $30.00 CSCL 05I

The cited articles from the international literature cover all aspects of stress factors on pilot performance. Included are articles on biological aspects of flight stress, psychophysiology, accelera-

tion stresses, flight fitness, and physiological effects and responses. This updated bibliography contains 185 citations, 85 of which are new entries to the previous edition. GRA

N81-14624*# Hamilton Standard, Windsor Locks, Conn.
DEVELOPMENT OF A PREPROTOTYPE SABATIER CO2 REDUCTION SUBSYSTEM Final Report
Gilbert N. Kleiner and Philip Birbara Aug. 1980 174 p
(Contract NAS9-15470)
(NASA-CR-160885; SVHSER-7221) Avail: NTIS HC A08/MF A01 CSCL 06K

A preoprototype Sabatier CO2 Reduction Subsystem was successfully designed, fabricated and tested. The lightweight, quick starting reactor utilizes a highly active and physically durable methanation catalyst composed of ruthenium on alumina. The use of this improved catalyst permits a single straight through plug flow design with an average lean component H2/CO2 conversion efficiency of over 99% over a range of H2/CO2 molar ratios of 1.8 to 5 while operating with flows equivalent to a crew size of one person steadystate to 3 persons cyclical (equivalent to 5 persons steady state). The reactor requires no heater operation after start-up even during simulated 55 minute lightside/39 minute darkside orbital operation over the above range of molar ratios and crew loadings. The subsystem's operation and performance is controlled by a microprocessor and displayed on a nineteen inch multi-colored cathode ray tube. Author

N81-14625# Seville Research Corp., Pensacola, Fla.
***HUMAN FACTORS PROBLEMS IN GENERAL AVIATION* Final Report, Jul. 1979 - Apr. 1980**
J. B. Shelnutt, J. M. Childs, W. W. Prophet, and W. D. Spears Apr. 1980 116 p refs
(Contract DOT-FA79NA-6040)
(AD-A091670; SEVILLE-TR-78-01; FAA-CT-80-194) Avail: NTIS HC A06/MF A01 CSCL 01/2

Approximately 80% of general aviation accidents in the past decade have been attributed to errors made by pilots. For this reason, the most promising approach to making substantial improvements in general aviation safety is through the systematic study of factors affecting the performance of general aviation pilots (i.e., human factors) and use of the resultant information to enhance pilot performance. In recognition of the need for comprehensive information to aid in the planning of such studies, the major objective of the work reported here was to identify and analyze human factors design issues related to the major performance problems of general aviation pilots. Thirty five such issues were identified, primarily through the review of the human factors, aircraft accident, and general aviation literature. The analysis and discussion of these issues was structured through the use of a conceptual model of the components of the general aviation system. Six such components were identified--(1) aircraft, (2) airports, (3) aeronautical information systems, (4) the pilot certification and ratings, and (5) continuation training and recurrent proficiency assessments. GRA

N81-15657 California Univ., Berkeley.
THYROID FUNCTION AT HIGH ALTITUDE IN THE MONKEY, MACACANEMESTRINA Ph.D. Thesis
Walid Khaled Husseini 1980 104 p
Avail: Univ. Microfilms Order No. 8029432

The monkeys were exposed to an altitude of 3.8 Km above sea level for a period of 70 days. Measurements of the plasma levels of TSH, thyroxine (T4) and triodothyronine (T3) and of T3 uptake, were made on samples taken at sea level, high altitude, and at sea level after return from altitude. The plasma levels of free T4 and free T3 were also determined in the form of a free T4 index and a free T3 index. The results indicated that hypoxia promptly depressed anterior pituitary TSH function, leading also to a depression of throid gland secretion of T4 and T3 in the first few days at high altitude. Plasma levels of TSH and T4 remained depressed during the entire stay at high altitude. However, the plasma T3 levels began to rise after 4 days, returned to sea level normal by 18 days, and were significantly elevated over sea level normal for the remainder of the stay at high altitude. It was concluded that the late rise in plasma T3 level was the result of a shift in favor of conversion of T4 and T3 rather than reverse T3 systematically in the body tissues.
Dissert. Abstr.

N81-15658*# *National Aeronautics and Space Administration*, Washington, D. C.
BULGARIAN CONTRIBUTIONS TO THE DEVELOPMENT OF SPACE BIOLOGY AND MEDICINE
K. Serafimov Aug. 1980 12 p refs Transl. into ENGLISH from Bulgariya i Kosmosut, 1979 p 93-100; publ. by Narodna Publishing House, Sofia Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3199)
(NASA-TM-76289) Avail: NTIS HC A02/MF A01 CSCL 06C

Several aspects of aerospace medicine are discussed. Particular attention is given to the following: the effects of anoxia; the effects of positive radial acceleration; and the effects of various degrees of athletic conditioning and drugs on the tolerance of space flight factors. R.C.T.

N81-15659*# National Aeronautics and Space Administration, Washington, D. C.
EFFECT OF EXCESSIVE SACCHAROSE ADMINISTRATION ON METABOLIC PROCESSES IN THE LIVER OF RABBITS WITH RESTRICTED MOBILITY
Yu. P. Rylnikov Aug. 1980 13 p refs Transl. into ENGLISH from Kardiologiya (USSR), v. 20, no. 4, Apr. 1980 p 75-80 Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prep. by Yaroslav Medical Inst.
(Contract NASw-3199)
(NASA-TM-76331) Avail: NTIS HC A02/MF A01 CSCL 06C

The administration of saccharose (3 g per 1 kg for 2 months) intensified changes encountered in hypokinesia. There was a more marked increase in the content of cholesterol, pre-beta and beta-lipoproteins, phospholipids, and glycosaminoglycans in the blood. At the same time, the administration of saccharose improved the course of metabolic processes in the liver of immobilized rabbits, restored to normal levels the reduced glycogen level, the rate of glycolysis and the conversion of cholesterol to bile acids and their discharge in the cystic bile. Author

N81-15660*# National Aeronautics and Space Administration, Washington, D. C.
RESPONSES OF THE FROG PRIMARY VESTIBULAR AFFERENTS TO DIRECT VIBRATION OF THE SEMICIRCULAR CANAL
I. V. Orlov Sep. 1980 16 p refs Transl. into ENGLISH from Fiziol. Zh. SSSR im. I. M. Sechenova, (USSR), v. 66, no. 1, 1980 p 48-55 Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prep. by USSR Academy Science, Leningrad
(Contract NASw-3199)
(NASA-TM-76332) Avail: NTIS HC A02/MF A01 CSCL 06C

Responses of primary afferents (PA) of lateral semicircular canal to sinusoidal vibration of the canal wall within the range 0.05-200 Hz (mean amplitudes 5-15 microns) in immobilized frogs were studied. Dynamic characteristics (gain, phase) of relative linear velocity of the vibrator (micron X/s) were examined. At 0.2 Hz, the gain was 5.35 + or - 3.19 imp X/s /micron X/s (mean; S.D.; n=14) and linearly decreased if the frequency rose. Phase lag of relative velocity at 0.05 Hz was 49.8 deg + or - 16.5 deg (n=13) and at 1 Hz 97 deg + or - 9.4 deg (n=22). At 100 Hz phase lag was about 240 deg. Three groups of PA are described: wide range PA reacting in the range from 0.05 up to 60-180 Hz; high frequency PA responding in the range from 20-40 up to 100-150 Hz; and low frequency PA responding in the range from 0.05 up to 2-20 Hz. Author

N81-15661*# National Aeronautics and Space Administration, Washington, D. C.
THE COMBINED EFFECTS OF IONIZING RADIATION AND WEIGHTLESSNESS ON CALCIUM AND PHOSPHORUS CONTENT IN THE MINERAL FRACTION OF THE CALCIFIED TISSUES IN THE RAT SKELETON
A. A. Prokhonchukov, N. A. Komissarova, A. G. Kolesnik, and L. L. Novikov Aug. 1980 7 p refs Transl. into ENGLISH from Radiobiol. (USSR), v. 19, no. 5, 1979 p 760-762 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3199)
(NASA-TM-76342) Avail: NTIS HC A02/MF A01 CSCL 06C

Phosphorus and calcium content in the ash from skeletal bones (ribs, scapula, vertebra, and crus) of 30 rats exposed to ionizing radiation (800 rads) on the flight of the Kosmos 690 biosatellite was studied. A 10 percent decrease in ash content coefficient and 29 percent decrease in phosphorus content was found immediately after the flight, and a 9 percent decrease in phosphorus content persisted after 26 days of readaptation to terrestrial conditions. Author

N81-15662*# National Aeronautics and Space Administration, Washington, D. C.
UNIFICATION OF SOME BIOCHEMICAL METHODS OF RESEARCH IN THE PRE- AND POST-FLIGHT PERIODS
R. A. Tigranyan Dec. 1980 8 p refs Transl. into ENGLISH of "Unifikatsiya Nekotroykh Biokhimicheskikh Metodov Issledovaniy v Pred- i poslepoletnom periode' Rept. Moscow, 1980 p 1-7 Presented at 11th Joint Soviet-American Working Group on Space Biology and Medicine, Moscow, Oct. 1980 p 1-7 Transl. by Kanner (Leo) Associates Redwood City., Calif. Original Doc. prep. by Ministry of Health USSR, Moscow
(Contract NASw-3199)
(NASA-TM-76466) Avail: NTIS HC A02/MF A01 CSCL 06B

The biochemical methods for determination of various parameters and factors during pre- and post-flight periods, as used by American and Soviet teams dealing with space flight medicine are compared. The emphasis is on the exchange of information on the study of the blood and urine content of space travelers before and after space flight. A series of electrolytic, enzymatic, and hormonal factors is discussed. E.D.K.

N81-15663*# San Francisco State Univ., Calif. Dept. of Biological Sciences.
EFFECTS OF CENTRIFUGATION ON GONADAL AND ADRENOCORTICAL STEROIDS IN RATS Final Report, 1 Nov. 1979 - 31 Oct. 1980
R. Kakihana and J. C. Butte 31 Oct. 1980 16 p refs
(Contract NCC2-25)
(NASA-CR-163858) Avail: NTIS HC A02/MF A01 CSCL 06C

Many endocrine systems are sensitive to external changes in the environment. Both the pituitary adrenal and pituitary gonadal systems are affected by stress including centrifugation stress. The effect of centrifugation on the pituitary gonadal and pituitary adrenocortical systems was examined by measuring the gonadal and adrenal steroids in the plasma and brain following different duration and intensity of centrifugation stress in rats. Two studies were completed and the results are presented. The second study was carried out to describe the developmental changes of brain, plasma and testicular testosterone and dihydrotestosterone in Sprague Dawley rats so that the effect of centrifugation stress on the pituitary gonadal syatem could be better evaluated in future studies. T.M.

N81-15664# Marine Biological Lab., Woods Hole, Mass.
CARBON DIOXIDE EFFECTS RESEARCH AND ASSESSMENT PROGRAM. MEASUREMENT OF CHANGES IN TERRESTRIAL CARBON USING REMOTE SENSING
G. M. Woodwell, (ed.) Sep. 1980 32 p refs Conf. Held at Woods Hole, Mass., May 1979 Sponsored by DOE
(CONF-7905176) Avail: NTIS HC A03/MF A01

A program was developed, based on satellite imagery supplemented by aerial photography, for measuring changes in the area of forests on a global basis. Such changes affect the atmospheric concentration of CO2. Suggestions for research and development in imaging techniques are presented and include uses of synthetic aperture radar, side looking airborne radar, and other forms of aerial photography. T.M.

N81-15665# California Univ., Berkeley. Lawrence Berkeley Lab. Chemical Biodynamics Div.
CHARGE SEPARATION IN THE LIGHT REACTIONS OF PHOTOSYNTHESIS
Kenneth Sauer Aug. 1980 18 p refs Presented at the 5th Intern. Congr. on Photosyn., Halkidiki, Greece, 7-13 Sep. 1980
(Contract W-7405-eng-48; Grants NSF PCM-76-05074; NSF PCM-79-11252)
(LBL-11449; CONF-800963-4) Avail: NTIS HC A02/MF A01

The initial events of the photosynthetic light reactions are described. Topics include: light absorption, excitation transfer, trapping, and electron transfer by radical pair charge separation. E.D.K.

N81-15666# Rochester Univ., N. Y. School of Medicine and Dentistry.
BIOLOGICAL EFFECTS OF IONIZING RADIATION AT THE MOLECULAR, CELLULAR AND ORGANISMAL LEVELS Triennial Progress Report, 15 Oct. 1977 - 14 Oct. 1980
Christopher S. Lange 1980 13 p refs
(Contracts DE-AS02-76EV-03501; EY-76-S-02-3501)
(COO-3501-14) Avail: NTIS HC A02/MF A01

Results of several investigations concerning DNA size, organization, and repair are reported. A theory of rotor speed dependent DNA sedimentation was tested quantitatively and found to be correct, i.e., T4c and T4D+ DNA+ DNAs sedimented with values as predicted by the equation. Furthermore, the quantitative validity of the theory indicated that the size of a DNA sedimenting under speed-dependent conditions is not undefinable but rather can be uniquely obtained by the application of that theory to the data. Secondly, the viscoelastic recoil (zero shear rate reduced recoil) was shown to be quantitative direct function of the number of intact (T4c) DNA molecules present (per ml) in solution. This demonstration made possible the measurement of a direct survival curve for intact DNA molecules (i.e., without double-strand breaks) after exposure to ionizing radiation. A DNA-D sub 37 of 47.4 krads was obtained for the DNA of T4c coliphage irradiated in air as a solution of phage particles. It is noted that this survival curve measures the number of intact DNA molecules, not the average number of breaks/molecule. M.G.

N81-15667# Woods Hole Oceanographic Institution, Mass.
CULTIVATION OF MACROSCOPIC MARINE ALGAE AND FRESHWATER AQUATIC WEEDS Progress Report, 1 May - 31 Dec. 1978
John H. Ryther 1979 126 p refs
(Contract DE-AS02-76EV-02948)
(COO-2948-3) Avail: NTIS HC A07/MF A01

The growth and yields in culture of the red seaweed Gracilaris tikvahiae were investigated. Partial control of epiphytes was achieved by nutrient removal, shading, and/or biological agents. For the first time, a single clone of the alga was grown continuously throughout the year without replacement. Yields in large (2600 l) aluminum tanks averaged 21.4 g dry weight/sq m day, equivalent to 31 tons/acre year (15.5 ash free dry wt tons/acre/year). Growth of Gracilaria and other seaweeds in Vexar mesh baskets in natural habitats and in the oceanic waters of a power plant cooling water intake canal were unsuccessful. Further studies were also conducted to determine the cause of the positive relationship between water exchange rate and growth of the seaweed, but results were inconclusive. Productivity of the freshwater macrophytes Lemna minor (common duckweed), Eichhornia crassipes (water hyacinth), and Hydrilla verticillata were measured throughout the year with mean yields of 3.7, 24.2 and

4.2 g dry weight/sq m day (5.4,35.3, and 6.1 dry tons/acre/year) respectively. DOE

N81-15668# Brookhaven National Lab., Upton, N. Y. Dept. of Biology.
PHOTOREACTIVATION IN BACTERIA AND IN SKIN
Betsy M. Sutherland 1980 30 p refs Sponsored by DOE (BNL-28385; BIO-3642; CONF-8010102-1) Avail: NTIS HC A03/MF A01

In many procaryotic and eucaryotic cells, photoreactivating enzyme mediates light-dependent repair of UV-induced damage: the enzyme binds to a pyrimidine dimer in DNA, and, on absorption of a photon (300-600 nm), sepcifically monomerizes the dimer, thus repairing the DNA. Photoreactivating enzyme was found in human tissues and human cells in culture; human cells in culture can photoreactivate cellular dimers, and can mediate photoreactivation of Herpes (human fibroblasts) and Epstein-Barr virus (human leukocytes). Measurements of pyrimidine dimer formation and repair in human skin indicate that detectable numbers of dimers are formed at 1 minimal erythemal dose, that the dimers are rapidly removed in skin kept in the absence of light, and they are more rapidly removed when the skin is exposed to visible light. T.M.

N81-15670 California Univ., Berkeley.
IDENTIFICATION OF THE HUMAN LOWER EXTREMITY IN TORSION Ph.D. Thesis
Chong-Won Lee 1980 191 p
Avail: Univ. Microfilms Order No. 8029470

Laboratory identification procedures consisted of the frequency response and the muscle activity tests. The frequency response test was performed to develop a transfer function model of the lower extremity in torsion when the input was sinusoidal foot rotation. The parameters of the system model were determined considering the variables such as the frequency and the amplitude of the foot rotation, muscle activity, posture, and joint compressive force within the range of 1 to 20 Hz, up to nearly maximal muscle activity, 0 to 30 degrees in knee flexion, and up to the subject's weight, respectively. The muscle activity test was performed to compute muscle induced torsional moments at the joints and to obtain a quantitative measure of muscle activity associated with the joint torsional motions. The computation of muscle induced moments was based on a linear EMG loading relationship and the hypothetical common motion cancellation.
Dissert. Abstr.

N81-15671*# National Aeronautics and Space Administration, Washington, D. C.
WATER METABOLISM REGULATING MECHANISMS IN HYPOKINESIA
V. P. Krotov Aug. 1980 8 p refs Transl. into ENGLISH from Patol. Fiziol. Eksp. Ter., no. 1, Jan. - Feb. 1980 p 15-18 Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prep. by USSR Ministry of Health
(Contract NASw-3199)
(NASA-TM-76309) Avail: NTIS HC A02/MF A01 CSCL 06S

The range of daily fluctuations of the proportion of the amount of consumed water and its content in the body was evaluated by means of a water metabolism regulation factor. This index constitutes a relative measure of fluctuations of the constant of tritium water elimination from the body per 24 hours. It is established that under conditions of long term hypokinesia regulation of water metabolism is disturbed both in humans and in animals. Still more marked changes are observed 2 to 3 weeks after restoration of motor activity. The shifts noted are evidence of general biological regularity of disturbance of regulation systems in long term restriction of motor activity and in the early restoration period. E.D.K.

N81-15672*# National Aeronautics and Space Administration, Washington, D. C.
ELECTROSTIMULATION OF MUSCLES AS A METHOD FOR THE TREATMENT AND PROPHYLAXIS OF HEMODYNAMIC DISTURBANCES DURING PROLONGED HYPOKINESIA
Ye. O. Dukhin and L. Y. Zhukovskyy Sep. 1980 12 p refs Transl. into ENGLISH from Visn. Akad. Amuk. USSR, no. 10, 1979 p 48-54 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3199)
(NASA-TM-76318) Avail: NTIS HC A02/MF A01 CSCL 06E

Hemodynamic and periopheral circulation indexes were recorded before, at the end of, and 5 days after 10 days of electrostimulation for 45 min daily, at rest and after a physical loading test. It was found that stroke and minute volume, cardiac output, and regional circulation improved and heart rate and peripheral resistance decreased. The functional state of the cardiac muscle and vascular tone are improved by electrostimulation of selected groups of skeletal muscles. T.M.

N81-15673*# National Aeronautics and Space Administration, Washington, D. C.
LOCAL REDISTRIBUTION OF BLOOD UNDER THE EFFECT OF FIXATION STRESS AGAINST A BACKGROUND OF HYPOKINESIA
O. A. Kovalev, V. F. Lysak, V. I. Severovostokova, and S. K. Shermetevskaya Aug. 1980 12 p refs Transl. into ENGLISH from Ziol. Zh. (USSR), v. 26, no. 1, Jan. - Feb. 1980 p 120-124 Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prep. by Doctors' Training Inst., Leningrad
(Contract NASw-3199)
(NASA-TM-76322) Avail: NTIS HC A02/MF A01 CSCL 06P

Fixation stress was used as a model of emotional disturbance. The effect of previous restrictions on mobility on the local redistribution of blood resulting from fixation stress was examined. Disturbances in carbohydrate which result from prolonged hypokinesia was studied. Radioactivity was used to determine the local redistribution of blood. Modified factor analysis was used to study the results of the experiment. T.M.

N81-15674*# National Aeronautics and Space Administration, Washington, D. C.
OCCUPATIONAL HYPOKINESIA AS A HYGIENIC PROBLEM
K. M. Smirnov Sep. 1980 12 p refs Transl. into ENGLISH from Gig. Tr. Prof. Zabol. (USSR), no. 3, Mar. 1980 p 5-9 Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prep. by All-Union Central Trade Union Council
(Contract NASw-3199)
(NASA-TM-76323) Avail: NTIS HC A02/MF A01 CSCL 06I

Insufficient motor activity at the work place is discussed as a widely prevalent problem reducing worker efficiency and adversely affecting worker health. Some guidelines are provided for evaluating and promulgating measures to prevent and correct hypokinesia at the work place and compensate for it during off-hours. Suggestions included developing standards for optimal work-related motor activity and setting limits for its reduction.
Author

N81-15675*# National Aeronautics and Space Administration, Washington, D. C.
BIOELECTRICAL ACTIVITY OF LIMB MUSCLES DURING COLD SHIVERING OF STIMULATION OF THE VESTIBULAR APPARATUS
G. I. Kuzmina Sep. 1980 14 p refs Transl. into ENGLISH from Fiziol. Zh. SSSR im., I. M. Sechenova (USSR), v. 66, no. 5, 1980 p 702-708 Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prep. by State Univ., Petrozavodsk, USSR
(Contract NASw-3199)
(NASA-TM-76334) Avail: NTIS HC A02/MF A01 CSCL 06B

The effects of caloric and electric stimulation of the vestibular receptors on the EMG activity of limb muslces in anesthetized cats during cold induced shivering involved flexor muscles alone. Both types of stimulation suppressed bioelectrical activity more effectively in the ipsilateral muscles. The suppression of shivering activity seems to be due to the increased inhibitory effect of

descending labyrinth pathways on the function of flexor motoneurons. Author

N81-15676*# National Aeronautics and Space Administration, Washington, D. C.
COMPARATIVE ASSESSMENT OF PROGNOSIS OF THE STOP STIMULUS AND TRAPEZOIDAL ROTATION PROGRAMS
V. K. Grigorova, V. K. Popov, and V. S. Todorova Sep. 1980 9 p refs Transl. into ENGLISH from Vestn. Otorinolaringologii (Bulgaria), no. 2, Mar. - Apr. 1980 p 30-33 Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prep. by Bulgarian Acad. of Sci., Sofia
(Contract NASw-3199)
(NASA-TM-76336) Avail: NTIS HC A02/MF A01 CSCL 06E

For prognosis of the diagnostic possibilities of the stop stimulus and trapezoidal rotation programs with respect to the nystagmus response, 24 healthy young persons with normal auditory and vestibular analysers were studied experimentally. The trapezoidal program more accurately reflects the function and tone balance of the vestibular system than the stop stimulus program and causes the subject no unpleasant sensations during the study. Some optimum couples, acceleration and armchair rotation rate, necessary for effective deviation of the cupuloendolymphatic system were determined. The maximum angular velocity of the slow nystagmus component was more informative than nystagmus duration. The trapezoidal program is recommended for otoneurological practice and the maximum angular velocity of the slow nystagmus component as the basic index. Author

N81-15677*# National Aeronautics and Space Administration, Washington, D. C.
ASSESSMENT OF OXYGEN AND CARBOGEN THERAPY EFFECT IN MENIERE'S DISEASE ACCORDING TO CLINICAL AND ELECTROENCEPHALOGRAPHIC DATA
A. B. Boronoyev Sep. 1980 14 p refs Transl. into ENGLISH from Zh. Ushnykh, Nosovykh i Gorlovykh Bolezney (USSR), no. 3, May - Jun. 1978 p 72-78 Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prep. by the Leningrad Sanitary Hygiene Medical Inst., USSR
(Contract NASw-3199)
(NASA-TM-76348) Avail: NTIS HC A02/MF A01 CSCL 06E

The method of constructing fields on the basis of EEG data gives a quantitative characterization of bioelectrical activity. Fields of average rates of the change of potentials in healthy people have a well defined configuration, where the greatest rates are found in the occipital zones, lower in the frontal and parietal, and least in the temporal zones. In response to functional loads the form of the field remains the same because of a synchronous change in the average rates in both hemispheres of the cerebrum to the same extent. The configuration of the fields of background bioelectric activity of the cerebrum in people with Meniere's disease is not uniform. On the basis of this investigation, a clear correlation was found between the subjective sensations of patients during oxygen and carbogen therapy and the changes in the spatial characteristics of the field of potentials of the cerebrum. This correlation makes it possible to objectively identify the nature of the vascular disturbances in Meniere's disease, develop a pathogenetic treatment plan, and evaluate its effectiveness. E.D.K.

N81-15678*# National Aeronautics and Space Administration, Washington, D. C.
ON THE MECHANISMS OF HARMFUL EFFECTS OF CERTAIN MEDICINAL PREPARATIONS ON THE AUDITORY ORGAN AND METHODS FOR THEIR PREVENTION
E. A. Bakay Nov. 1980 26 p refs Transl. into ENGLISH from Zh. Ushnykh, Nosovykh Bolezney (USSR), no. 5, Oct. - Nov. 1979 p 78-84 Transl. by Scientific Translation Service, Santa Barbara, Calif.
(Contract NASw-3198)
(NASA-TM-76425) Avail: NTIS HC A03/MF A01 CSCL 06E

Various drugs are discussed and many references are mentioned. It was concluded that the development of methods of pharmacological prevention of the harmful effect of drugs on the auditory analyzer is a necessity. Author

N81-15679*# National Aeronautics and Space Administration, Washington, D. C.
ORTHOSTASIS TEST IN THE PRACTICE OF THE CARDIOLOGIST
N. P. Moskalenko and M. G. Glezer Sep. 1980 14 p refs Transl. into ENGLISH from Kardiologiya (USSR), v. 19, no. 11, 1979 p 112-116 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3199)
(NASA-TM-76324) Avail: NTIS HC A02/MF A01 CSCL 06E

The orthostasis test makes it possible to evaluate neurohumoral regulation and reaction of the circulatory system and to detect changes in the function of a number of internal organs (especially the kidney). Simultaneous recording of the ECG in an orthostatic position despite nonspecificity, makes it possible to detect hidden damage (organic or metabolic) or increased sensitivity of the myocardium to stressor sympathetico-adrenal effects, stability of therapeutic effect, and the action mechanism of a number of drugs. Author

N81-15680*# National Aeronautics and Space Administration, Washington, D. C.
EFFECT OF LONG-TERM HYPOKINESIA ON THE ELECTROLYTIC COMPOSITION OF THE BLOOD IN PATIENTS WITH OSTEOARTICULAR TUBERCULOSIS
V. P. Zakutaeva Sep. 1980 7 p refs Transl. into ENGLISH from Zdravookhr. Kirgizii (USSR), no. 3, May - Jun. 1978 p 32-35 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3199)
(NASA-TM-76325) Avail: NTIS HC A02/MF A01 CSCL 06P

Seventy-six patients with osteoarticular tuberculosis were divided into two groups, one of which was required to maintain strict bed rest and the other of which was allowed unrestricted motor activity. A study of blood electrolyte composition in the two groups revealed that bed rest for these patients results in decreased plasma potassium calcium, and magnesium content, but that these indices improved after the patients were allowed to move freely. The study suggests that patients with osteoarticular tuberculosis who are on bed rest be carefully observed for alterations in blood electrolytes and that proper electrolyte balance be maintained. Author

N81-15681*# National Aeronautics and Space Administration, Washington, D. C.
STATE OF GAS EXCHANGE IN RECUMBENT AND ORTHOSTATIC POSITIONS AND UNDER PHYSICAL LOAD IN HEALTHY PERSONS OF VARYING AGE, SEX AND BODY BUILD
G. A. Glezer, M. Charyyev, and N. L. Zilbert Sep. 1980 7 p refs Transl. into ENGLISH from Zdravookhraneniye Turkmenistana (USSR), v. 33, no. 10 Oct. 1979 p 24-27 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3199)
(NASA-TM-76357) Avail: NTIS HC A02/MF A01 CSCL 06P

Age effect on gas exchange was studied in the recumbent and orthostatic positions and under physical load. In the case of the older age group and for normal as compared with hypersthenic persons, oxygen consumption during rest and during moderate physical overload diminishes. When the vertical position is assumed oxygen consumption in persons of various age groups is distinctly increased, particularly in the elderly group. There is a reduction in the amount of oxygen consumption, oxygen pulse, recovery coefficient, and work efficiency under moderate overload. In persons over 50, physical labor induces a large oxygen requirement and a sharp rise in the level of lactic acid and the blood's lactate/pyruvate ratio. No distinct difference was noted in the amount of oxygen consumed during rest and during physical

overload in men and women of the same physical development and age. E.D.K.

N81-15682*# National Aeronautics and Space Administration, Washington, D. C.
INSTRUMENT FOR TWO-SPEED OPTOKINETIC STIMULATION
I. F. Kandaurov, L. A. Shestak, and Yu. A. Kuvshinov Sep. 1980 6 p refs Transl. into ENGLISH from Zh. Ushnykh Nosovykh Gorlovykh Bolez. (USSR) no. 3, 1980 p 78-79 Transl. by Scientific Translation Service, Santa Barbara, Calif. Original doc. prep. by Kermerovo Medical Inst.
(Contract NASw-3198)
(NASA-TM-76364) Avail: NTIS HC A02/MF A01 CSCL 06B

A device for providing optokinetic stimulation is described which has the advantages of being small, simple in design, and permits automatic operation in four directions at two drum speeds. The device has a screened chamber allowing polygraphic recording of optokinetic reactions by EEG. E.D.K.

N81-15683*# National Aeronautics and Space Administration, Washington, D. C.
INSTRUMENTS AND ATTACHMENTS FOR ELECTRONYSTAGMOGRAPHY
Yu. T. Mironenko and A. A. Vilenskiy Sep. 1980 6 p refs Transl. by Scientific Translation Service, Santa Barbara, Calif. Original doc. prep. by Leningrad Sci. Res. Inst. of Diseases of the Ear, Throat, Nose and Speech Transl. into ENGLISH from Zh. Usnykh Nosovykh i Gorlovykh Bolez. (USSR), no. 3, 1980 p 79-81
(Contract NASw-3198)
(NASA-TM-76365) Avail: NTIS HC A02/MF A01 CSCL 06B

A portable set of instruments and devices was developed which makes it possible to record spontaneous nystagmus with open and closed eyes. Rotational, caloric, position, and pressure nystagmus under any conditions may also be recorded. E.D.K.

N81-15684*# National Aeronautics and Space Administration, Washington, D. C.
MAIN PRINCIPLES AND TECHNIQUE OF ELECTRONYSTAGMOGRAPHY (A BRIEF SURVEY OF THE LITERATURE)
K. S. Tanchev Sep. 1980 16 p refs Transl. into ENGLISH from Zh. Ushnykh Nosovykh Gorlovykh Bolez. (USSR), no. 3, 1980 p 82-86 Transl. by Scientific Translation Service, Santa Barbara, Calif.
(Contract NASw-3198)
(NASA-TM-76366) Avail: NTIS HC A02/MF A01 CSCL 06B

Electronystagmography (ENG) is one of the modern methods for objective recording of nystagmus, its quantitative and qualitative assessment. It is used more and more often in clinical practice. A brief review of the history of recording of nystagmus and a survey of the relevant literature is presented. E.D.K.

N81-15685*# National Aeronautics and Space Administration, Washington, D. C.
MECHANISMS FOR VESTIBULAR DISORDERS IN SPACE FLIGHT. FACTS AND HYPOTHESES
E. I. Matsnev Dec. 1980 31 p refs Transl. into ENGLISH of "Mekhanizmy Vestibulyarnykh Narusheniy v Kosmicheskom Polete. Fakty i Gipotezy" Rept. USSR Ministry of Health, Moscow Presented at 11th Joint Soviet-Am. Working Group on Space Biol. and Med., Moscow, Oct. 1980 p 1-33 Transl. by Scientific Translation Service, Santa Barbara, Calif. Original doc. prep. by USSR Ministry of Public Health
(Contract NASw-3198)
(NASA-TM-76469) Avail: NTIS HC A03/MF A01 CSCL 06S

This article discusses the vestibular disorders associated with space flight. It is found there is still no complete understanding of the changes occurring in the sensory systems of the body during weightlessness. Results of studies are presented, including results of a ground model. Author

N81-15686*# National Aeronautics and Space Administration, Washington, D. C.
SIGNIFICANCE OF VESTIBULAR AND PROPRIOCEPTIVE AFFERENTATION IN THE REGULATION OF HUMAN POSTURE
V. S. Gurfinkel Dec. 1980 12 p Transl. into ENGLISH of "Znacheniye vestibulyarnoy i propriotseptivnoy afferentatsii v regulyatsii pozy cheloveka" Moscow, 1980 10 p Presented at the 11th Joint Soviet-Am. Working Group on Space Biol. and Med., Moscow, Oct. 1980 Transl. by Scientific Translation Service, Santa Barbara, Calif. Original doc. prep. by Ministry of Health of the USSR, Moscow
(Contract NASw-3198)
(NASA-TM-76470) Avail: NTIS HC A02/MF A01 CSCL 06P

Viewpoints on the vertical human posture and the relation between postural adaptation during voluntary movements and the guarantee of stable locomotor movements are examined. Various complex sensory systems are discussed. E.D.K.

N81-15687*# National Aeronautics and Space Administration, Washington, D. C.
FUNCTIONAL ASYMMETRY OF POSTURE AND BODY SYSTEM REGULATION
V. N. Boloban and A. P. Otsupok Sep. 1980 11 p refs Transl. into ENGLISH from Teor. Prakt. Fiz. Kultury (USSR), no. 10, Oct. 1979 p 6-10 Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prep. by Kiev State Inst. of Physical Culture
(Contract NASw-3199)
(NASA-TM-76401) Avail: NTIS HC A02/MF A01 CSCL 06P

The manifestation of functional asymmetry during the regulation of an athlete's posture and a system of bodies and its effect on the execution of individual and group acrobatic exercises were studied. Functional asymmetry of posture regulation was recorded in acrobats during the execution of individual and group exercises. It was shown that stability is maintained at the expense of bending and twisting motions. It is important to consider whether the functional asymmetry of posture regulation is left or right sided in making up pairs and groups of acrobats. Author

N81-15688# Medical Biological Lab. RVO-TNO, The Hague (Netherlands).
INFLUENCE OF TL-LIGHT ON MAN [INVLOED VAN TL-VERLICHTING OP DE MENS]
A. C. M. vanDerdrift and W. J. C. Bogaerts Aug. 1979 34 p refs In DUTCH; ENGLISH summary
(MBL-1979-4) Avail: NTIS HC A03/MF A01

On the basis of a critical evaluation of the data a qualitative analysis is given of the risks which exposure to TL-illumination may bring about for human health, particularly for the health of employees who are nearly continuously exposed to this type of light during everyday work. It was concluded that prolonged exposure to a normal and properly installed TL-lighting does not involve significant risks for the health of man, certainly when compared to the risks connected with even a relatively short exposure to sunlight. T.M.

N81-15689# Duke Univ., Durham, N. C.
VISUAL ACUITY AND THE BALANCE BETWEEN RECEPTOR DENSITY AND GANGLION CELL RECEPTIVE FIELD OVERLAP Final Report
Myron L. Wolbarsht and James Ringo Jul. 1980 45 p refs
(Contract N00019-79-C-0370)
(AD-A089607) Avail: NTIS HC A03/MF A01 CSCL 06/16

Visual acuity has been analyzed in terms of the responses of the retinal ganglion cells to different stimuli within their receptive field. The analysis includes not only the relation of the response to the receptor matrix, but also to the neural processing within the retina. A discussion is given of the different methods of analyzing the receptive fields: sensitivity profiles and Ricco field (area x intensity) plots, and displacement sensitivity (the response to a small stimulus plot switched between two positions just touching each other). The difficulties with each of these methods

of analyzing the receptive field are illustrated with experimental data. The experimental data also indicates that the blue cone system may not contribute to visual acuity, possibly due to the neural organization of the receptive field, rather than to the small number of blue receptors. The present data indicates that in the cat area central is the average ganglion cell receptive field size is so large that through overlap, each retinal locus must be connected to at least 15 receptive field centers. GRA

N81-15690# Sloan-Kettering Inst. for Cancer Research, New York.
RADIATION CARCINOGENESIS IN MAN: A CRITICAL REVIEW
Helen Quincy Woodard Aug. 1980 134 p refs Sponsored by DOE
(EML-380) Avail: NTIS HC A07/MF A01

Reports in which there is reasonable evidence that human cancer has been caused by ionizing radiation are reviewed. The reported incidence of cancer of each type is correlated with such factors as seem pertinent and for which data are recorded. Many factors are interrelated and can not be considered separately, but major emphasis is given to radiation quantity. This includes both a consideration of the dose-response relation where there is evidence that cancer was caused by radiation and a consideration of situations where the evidence for carcinogenesis by very small radiation doses is doubtful. Results of experiments in animals are quoted, but only insofar as they clarify observations in man. No attempt to forecast future incidences of radiogenic cancer in humans is made. S.F.

N81-15691# Southwest Research Inst., San Antonio, Tex.
PRELIMINARY STUDY OF THE BEHAVIORAL AND BIOLOGICAL EFFECTS OF HIGH INTENSITY 60 Hz ELECTRIC FIELDS Interim Technical Progress Report
Charles S. Feldstone, James J. Polonis, Houston D. Smith, Elizabeth G. Gibson, and Wilson B. Tarver Aug. 1980 175 p refs
(Contract ET-78-C-01-2875)
(SWRI-14-5277; ITPR-5) Avail: NTIS HC A08/MF A01

The studies were conducted in an outdoor facility which permitted distracting stimuli. Since the subjects were exposed to weather changes, the observed behavioral changes could have been attributed to climate as well as electric fields. A group of six individual subjects (three different tasks) and a group of four social subjects (living together) were placed in the exposure facility. An initial pre-exposure period allowed data to be gathered for 14 experimental days before any electric fields were turned on. A similar (post-exposure) period followed the exposure period. For the first experimental group, the exposure period was a six week period during which data were gathered on 23 days. On each day the electric fields were on for two-thirds of the data gathering period for each subject. Thus, data were gathered during the exposure period both with fields on and with fields off. The exposures of subjects in the preliminary study was to 30 kV/m 50 Hz electric fields. Author

N81-15692# New York Inst. of Tech., Dania, Fla. Science and Technology Research Center.
CONSTRUCTION OF PULSE ECHO ULTRASONIC TEST EQUIPMENT AND ACQUISITION OF TISSUE SIGNATURE DATA Final Report
William E. Glenn, James R. Rabinowitz, and Leonard Weiss 1980 60 p refs Prepared in cooperation with Roswell Park Memorial Inst., Buffalo
(Grant NSF DAR-76-10364)
(PB80-221880; NSF/RA-800105) Avail: NTIS HC A04/MF A01 CSCL 06B

Work is reported on the design, fabrication and testing of equipment to measure the interaction of ultrasound with small biological samples under conditions where the biological degradation of these samples is minimized. It appears that the greatest part of the attenuation of ultrasound by tissue is due to scattering, not absorption. Therefore, it should be expected that scattered signals are more likely to give more useful signatures than absorption measurements. The results of studies on tumorogenesis are reported. GRA

N81-15693# Bureau of Radiological Health, Rockville, Md. Div. of Electronic Products.
MICROWAVE HAZARD INSTRUMENTS: AN EVALUATION OF THE NARDA 8100, HOLADAY HI-1500, AND SIMPSON 380M Final Report
W. A. Herman and D. M. Witters, Jr. Jun. 1980 49 p refs (PB80-227820; DHHS/PUB/FDA-80-8122; FDA/BRH-80/102) Avail: NTIS HC A03/MF A01 CSCL 13L

A set of 13 parameters most likely to have significant impact on the accuracy of microwave oven survey meters was devised. Measurement systems and protocols were developed and evaluated. The resulting techniques were used to evaluate widely used survey meters produced by three manufacturers. The results of these evaluations are presented, along with additional analyses of problems generic to such survey instruments. GRA

N81-15694# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho. System Safety Div.
PSYCHOPHYSIOLOGICAL AND OTHER FACTORS AFFECTING HUMAN PERFORMANCE IN ACCIDENT PREVENTION AND INVESTIGATION
Lawrence R. Klinestiver 1980 31 p refs Presented at 18 Ann. SAFE Symp.: Reach Out for a Safe Tomorrow, San Diego, Calif., 12-16 Oct. 1980
(Contract DE-AC07-61ID-01570)
(CONF-801096-1) Avail: NTIS HC A03/MF A01

A total of 18 jet fighter aircraft mishaps was investigated or reviewed. A human factors evaluation summary indicates that supervision, experience/training, radio communications, environmental, and psychological factors were not prominent in these mishaps. Other factors were decidely predominant in these mishaps. A notable observation in the 72 hour profile, normally prepared by the flight surgeon, was that it became a joint effort with the human factors advisor. Although the 72 hour profile does not appear to be a significant factor in these accidents, the importance of obtaining vital information regarding fatigue, nutrition, life style changes, and stress (physical and mental) sometimes determined the accident board's approach to the problem. DOE

N81-15695 Ohio State Univ., Columbus.
AIRCREW COMPLIANCE WITH STANDARD OPERATING PROCEDURES AS A COMPONENT OF AIRLINE SAFETY Ph.D. Thesis
Jeffrey Edward Schofield 1980 179 p
Avail: Univ. Microfilms Order No. 8100248

The relationships between compliance with a well defined set of explicit procedures and operational safety are discussed. The pervasiveness of standardized operating procedures in the airline environment and examples of their affiliation with accidents are illustrated. The concept of task, procedure, and internal model are drawn together. The data for this analysis were generated by means of a pioneering experiment high fidelity full mission simulation. Fully qualified crew members from a major U.S. airline served as volunteer subjects. Routine procedural activity rather than emergency or rare event behavior is emphasized in the analysis. A finite collection of normal operating procedures is identified using crew publications and the simulation scenario. Various empirical and analytical taxonomies of these procedures are constructed. A taxon of verbal Crew Coordination Procedures is used to objectively evaluate routine procedural compliance. Crew member adherence to procedural imperatives is shown to be nonhomogeneous. Dissert. Abstr.

N81-15696 Oklahoma Univ., Norman.
A COMPARATIVE STUDY OF THE PERFORMANCE OF THE INDEX FINGER AND THUMB AS TRIGGER MECHANISMS FOR POWER HAND TOOLS Ph.D. Thesis
Yoshio Ikeda 1980 189 p
Avail: Univ. Microfilms Order No. 8101513

The use of the index finger and the thumb as trigger operators of power tools was evaluated. The grip for holding a portable tool provides the foundation which allows the index finger and the thumb to perform their trigger functions. Two types of power grips used in these trigger operations were evaluated. Three females and three males performed various types of isometric exercises. The measure of muscular strength was the five second maximal voluntary contraction (MVC). For endurance, a relative strength score (RSS) was used. The RSS was defined as the ratio of the MVC, measured at fixed interval, to the MVC at the beginning of the exercise. Significant results and observations are reported. Dissert. Abstr.

N81-15697 Oklahoma Univ., Norman.
EVALUATION OF STATIC WORK CAPABILITIES IN A HOT ENVIRONMENT Ph.D. Thesis
Robert Edward Schlegel 1980 132 p
Avail: Univ. Microfilms Order No. 8101523

The purpose of this study was to investigate the effects of hot environments on various measures of static work capability. Using a static hand grip contraction, the maximum strength and continuous hold endurance of five female subjects in good physical condition were tested under different heat stress conditions. The results indicated that there was only a slight decrease in maximum strength from the 0.0 to the 1.2 C levels (approximately 8%). However, the difference in continuous hold endurance were more dramatic. At the 1.2 C core temperature increment, there was almost a 60% decrease in the length of time an individual could exert 1/3 of his maximum strength compared with the 0.0 C control level. Significant differences also existed at the other core temperature levels. Dissert. Abstr.

N81-15698 Pennsylvania Univ., Philadelphia.
IMAGE ANALYSIS OF HUMAN MOTION Ph.D. Thesis
Joseph ORourke 1980 352 p
Avail: Univ. Microfilms Order No. 8028880

The input to the system consists of digitized images representing snapshots of a single human performing a motion sequence. The output of the system is a description of the motion in two forms: lists of coordinate-time pairs tracking the movements of individual body parts, and streams of primitive movement commands which describe uniform chunks of movement. The system includes a detailed model of the human body which incorporated the structural relationships between parts of the body and the physical limitations to relative movement between the parts. This model is used to guide the image analysis through a prediction/ verification control cycle. Predictions are made at a high level on the basis of previous analysis and the properties of the human model. The low level image analysis then verifies the prediction and adjust the model according to any discrepancies found between the prediction and image, or according to new knowledge acquired during the examination of the image. This cycle is repeated for each input frame. Dissert. Abstr.

N81-15699*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
KINESIMETRIC METHOD AND APPARATUS Patent Application
William E. Thornton, inventor (to NASA) Filed 17 Oct. 1980 49 p
(NASA-Case-MSC-18929-1; US-Patent-Appl-SN-198093) Avail: NTIS HC A03/MF A01 CSCL 05H

The functional capability of bodies was studied. Reach as well as velocity, acceleration and force generation at various positions was determined for a body by a three dimensional kinesimeter equipped with an ergometer. A general data package indicative of performance potential of a subject body or collection of bodies is provided for interfacing with data characteristic of various environments. T.M.

N81-15700*# Foster-Miller Associates, Inc., Waltham, Mass.
DEVELOPMENT OF A TRASH HANDLING SUBSYSTEM FOR A MANNED SPACECRAFT Final Report
M. Burnett Nov. 1980 36 p refs
(Contract NAS9-15778)
(DRL-T-1496; NASA-CR-160904) Avail: NTIS HC A03/MF A01 CSCL 06K

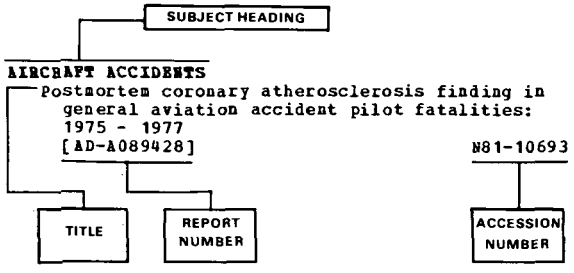
A prototype laboratory system to shred and transport trash material within a spacecraft was designed and demonstrated. In addition to handling the normal trash materials, the system demonstrated the ability to handle or reject (if it is too tough) glass, metal and ceramics without damaging the system. The system is not dependent on liquids for the shredding and transportation and can transport slurried, damp or dry material. The resulting system offers a greater system flexibility with operational reliability. T.M.

N81-15701*# Life Systems, Inc., Cleveland, Ohio.
TRIPLE REDUNDANT HYDROGEN SENSOR WITH IN SITU CALIBRATION Final Report, Jul. 1976 - Nov. 1980
J. B. Lantz, J. D. Powell, F. H. Schubert, and E. P. Koszenski Nov. 1980 56 p refs
(Contracts NAS9-16065; NAS9-14658)
(NASA-CR-160862; LSI-TR-407-4) Avail: NTIS HC A04/MF A01 CSCL 06K

To meet sensing and calibration needs, an in situ calibration technique was developed. It is based on electrolytic generation of a hydrogen/air atmosphere within a hydrogen sensor. The hydrogen is generated from water vapor in the air, and being electrical in nature, the in situ calibration can be performed completely automatically in remote locations. Triply redundant sensor elements are integrated within a single, compact housing, and digital logic provides inter-sensor comparisons to warn of and identify malfunctioning sensor elements. An evaluation of this concept is presented. L.F.M.

SUBJECT INDEX

Typical Subject Index Listing



The title is used to provide a description of the subject matter. When the title is insufficiently descriptive of the document content, a title extension is added, separated from the title by three hyphens. The NASA or AIAA accession number is included in each entry to assist the user in locating the abstract in the abstract section of this supplement. If applicable, a report number is also included as an aid in identifying the document.

A

B

C

D

E

F

G

H

I

J

L

M

N

O

P

R

S

T

U

V

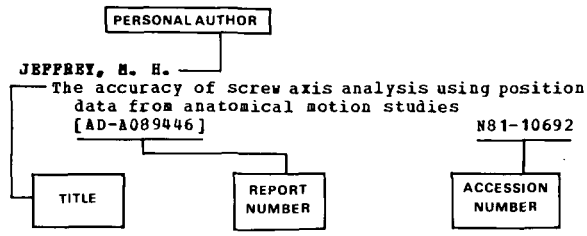
W

X

Y

PERSONAL AUTHOR INDEX

Typical Personal Author Index Listing



The title of the document is used to provide the user with a brief description of the subject matter. The NASA or AIAA accession number is included in each entry to assist the user in locating the abstract in the abstract section of this supplement. If applicable, a report number is also included as an aid in identifying the document.

A

B

C

D

E

F

G

H

I

J

K

L

M

N

O

P

R

S

T

U

V

W

Y

Z

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
NASA SP-7011(218)		

4. Title and Subtitle	5. Report Date
AEROSPACE MEDICINE AND BIOLOGY A Continuing Bibliography (Supplement 218)	April 1981
	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, D.C. 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 161 reports, articles, and other documents introduced into the NASA scientific and technical information system in March 1981.

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	62	$7.00 HC

*For sale by the National Technical Information Service, Springfield, Virginia 22161

NASA-Langley, 1981

Preceding Page Blank

PUBLIC COLLECTIONS OF NASA DOCUMENTS

DOMESTIC

NASA distributes its technical documents and bibliographic tools to eleven special libraries located in the organizations listed below. Each library is prepared to furnish the public such services as reference assistance, interlibrary loans, photocopy service, and assistance in obtaining copies of NASA documents for retention.

CALIFORNIA
University of California, Berkeley
COLORADO
University of Colorado, Boulder
DISTRICT OF COLUMBIA
Library of Congress
GEORGIA
Georgia Institute of Technology, Atlanta
ILLINOIS
The John Crerar Library, Chicago
MASSACHUSETTS
Massachusetts Institute of Technology, Cambridge
MISSOURI
Linda Hall Library, Kansas City
NEW YORK
Columbia University, New York
OKLAHOMA
University of Oklahoma, Bizzell Library
PENNSYLVANIA
Carnegie Library of Pittsburgh
WASHINGTON
University of Washington, Seattle

NASA publications (those indicated by an "*" following the accession number) are also received by the following public and free libraries:

CALIFORNIA
Los Angeles Public Library
San Diego Public Library
COLORADO
Denver Public Library
CONNECTICUT
Hartford Public Library
MARYLAND
Enoch Pratt Free Library, Baltimore
MASSACHUSETTS
Boston Public Library
MICHIGAN
Detroit Public Library
MINNESOTA
Minneapolis Public Library
MISSOURI
Kansas City Public Library
St. Louis Public Library
NEW JERSEY
Trenton Public Library
NEW YORK
Brooklyn Public Library
Buffalo and Erie County Public Library
Rochester Public Library
New York Public Library
OHIO
Akron Public Library
Cincinnati Public Library
Cleveland Public Library
Dayton Public Library
Toledo Public Library
TENNESSEE
Memphis Public Library
TEXAS
Dallas Public Library
Fort Worth Public Library
WASHINGTON
Seattle Public Library
WISCONSIN
Milwaukee Public Library

An extensive collection of NASA and NASA-sponsored documents and aerospace publications available to the public for reference purposes is maintained by the American Institute of Aeronautics and Astronautics, Technical Information Service, 555 West 57th Street, 12th Floor, New York, New York 10019.

EUROPEAN

An extensive collection of NASA and NASA-sponsored publications is maintained by the British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. By virtue of arrangements other than with NASA, the British Library Lending Division also has available many of the non-NASA publications cited in *STAR*. European requesters may purchase facsimile copy of microfiche of NASA and NASA-sponsored documents, those identified by both the symbols "#" and "*", from: ESA - Information Retrieval Service, European Space Agency, 8-10 rue Mario-Nikis, 75738 Paris CEDEX 15, France.

NASA CONTINUING BIBLIOGRAPHY SERIES

NUMBER	TITLE	FREQUENCY
NASA SP–7011	AEROSPACE MEDICINE AND BIOLOGY Aviation medicine, space medicine, and space biology	Monthly
NASA SP–7037	AERONAUTICAL ENGINEERING Engineering, design, and operation of aircraft and aircraft components	Monthly
NASA SP–7039	NASA PATENT ABSTRACTS BIBLIOGRAPHY NASA patents and applications for patent	Semiannually
NASA SP–7041	EARTH RESOURCES Remote sensing of earth resources by aircraft and spacecraft	Quarterly
NASA SP–7043	ENERGY Energy sources, solar energy, energy conversion, transport, and storage	Quarterly
NASA SP–7500	MANAGEMENT Program, contract, and personnel management, and management techniques	Annually

Details on the availability of these publications may be obtained from:

SCIENTIFIC AND TECHNICAL INFORMATION OFFICE

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Washington, D.C. 20546