NASA SP-7011(132)



# AEROSPACE MEDICINE AND BIOLOGY

## A CONTINUING BIBLIOGRAPHY

## WITH INDEXES

## (Supplement 132)

## SEPTEMBER 1974

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

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NASA SP-7011 (132)

# AEROSPACE MEDICINE AND BIOLOGY

## A CONTINUING BIBLIOGRAPHY WITH INDEXES

## (Supplement 132)

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 August 1974 in

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

*Scientific and Technical Information Office*
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SEPTEMBER 1974
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# INTRODUCTION

This Supplement to *Aerospace Medicine and Biology* (NASA SP-7011) lists 261 reports, articles and other documents announced during August 1974 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA)*. The first issue of the bibliography was published in August 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 1974 Supplements.

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# TABLE OF CONTENTS



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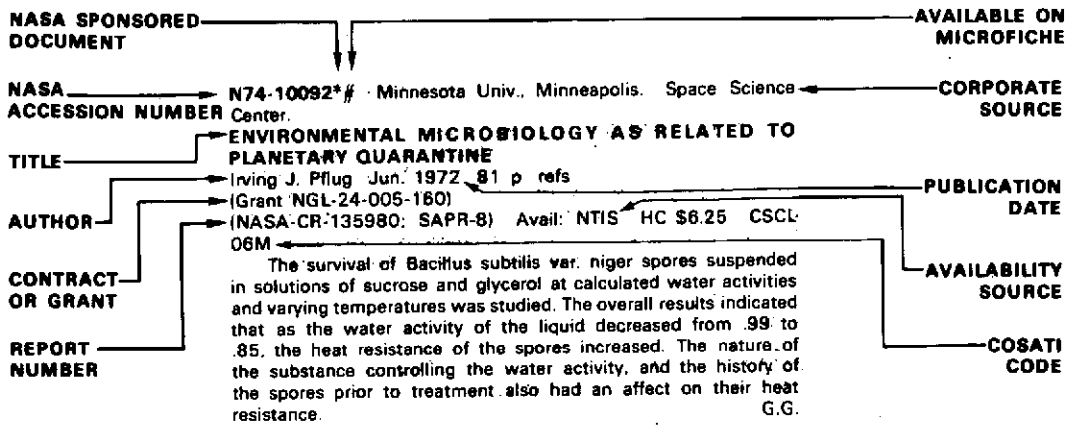


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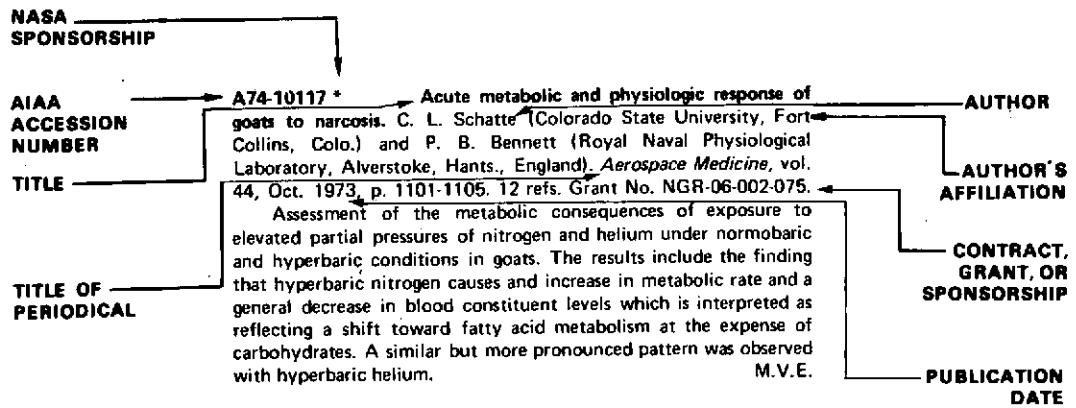

# AEROSPACE MEDICINE AND BIOLOGY

*A Continuing Bibliography (Suppl. 132)* **SEPTEMBER 1974**


## IAA ENTRIES

**A74-31879** # **Effects of changes in plasma volume and osmolarity on thermoregulation during exercise.** B. Nielsen (Kobenhavns Universitet, Copenhagen, Denmark). *Acta Physiologica Scandinavica*, vol. 90, Apr. 1974, p. 725-730. 19 refs.

Earlier studies have shown that the extent of deep body temperature increase during exercise is affected by the water balance of the subjects: the increase is greater in dehydrated subjects, while hyperhydration reduces it. Also, it has been established (Nielsen et al., 1971) that the effect of the state of hydration is related to plasma osmolarity rather than to plasma volume. The present work reports on tests at high and low temperature, that is, conditions with high and low activity of the sweating mechanism. Plateau body temperature during work was related to osmolarity, but only at high ambient temperature (30 C). Plasma osmolarity may act peripherally by reducing the sensitivity of the sweat glands to their neural drive. P.T.H.

**A74-31882** **Effect of type of aversive event and warning signal duration on human avoidance performance.** D. L. Koch and G. H. Moffat (Southern Mississippi, University, Hattiesburg, Miss.). *Psychonomic Society, Bulletin*, vol. 3, Apr. 1974, p. 285-288. 19 refs.

**A74-31922** * **The comfort and satisfaction of air travelers - Basis for a descriptive model.** I. D. Jacobson and J. Martinez (Virginia, University, Charlottesville, Va.). *Human Factors*, vol. 16, Feb. 1974, p. 46-55. 8 refs. Grant No. NGR-47-005-181.

The results of a questionnaire and interview survey are used as a basis for proposing a descriptive model of the comfort and satisfaction of the commercial air traveler. Passenger attitudes toward the present commercial air travel system are examined. Comfort is interpreted as being represented by a four-dimensional composite of commonly encountered environmental variables. Satisfaction is represented as a composite of safety, cost-benefit, luxury, and in-flight activity dimensions. (Author)

**A74-31923** **Thresholds and resolution in human vision - A new approach to night vision testing.** T. Shipley (Miami, University, Miami, Fla.). *Human Factors*, vol. 16, Feb. 1974, p. 56-64. 18 refs. Contract No. DA-49-193-MD-2344.

Visual acuity dark adaptation in the fovea was studied in immediate temporal alternation with foveal threshold adaptation. This method avoids some of the inconsistencies of earlier work and produces an index of individual differences in visual performances for untrained and unselected observers. Moreover, the results help to display the separate contributions of photochemical and neurological factors to the dark-adaptation process. (Author)

**A74-31924** **Watchkeeping performance as a function of certain properties of the viewing situation.** R. A. Bell, L. E. Symington (U.S. Army, Human Engineering Laboratory, Aberdeen Proving Ground, Md.), and W. Bevan (Johns Hopkins University, Baltimore, Md.). *Human Factors*, vol. 16, Feb. 1974, p. 65-69. 8 refs. Contract No. N00014-67-A-0163-0001.

Watchkeeping performance was tested in eight independent groups of 10 subjects who performed a 90-min watchkeeping assignment in the detection of a plus sign occasionally appearing on a matrix of solid circles. Numbers of stimulus elements on the display, their locations on the field of vision, and the distance of the observer from the display were the independent variables of tests. Average detection time for successive 100-trial blocks indicated a commonly observed vigilance decrement. Accuracy of response was found to deteriorate with an increase in stimulus density but was unaffected by the proximity of display contours to the stimulus array, or by viewing distance. V.Z.

**A74-31925** **Human response to whole-body vibration - An evaluation of current trends.** M. L. McCullough and M. J. Clarke (Swansea, University College, Swansea, Wales). *Human Factors*, vol. 16, Feb. 1974, p. 78-86. 10 refs. Science Research Council of England Grant No. B/SR/7005.

Psychophysical techniques using a ratio scale to relate objective-to-subjective magnitudes of vibration stimuli is proposed as a more suitable alternative to the semantic vibration ratings common in studies of vehicular vibrations. It is argued that this approach should form the starting point of future research and that fractionation and multiplication procedures are more appropriate than magnitude estimation procedures in developing ratio scales. Some preliminary data are given to support the latter contention. V.Z.

**A74-31990** **Macroscopic isotropy of lung expansion.** R. Ardila, T. Horie, and J. Hildebrandt (Virginia Mason Research Center, Seattle, Wash.). *Respiration Physiology*, vol. 20, Mar. 1974, p. 105-115. 24 refs. Grant No. NIH-HL-14854.

Investigation of pulmonary pressure-volume hysteresis extending Hills' (1971) geometric-irreversibility suggesting experiments on excised human lungs to smaller fresh rabbit lungs. The latter air-filled and supported by saline in a manner minimizing distortion due to their own weight, showed nearly equal inflation- and deflation-attendant dimensional changes between orthogonally placed pleural markers, while the simultaneous pressure-volume hysteresis was large. With saline in the lungs, expansion was slightly more irregular, although surface strain in one axis was typically within 10% of that on an axis at right angles. It is concluded that both nonelastic and nonhomogeneous material properties are required in order for geometrical reversibility to be manifested, but, conversely, that the presence of this irreversibility cannot be used to quantitatively predict or explain pressure-volume hysteresis. M.V.E.

**A74-31991** **Ventilatory responses to exercise in divers and non-divers.** D. A. Lally, F. W. Zechman, and R. A. Tracy (Hawaii, University, Honolulu, Hawaii; Kentucky, University, Lexington, Mass.). *Respiration Physiology*, vol. 20, Mar. 1974, p. 117-129. 30 refs. Grant No. NOAA-GH-62.

The initial (neurogenic) and steady-state ventilatory responses to three levels of treadmill exercise (+ 10% grade; 1.6, 3.2 and 4.8 km/hr) were studied in divers, sedentary non-divers, and non-diving athletes. The steady-state ventilatory responses of divers were lower than the sedentary group, significantly so at 3.2 and 4.8 km/hr where the differences were 20% of the sedentary values. The initial responses of divers were also lower, but with marginal significance. Both initial and steady-state responses of athletes were intermediate between divers and sedentary non-divers. Both divers and athletes tended to have higher alveolar CO2 pressure and lower R values than sedentary non-divers; divers more so than athletes. Divers showed a markedly slower and deeper breathing pattern than the other two groups. We suggest that the unusual ventilatory behavior of divers is not fitness-related, reflects more than reduced chemosensitivity, and may involve a conditioned response phenomenon. (Author)

**A74-31992** **A method for obtaining data and equilibrium constants for the haemoglobin-oxygen equilibrium in vitro.** B. Seaton and B. B. Lloyd (Oxford University, Oxford, England). *Respiration Physiology*, vol. 20, Mar. 1974, p. 191-207. 14 refs. Medical Research Council Grant No. G-967/79/B.

**A74-31993** **The effects of pH on the equilibrium constants of various models for the haemoglobin-oxygen equilibrium in vitro.**

B. Seaton and B. B. Lloyd (Oxford University, Oxford, England). *Respiration Physiology*, vol. 20, Mar. 1974, p. 209-230. 13 refs. Medical Research Council Grant No. G-976/79/B.

**A74-32250** **Skylab aids design of maneuvering unit.** C. Covault. *Aviation Week and Space Technology*, vol. 100, June 3, 1974, p. 42-45, 47.

The astronaut maneuvering unit (AMU) is to be used on board the space shuttle. Solid baselines provided by tests of AMU systems in the Skylab workshop will be utilized in the design of the maneuvering unit. Test flights by orbiting Skylab crewmen with two AMU propulsion designs have verified the necessity of combining six degrees of orientation capability with control systems that duplicate regular spacecraft hardware. The experience obtained with the two designs is discussed in detail, giving attention to the potential of the foot control system, the operational backpack modes, basic maneuvers, baseline maneuvers, and exploratory maneuvers. G.R.

**A74-32334** # **Deformation and haemolysis of red cells in shear flow.** E. Richardson (Strathclyde, University, Glasgow, Scotland). *Royal Society (London), Proceedings, Series A*, vol. 338, no. 1613, June 4, 1974, p. 129-153. 32 refs.

Many in vitro experiments are performed to investigate mechanical damage to red blood cells. A theoretical interpretation of such experiments involving high shear-rate flows is presented. Since haemolysis affects individual cells, attention is concentrated on a single cell. The model chosen for analysis is an ellipsoid in a uniform shear flow. The small size of the cell ensures a small particle-based Reynolds number and hence the applicability of existing solutions for slow flow past an ellipsoid. Assuming a flexible elastic membrane the resulting stresses and displacements are calculated for low shear-rates. Passing to higher shear-rates, the behavior of Rand's viscoelastic membrane breakdown model when subjected to the calculated stresses is investigated. The nonuniform rate of cell rotation produces a prediction of steady growth of strain, without increase of applied stress, until haemolysis occurs. (Author)

**A74-32401** **Chronobiology.** Edited by L. E. Scheving (Arkansas, University, Little Rock, Ark.), F. Halberg (Minnesota, University, Minneapolis, Minn.), and J. E. Pauly (Arkansas, University, Little Rock, Ark.). Tokyo, Igaku Shoin, Ltd., 1974. 789 p. $43.20.

Investigations in the theory of chronobiology - the study of rhythms of biological and physiological functions - are presented along with descriptions and discussions of experiments. Included are studies of plants, insects, and rodents as well as primates. Some of the topics covered include: cycloecology in space on the moon and beyond, rhythmic variation in heart rate and respiration rate during space flight, the human circadian system and aerospace travel, the ultradian rhythms and sleep, REMs during sleep and wakefulness, circadian cyclic sensitivity to gamma radiation as an unconditioned stimulus in taste aversion conditioning, and the resynchronization of human circadian rhythms after transmeridian flights.

Individual items are announced in this issue. P.T.H.

**A74-32402** **Circadian parameters of the infradian growth mode in continuous cultures - Nucleic acid syntheses and oxygen induction of the ultradian mode.** C. F. Ehret, J. H. Barnes, and K. E. Zichal (Argonne National Laboratory, Argonne, Ill.). In: Chronobiology. Tokyo, Igaku Shoin, Ltd., 1974, p. 44-50. 13 refs. AEC-supported research.

**A74-32403** **Chronobiological study on growth hormone secretion in man - Its relation to sleep-wake cycles and to increasing age.** R. D'Agata, R. Vigneri, and P. Polosa (Catania, Università, Catania, Italy). In: Chronobiology. Tokyo, Igaku Shoin, Ltd., 1974, p. 81-87. 19 refs.

**A74-32404** **A study on the possible presence of a thyrotropin serum levels rhythmicity in man.** R. Vigneri and R. D'Agata (Catania, Università, Catania, Italy). In: Chronobiology. Tokyo, Igaku Shoin, Ltd., 1974, p. 94-97. 11 refs.

**A74-32405** * **A study of periodicity in a patient with hypertension - Relations of blood pressure, hormones and electrolytes.** W. J. Meyer, C. S. Delea, H. Levine, F. Halberg, and F. C. Bartter (National Institutes of Health, National Heart and Lung Institute, Bethesda, Md.; New Britain General Hospital, New Britain, Conn.; Minnesota, University, Minneapolis, Minn.). In: Chronobiology. Tokyo, Igaku Shoin, Ltd., 1974, p. 100-107. 8 refs. Research supported by the Connecticut Regional Medical Program, Connecticult Heart Association, and NASA; NSF Grant No. GW-7613; Grant No. PHS-5-K6-GM-13981.

**A74-32406** **Circadian rhythms in urinary excretion of 17-hydroxycorticosteroids, dehydroepiandrosterone, androsterone and etiocholanolone of two healthy male subjects.** A. Cavalleri (Pavia, Università, Pavia, Italy), N. Montalbetti (Magenta, Ospedale Civile, Magenta, Italy), and A. Reinberg (CNRS, Paris, France). In: Chronobiology. Tokyo, Igaku Shoin, Ltd., 1974, p. 108-111. 11 refs.

**A74-32407** **Circadian rhythm in plasma ACTH in healthy adults.** P. Vague, C. Oliver, and J. Y. Bourgoin (Aix-Marseille, Université, Marseille, France). In: Chronobiology. (A74-32401 15-04) Tokyo, Igaku Shoin, Ltd., 1974, p. 112-114. 7 refs. Research supported by the Caisse Nationale d'Assurance Maladie des Travailleurs Salariés.

Five healthy adults, four women and one man aged 20 to 31, were studied while on their habitual diurnal activities. Plasma ACTH was assayed by a radioimmunoassay method previously described (Oliver, 1971; Vague et al., 1971). Its sensitivity allows detection of less than 5 micromicrogr/ml (pg/ml). The precision and reproducibility are plus or minus 10 per cent for a 95 per cent degree of confidence in the range 5 to 400 pg/ml. In the system used, the entire sequence of the ACTH molecule is detected; the recognition by the antiserum of fragments of the molecule is insignificant. F.R.L.

**A74-32408** * **Circadian rhythm of ACTH and growth hormone in human blood - Time relations to adrenocortical /blood and urinary/ rhythms.** D. J. Lakatua, E. Haus, E. M. Gold, and F. Halberg (St. Paul-Ramsey Hospital, St. Paul; Minnesota, University, Minneapolis, Minn.). In: Chronobiology. Tokyo, Igaku Shoin, Ltd., 1974, p. 123-129. 34 refs. Research supported by the St. Paul-Ramsey Medical Education and Research Foundation; NSF Grant No. GW-7613; Grants No. PHS-5-K6-GM-13981; No. NGR-24-005-006.

**A74-32409** * **Cosinor mapping of physiologic and psychologic variables in 10 healthy men before and during balneotherapy.** R. Günther, E. Knapp, E. Haus, and F. Halberg (Innsbruck, Universität, Innsbruck, Austria; St. Paul-Ramsey Hospital, St. Paul; Minnesota, University, Minneapolis, Minn.). In: Chronobiology. Tokyo, Igaku Shoin, Ltd., 1974, p. 228-233. 16 refs. Research supported by the St. Paul-Ramsey Hospital Medical Research and Education Foundation and NASA; NSF Grant No. GW-7613; Grants No. PHS-5-K6-GM-13981; No. PHS-1-RO1-CA-14445-01.

**A74-32410** **Circadian variations of thermoregulatory response in man.** G. Hilderbrandt (Marburg, Universität, Marburg an der Lahn, West Germany). In: Chronobiology. Tokyo, Igaku Shoin, Ltd., 1974, p. 234-240. 19 refs.

The organism appears to be more sensitive to cold stimuli during the circadian warming-up phase, and more sensitive to heat stimuli during the cooling-down phase. This means that in each case there is a particularly strong response to those stimuli which cause reactions that increase the predominant phase direction of thermoregulation. According to the findings, average maximal sensitivity to cold and heat stimuli does not occur at the time of maximal or minimal body temperature, but rather approximately in the middle of the circadian

phases, at the time at which body temperature is changing most rapidly. F.R.L.

**A74-32411** **Chronobiologic serial section on 8876 oral temperatures collected during 4-1/2 years by presumably healthy man /age 20.5 years at start of study/.** R. B. Sothern (Minnesota, University, Minneapolis, Minn.). In: Chronobiology. Tokyo, Igaku Shoin, Ltd., 1974, p. 245-248.

**A74-32412** **The transfer and utilization of Vitamin C as interpreted by its human biological rhythms.** C. W. M. Wilson (Dublin, University, Dublin, Ireland). In: Chronobiology. Tokyo, Igaku Shoin, Ltd., 1974, p. 249-255. 27 refs.

**A74-32413** **Autorhythmometry methods for longitudinal evaluation of daily life events and mood - Psychophysiologic chronotography.** C. F. Stroebel (Institute of Living Hospital, Hartford, Conn.). In: Chronobiology. Tokyo, Igaku Shoin, Ltd., 1974, p. 379-385. 14 refs. Research supported by the Gengras Foundation; Grants No. NIH-MH-08870; No. NIH-MH-08552.

**A74-32414 *** **Clinical aspects of blood pressure autorhythmometry.** H. Levine (Connecticut, University, Hartford; New Britain General Hospital, New Britain, Conn.) and F. Halberg (Minnesota, University, Minneapolis, Minn.). In: Chronobiology. Tokyo, Igaku Shoin, Ltd., 1974, p. 406-414. Research supported by the Connecticut Regional Medical Program, Connecticut Heart Association, and NASA; NSF Grant No. GW-7613; Grant No. PHS-5-K6-GM-13981.

Self-measurements made by a 55-year-old physician with mild to moderate hypertension of ten years' duration are considered. The physician had been in excellent health until age 45 when sustained elevation of blood pressure up to 180/100 mmHg and a slight aortic diastolic murmur were noted. On the basis of the investigation it is suggested that physical and mental performance measures provide an objective basis for assessing the desirability of a given physiological change. Such studies will have to be complemented by a search for long-term effects. G.R.

**A74-32416** **Biorhythms of a nonhuman primate in space.** T. Hoshizaki (California, University, Los Angeles, Calif.). In: Chronobiology. Tokyo, Igaku Shoin, Ltd., 1974, p. 424-428. 10 refs.

The experiment conducted on the Biosatellite III is described, in which the biorhythmicity of various physiological and metabolic rhythms of a nonhuman primate subject were monitored as to the magnetic field through which the satellite traversed and capsule conditions. The heart rate and the brain and body temperatures revealed a periodicity greater than 25 hours, while blood pressure showed a 24-hr rhythm. The preflight baseline experiments for the second Biosatellite experiment are described, in which a chimpanzee was entrained to a 12-hour light/12-hour dark regimen for ten days, then a 10-day period of continuous light, followed by a 12-hour light/12-hour dark regimen. During the alternating light/dark period, the subject's micturition rhythm was on a 24-hour period, while during the time of continuous light this period increased to 24.8 hours. P.T.H.

**A74-32417 *** **Phase relationships between circadian rhythms and the environment in humans during hypokinesis.** C. M. Winget, J. Vernikos-Danellis, C. S. Leach, and P. C. Rambaut (NASA, Ames Research Center, Environmental Biology Div., Moffett Field, Calif.; NASA, Johnson Space Center, Preventive Medicine Div., Houston, Tex.). In: Chronobiology. Tokyo, Igaku Shoin, Ltd., 1974, p. 429-434.

**A74-32418 *** **Rhythmic variation in heart rate and respiration rate during space flight - Apollo 15.** J. A. Rummel (NASA, Johnson Space Center, Environmental Physiology Laboratory, Houston, Tex.). In: Chronobiology. Tokyo, Igaku Shoin, Ltd., 1974, p. 435-440. 8 refs.

As part of the operational biomedical monitoring for Apollo manned missions, ECG and respiration rate are telemetered at selected intervals to mission control. The data were collected as part of this monitoring program. These data were evaluated for circadian and ultradian rhythmicity because of their uniqueness. The ability to detect and quantitate biorhythms in living systems during space flight is an important aspect of evaluating hypotheses concerning the underlying mechanisms of these phenomena. Circadian variation in heart rate during space flight is demonstrated here. In analyzing generated time series data it has been found that period discrimination is much better than the theoretical limit. F.R.L.

**A74-32419 *** **Hydrocortisone and ACTH levels in manned spaceflight.** C. S. Leach (NASA, Johnson Space Center, Endocrine Laboratory, Houston, Tex.) and B. O. Campbell (Baylor University, Houston, Tex.). In: Chronobiology. Tokyo, Igaku Shoin, Ltd., 1974, p. 441-447. 27 refs.

The plasma hydrocortisone, plasma ACTH, and urinary hydrocortisone values were recorded for each man of the crews of Apollo flights eight through fifteen, 30, 14, and 5 days before flight, immediately after spaceflight recovery, and on future days until the return of most variables to preflight values. The plasma and urinary preflight hydrocortisone values were significantly higher than the postflight values. This result is discussed in terms of three possible explanations: (1) the adrenal-cortical function is suppressed during spaceflight; (2) the activity in flight may amount to stressful exercise, which tests have shown can cause a decrease in plasma adrenocortical hormones; and (3) the in-flight work-rest cycles may be such as to affect the circadian periodicity of the pituitary-adrenal function. P.T.H.

**A74-32420** **The human circadian system and aerospace travel.** H. W. Simpson (Glasgow, University, Glasgow, Scotland; Minnesota, University, Minneapolis, Minn.). In: Chronobiology. Tokyo, Igaku Shoin, Ltd., 1974, p. 448-450. Research supported by the Medical Research Council.

Studies of the effect of a 21-h day/night cycle on eight adults are considered. It was found that a 21-h routine in man resulted in a split of the normally single 24-h circadian component into an environmentally timed 21-h component and an about 24-h component. The non-24-h nature of the intrinsic component is reemphasized and evidence is provided that the period of this component is significantly greater than 24.0 h. G.R.

**A74-32421** **Changes in internal phase relationships during isolation.** J. Kriebel (Max-Planck-Institut für Verhaltensphysiologie, Erling-Andechs, West Germany). In: Chronobiology. Tokyo, Igaku Shoin, Ltd., 1974, p. 451-459. 17 refs.

An experiment with a young male subject was conducted to study the phase relationship of various functions in synchronization and isolation. The experiment included a period of seven days involving a synchronization to 24 hours of normal social life routine. During this period the subject was doing laboratory work during the day time. Another part of the experiment consisted of a 17-day isolation period in which the subject lived alone in an isolated room without Zeitgebers. This test was followed by a 13-day postisolation period involving a normal social life. Circadian rhythms of 15 functions were observed during the experiment. It was found that all variables remained internally synchronized. The variables showed free running periods of about 26 hours during the steady-state part of the isolation time. G.R.

**A74-32422 *** **Gravitational considerations with animal rhythms.** C. C. Wunder (Iowa, University, Iowa City, Iowa). In: Chronobiology. Tokyo, Igaku Shoin, Ltd., 1974, p. 460-465. 12 refs. Grant No. NGR-16-001-031; Contract No. NAS2-6064.

As established in the laboratory and largely confirmed by others, simulated high-g environments influence growth and develop-

ment of animals as small as or smaller than baby turtles, sometimes accelerating and sometimes decelerating these processes. High-g environments result in many functional changes or adjustments in feeding, metabolism, circulation, fluid balances, and structures for support, and influence life expectancy. An assembly of equipment suitable for measuring oxygen consumption of small mammals as influenced by chronic centrifugation and/or by day-night rhythms is discussed. F.R.L.

**A74-32423 27-hour-day effects on reproduction and circadian activity period in rats.** F. M. Brown (Virginia, University, Charlottesville, Va.). In: Chronobiology. Tokyo, Igaku Shoin, Ltd., 1974, p. 466-471. 18 refs. Grant No. PHS-MH-04920.

**A74-32424 The rhythms of sleep and waking.** W. B. Webb (Florida, University, Gainesville, Fla.). In: Chronobiology. Tokyo, Igaku Shoin, Ltd., 1974, p. 482-486. 10 refs.

The cyclical components of sleep and waking are summarized along two dimensions: sleep and waking relations within the circadian period and cycles within sleep periods. The patterning of sleep, both in its circadian and ultradian character, is shown to be clearly developmental. A heavily endowed biorhythm system is suggested. M.V.E.

**A74-32425 The paradoxical sleep cycle revisited.** S. A. Lewis (Edinburgh, University, Edinburgh, Scotland). In: Chronobiology. Tokyo, Igaku Shoin, Ltd., 1974, p. 487-490. 8 refs.

An investigation is conducted concerning the assumption that paradoxical sleep is a periodic phenomenon with a cycle length of 90 min. Experimental tests involving eight subjects show that the mean cycle length of paradoxical sleep is indeed 90 min. However, the standard deviations indicate large individual differences. In order to account for 95% of the distribution, the range has to be of the order of 50 min. to 130 min. The validity of the hypothesis suggested by Globus (1966) is discussed. G.R.

**A74-32426 Rapid eye movements during sleep and wakefulness.** E. Othmer and M. Hayden (Renard Hospital, St. Louis, Mo.). In: Chronobiology. Tokyo, Igaku Shoin, Ltd., 1974, p. 491-494. 15 refs.

**A74-32427 Studies on ultradian rhythmicity in human sleep and associated neuro-endocrine rhythms.** E. D. Weitzman, D. Fukushima, C. Nogeire, L. Hellman, J. Sassin, M. Perlow, and T. F. Gallagher (Montefiore Hospital and Medical Center, Bronx, N.Y.). In: Chronobiology. Tokyo, Igaku Shoin, Ltd., 1974, p. 503-505. 9 refs.

**A74-32428 Rhythms of the biogenic amines in the brain and sleep.** P. J. Morgane and W. C. Stern (Worcester Foundation for Experimental Biology, Shrewsbury, Mass.). In: Chronobiology. (A74-32401 15-04) Tokyo, Igaku Shoin, Ltd., 1974, p. 506-511. 18 refs. Grants No. NIH-MH-02211; No. NIH-MH-10625.

It is shown that the complexity in the distribution and timing of monoamine cycles in the brain makes it hazardous to draw simple correlations between rhythmic physiological functions or behavioral states such as sleep, psychomotor activity, endocrine rhythms, etc., on the one hand, and regional fluctuations in the levels of a biogenic amine, on the other. It seems probable that the amine rhythms in a region reflect fluctuations in activity either in cell discharge or in metabolism of the cells of origin of amine-containing terminals which are localized in specific regions of the brain stem. M.V.E.

**A74-32429 Cues in sensori-motor synchronization.** P. Fraisse (Paris V, Université, Paris, France). In: Chronobiology. Tokyo, Igaku Shoin, Ltd., 1974, p. 517-522. 9 refs.

The characteristics of the sensori-motor synchronization are discussed. In the form of synchronization considered, some anticipatory mechanism is required which makes it possible that the response is perceived simultaneously with the stimulus. A series of experiments were conducted to investigate the nature of the cues coming from the response made to the stimulus. The specific role of stimulus-response lag in synchronization was explored in a second investigation. G.R.

**A74-32430 Low amplitude infradian cycles of urinary 17-hydroxycorticosteroid excretion in a healthy male subject.** G. C. Curtis and D. McEvoy (Pennsylvania, University, Philadelphia, Pa.). In: Chronobiology. Tokyo, Igaku Shoin, Ltd., 1974, p. 523-526. 6 refs. Grant No. PHS-MH-08806.

**A74-32431 * Phase analysis of the somatic and mental variables in Gjessing's case 2484 of intermittent catatonia.** H. W. Simpson, L. Gjessing, A. Fleck, J. Kühl, and F. Halberg (Royal Infirmary, Glasgow, Scotland; Minnesota, University, Minneapolis, Minn.). In: Chronobiology. Tokyo, Igaku Shoin, Ltd., 1974, p. 535-539. 16 refs. Research supported by the Medical Research Council; Grants No. PHS-5-KM-GM-13981; No. NGR-24-005-006.

**A74-32432 Some circadian rhythms in experimental ethology and comparative psychopathology.** C. Poirel (Quebec, Université, Chicoutimi, Canada; Toulouse, Université, Toulouse, France). In: Chronobiology. (A74-32401 15-04) Tokyo, Igaku Shoin, Ltd., 1974, p. 540-543. 12 refs. Research supported by the Centre National de la Recherche Scientifique; National Research Council of Canada Grant No. A-7893.

**A74-32433 Circadian cyclic sensitivity to gamma radiation as an unconditioned stimulus in taste aversion conditioning.** J. W. Ternes (Florida State University, Tallahassee, Fla.). In: Chronobiology. Tokyo, Igaku Shoin, Ltd., 1974, p. 544-547. 9 refs. Contracts No. AT(40-1)-2903; No. AT(40-1)-2690.

**A74-32434 Adaptation of circadian rhythms in urinary excretions to local time, after rapid air travel.** F. Gerritzen and T. Strengers. In: Chronobiology. (A74-32401 15-04) Tokyo, Igaku Shoin, Ltd., 1974, p. 555-559.

**A74-32435 Phase relations between components of human circadian rhythms.** J. N. Mills (Manchester, Victoria University, Manchester, England). In: Chronobiology. Tokyo, Igaku Shoin, Ltd., 1974, p. 560-563. Research supported by the Medical Research Council.

Extension of previous research on the effect of real and simulated time zone shifts upon the circadian rhythms of body temperature and urinary excretion rate of sodium and potassium. The new results obtained include findings on a subject after simulated eastward and westward flights: in the first case of sodium rhythm adapted almost immediately, while the potassium rhythm adapted slowly over 4 days; in the second, the potassium rhythm took about 4 days to adapt, while the temperature adapted immediately. This indicates the lack of any phase locking between urinary potassium and either urinary sodium or body temperature. M.V.E.

**A74-32436 The resynchronization of human circadian rhythms after transmeridian flights as a result of flight direction and mode of activity.** K. E. Klein and H.-M. Wegmann (Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, Institut für Flugmedizin, Bad Godesberg, West Germany). In: Chronobiology. Tokyo, Igaku Shoin, Ltd., 1974, p. 564-570. 16 refs. Contract No. F33615-70-C-1598.

**A74-32437 Effects of acute shifts in circadian rhythms of sleep and wakefulness on performance and mood.** J. M. Taub and R. J. Berger (California, University, Santa Cruz, Calif.). In: Chronobiology. Tokyo, Igaku Shoin, Ltd., 1974, p. 571-575. 18 refs. Grant No. PHS-1-R01-MH-18928-01A1.

**A74-32438** **Phase-shifts of circadian rhythms - Definitive representation and quantitative analysis from computer application of the beta-distribution as a model.** W. B. Quay (California, University, Berkeley, Calif.). In: Chronobiology. Tokyo, Igaku Shoin, Ltd., 1974, p. 586-589. 16 refs. Grant No. NIH-NS-06296.

**A74-32439** **Why is so little known about the biological clock.** F. A. Brown, Jr. (Northwestern University, Evanston, Ill.). In: Chronobiology. Tokyo, Igaku Shoin, Ltd., 1974, p. 689-693. NSF Grant No. GB-31040.

A critical review of the evidence for the existence in living creatures of an autonomous, endogenous timing systems or 'biological clock' is shown to indicate that no known property of biological rhythms suggests that the observed rhythmic variations with all their well-known 'clock' properties can proceed independently of all ambient geophysical rhythms, or compells the conclusion that an environmentally-independent clock system exists. It is pointed out that there is mounting evidence of biologically significant roles of the very weak ambient geoelectromagnetic fields that act as subtle Zeitgebers or synchronizers of the postulated independent internal 'clocks' in much the same manner as light and temperature changes. Observed synodic monthly variations in strength of negative phototaxis in planarians seem to support the existence of these subtle Zeitgebers. M.V.E.

**A74-32440** **Different aspects of the studies of human circadian rhythms under the influence of weak electric fields.** R. Wever (Max-Planck-Institut für Verhaltensphysiologie, Erling-Andechs, West Germany). In: Chronobiology. Tokyo, Igaku Shoin, Ltd., 1974, p. 694-699. 42 refs.

It has been found that a weak electric 10-cps field influences human circadian rhythms in a predictable manner. Electric fields can, therefore, be used to conduct a systematic study of the properties of human circadian rhythms. A field which is switched on and off periodically by the experimenter represents a Zeitgeber. Experiments show that the external phase relationship between the biological rhythms and the Zeitgeber as well as the internal phase relationship between different biological rhythms change regularly, depending on the period. The effect of natural electromagnetic fields on human beings is also discussed. G.R.

**A74-32441** **Instrumentation for chronobiologic studies.** R. M. Goodman (Franklin Institute Research Laboratories, Philadelphia, Pa.). In: Chronobiology. Tokyo, Igaku Shoin, Ltd., 1974, p. 717-722. 18 refs.

Implantable telemetric devices and specialized, subject-carried recorders for biologic data are dealt with. Implantable, biological telemetric devices provide a means for transmitting internally sensed data from unrestrained subjects. Such equipment is usually designed to be physically small and of modest weight in comparison with the subject. These characteristics improve physiologic acceptability and permit considerable versatility in the choice of implantation sites. These implants are generally classified as 'passive', 'active', and 'biopowered' devices; the differences simply relate to the method by which each is powered. F.R.L.

**A74-32442** **Correlation coefficients for ranked angular variates.** D. C. Hillman (Minnesota, University, Minneapolis, Minn.). In: Chronobiology. Tokyo, Igaku Shoin, Ltd., 1974, p. 723-730.

A method is shown for extension of Spearman's rho and Kendall's tau rank correlation coefficients to two angular variates, and for further modification of a similar extension suggested by Batschelet for the correlation of an angular variate with a linear variate. Sample calculations are shown for an example having five data points, and tests of dependency are shown using the null hypothesis that each possible permutation is equally likely. (Author)

**A74-32443** **Pulmonary patho-physiology of industrial disability.** W. G. Reddan, J. A. Dempsey, G. A. doPico, L. Chosy, and J. Rankin (Wisconsin, University, Madison, Wis.). In: Chronobiology. Tokyo, Igaku Shoin, Ltd., 1974, p. 737-741. 10 refs.

An attempt was made to evaluate the degree of respiratory impairment in a defined industrial population by means of a patient profile relative to his pulmonary and metabolic stress response, and then practically to assess the importance of this impairment upon the capacity to perform intermittent prolonged work in an industrial environment. The modifying effects of the work environment were assessed through a series of day-long on- and off-the-job measurements to determine (1) the pulmonary and metabolic requirements of several defined types of work; (2) the independent effects of 8-hour rhythms; (3) changes over the work shift in tolerance to stress at exercise levels bracketing the occupational requirement; and (4) the relationship of physiologic efficiency to productivity. F.R.L.

**A74-32444** **Cardiovascular circadian rhythm in man.** L. Wertheimer, A. Hassen, A. Delman, and A. Yaseen (New York Medical College, New York, N.Y.). In: Chronobiology. Tokyo, Igaku Shoin, Ltd., 1974, p. 742-747. 7 refs.

Investigation of the circadian rhythm of catecholamine excretion in man, with concomittant alterations in myocardial contractility, heart rate, and blood pressure. This circadian rhythm and the associated alterations are confirmed by the results obtained, and these findings suggest that the response to stress of the cardiovascular system in man may be significantly altered by the phase of the circadian rhythm. Knowledge of these rhythmic changes may be of great importance for the understanding and treatment of cardiovascular disease. M.V.E.

**A74-32515** **Similarity judgments modified by feedback.** R. A. M. Gregson (Canterbury, University, Christchurch, New Zealand). *Acta Psychologica*, vol. 38, Apr. 1974, p. 117-129. 13 refs.

Three experiments in which numerical similarity judgments of pairs of figures were modified by giving subjects correct judgments as feedback are reported. The number of learning trials and test trials differed over the three experiments, but results were consistent and showed slight modification of judgments; intersubject variance about the nominated correct responses is reduced by feedback. Implications for cognitive and scaling theories are noted. (Author)

**A74-32516** **Task requirement and hemifield asymmetry in tachistoscopic partial report performance.** E. Scheerer (Rochester, University, Rochester, N.Y.). *Acta Psychologica*, vol. 38, Apr. 1974, p. 131-147. 28 refs. U.S. Department of Health, Education, and Welfare Grant No. OEG-072-0671; Grant No. PHS-MH-17053.

**A74-32517** **The role of hemispheric specialization in the analysis of STROOP stimuli.** V. Schmit and R. Davis (Newcastle-upon-Tyne, University, Newcastle-upon-Tyne, England). *Acta Psychologica*, vol. 38, Apr. 1974, p. 149-158. 10 refs.

Review of experimental investigation results on the role of hemispheric specialization in the identification and processing of STROOP stimuli. These results demonstrate the existence of differences between the two hemispheres in the time required to classify on the basis of color or color name. They also show greater interference in the dominant hemisphere as a result of incompatible color or color-name information. M.V.E.

**A74-32616 #** **Determination of the differential threshold by the bilateral method of constant stimuli.** J. Kaluzny (Slovenska Akademia Vied, Fyzikalny Ustav, Bratislava, Czechoslovakia). *Acta Physica Slovaka*, vol. 24, no. 2, 1974, p. 119-127. 5 refs.

Discussion of the nature and merits of the bilateral method of constant stimuli for determining the psychophysical variable called the differential threshold. Following a description of the measurement procedure and measurement result processing, the possibilities afforded by the bilateral method are compared to those of the standard method. M.V.E.

**A74-32637** **Directionally selective light adaptation - A visual consequence of receptor disarray.** D. I. A. MacLeod (Cambridge University, Cambridge, England). *Vision Research*, vol. 14, June 1974, p. 369-378. 31 refs. Research supported by the Medical Research Council and H. E. Durham Fund.

Brightness matches were established between test lights that entered the eye at diametrically opposite points within the pupil. In parafoveal observation, test lights entering near the temporal margin had to be more intense for temporal than for nasal entry of an adapting light. The appendix develops a quantitative theory of this effect, and derives from the results an estimate of the directional sensitivity of single cones and an estimate of the variation in tilt among the receptors in a small retinal region. (Author)

**A74-32638** **Coordination of head and eye movements to fixate continuous and intermittent targets.** M. A. Gresty (RAF, Institute of Aviation Medicine, Farnborough, Hants., England). *Vision Research*, vol. 14, June 1974, p. 395-403. 13 refs.

To compare head-eye coordination with and without a target which was visible during the movement, subjects fixated in the direction of target lamps which: (1) flashed for 40 msec followed by 1 sec darkness; (2) were continuously illuminated for 3 sec. Ballistic head movements were produced which made up 85 and 75 per cent respectively of the gaze displacement in conditions (1) and (2). Eye movements were a combination of voluntary step, vestibulo-ocular reflex, position correcting steps and slow movements. Saccades produced by passive head rotation were modified during similar fixation movements. Accuracy of responses to flash was high although response components showed wide variability. (Author)

**A74-32736** **Operant conditioning of single-unit response patterns in visual cortex.** P. G. Shinkman, C. J. Bruce, and B. E. Pfingst (North Carolina, University, Chapel Hill, N.C.). *Science*, vol. 184, June 14, 1974, p. 1194-1196. 9 refs. Grants No. PHS-MH-17246; No. PHS-MH-17570; No. PHS-HD-03110.

Unit responses to photic stimuli were studied in cat visual cortex. After the baseline response pattern of a cell was determined, conditioning trials were given during which reinforcement was contingent upon increased firing during a selected segment of the poststimulus interval. Density of reinforcement increased substantially in about half the cells studied; significant increases in firing occurred within, but not outside, the criterion segment. (Author)

**A74-32737** **Curvature detectors in human vision.** C. F. Stromeyer, III (Stanford University, Stanford, Calif.). *Science*, vol. 184, June 14, 1974, p. 1199-1201. 27 refs.

McCullough (1965) showed that a striking aftereffect was produced by adaptation for several minutes to a vertical grating of black and orange stripes alternating with a horizontal grating of black and blue stripes. Black and white test gratings with retinal orientations similar to those of the adapting patterns were tinged with colors opposite to the adapting colors. These effects were ascribed to 'color adaptation of orientation-specific edge detectors'. Riggs (1973) has observed similar effects with patterns of curved lines. He postulates curvature detectors, which prefer strong curvature. McCullough's simpler idea (the oriented-line hypothesis) can explain these effects. Experiments are described which show that this hypothesis accounts for Riggs' observations. Riggs maintains, as a working hypothesis, that there are visual units specialized both for color and for the changes in line orientation that define angles and curves. F.R.L.

**A74-32747 #** **Modeling of a complex of systems of the organism which are associated with blood circulation and carrying out of physiological experiments with this complex (Modelirovanie kompleksa sistem organizma, sviazannykh s krovoobrashcheniem i vosproizvedenie na nem fiziologicheskikh eksperimentov).** L. A. Dartau. In: Optimization. Study of operations. Bionics. (A74-32739 15-08) Moscow, Izdatel'stvo Nauka, 1973, p. 229-235. 16 refs. In Russian.

**A74-32748 #** **A quantitative model of the excitable myocardium cell (O kolichestvennoi modeli vozbudimoi kletki miokarda).** A. A. Petrov. In: Optimization. Study of operations. Bionics. (A74-32739 15-08) Moscow, Izdatel'stvo Nauka, 1973, p. 235-239. 7 refs. In Russian.

A mathematical model is proposed for an element of the excitable membrane of Purkinje's myocardium fiber. The model uses a structural approximation of sodium conductivity component which differs from that in the Noble classical model and allows a flexible parameter control for different modes of activity. Good agreement is obtained between electrophysiological experiments and the results obtained on the model. V.Z.

**A74-32749 #** **A hypothetical mechanism of data processing in neuron dendrites (Gipoteticheskii mekhanizm pererabotki informatsii v dendritakh neirona).** L. A. Shmelev. In: Optimization. Study of operations. Bionics. (A74-32739 15-08) Moscow, Izdatel'stvo Nauka, 1973, p. 254-261. 21 refs. In Russian.

Transformation rhythms in dendrite branching modes are analyzed in light of available dendrite membrane stimulation data. The possibility of execution of logical and arithmetical operations in a single Y-shaped dendrite branching is evaluated. It is theorized that a spike can arise at any point of a dendrite when the depolarization potential exceeds a certain threshold level, and that the progress of a spike through a dendrite section depends on the input resistance of this section and on the instantaneous total current in the section. Types of branching and of synaptic contacts, and synapse locations of branches are discussed as factors influencing the capability of dendrite branchings to execute logical and arithmetical operations. V.Z.

**A74-32880 #** **The equation of evolution and the limit theorem for general genetic systems without selection (Evoliutsionnoe uravnenie i predel'naia teorema dlia obshchikh geneticheskikh sistem bez otbora).** V. M. Kirzhner (Akademiia Nauk Ukrainskoi SSR, Fiziko-Tekhnicheskii Institut Nizkikh Temperatur, Kharkov, Ukrainian SSR) and Iu. I. Liubich (Khar'kovskii Gosudarstvennyi Universitet, Kharkov, Ukrainian SSR). *Akademiia Nauk SSSR, Doklady*, vol. 215, Apr. 1, 1974, p. 776-779. 9 refs. In Russian.

**A74-32885 #** **The effect of cystamine on the colony-forming ability of irradiated bone marrow cells from guinea pigs in monolayer cultures (Vliianie tsistamina na kolonieobrazuiushchuiu sposobnost' kletok kostnogo mozga obluchennykh morskikh svinok v monosloinoi kul'ture).** T. K. Dzharak'ian, A. A. Akopova, L. B. Berlin, I. V. Gusev, and N. V. Kutasova (Voenno-Meditsinskaia Akademiia, Leningrad, USSR). *Akademiia Nauk SSSR, Doklady*, vol. 215, Apr. 1, 1974, p. 1007-1009. 15 refs. In Russian.

**A74-32893 #** **Hippocampal theta rhythm and motor activity (Gippokampal'nyi teta-ritm i dvigatel'naia aktivnost').** L. A. Preobrazhenskaia (Akademiia Nauk SSSR, Institut Vysshei Nervnoi Deiatel'nosti i Neirofiziologii, Moscow, USSR). *Zhurnal Vysshei Nervnoi Deiatel'nosti*, vol. 24, Mar.-Apr. 1974, p. 227-235. 35 refs. In Russian.

The relation of hippocampal theta rhythm with motor activity in dogs is considered. It is shown that enhancement of hippocampal theta rhythm activity, along with heart rate acceleration, occurs in cases when the animal undergoes no instrumental reaction. M.V.E.

**A74-32894 #** **Daily dynamics of conditioned activity and of some vegetative functions in experimental neurosis in monkeys (Sutochnaia dinamika uslovnoreflektornoi deiatel'nosti i nekotorykh vegetativnykh pokazatelei pri eksperimental'nom nevroze u obez'ian).** Sh. L. Dzhalagoniia (Akademiia Meditsinskikh Nauk SSSR, Sukhumi, Georgian SSR). *Zhurnal Vysshei Nervnoi Deiatel'nosti*, vol. 24, Mar.-Apr. 1974, p. 236-242. 18 refs. In Russian.

**A74-32895 #** **Quantitative characteristics of local blood flow in the human brain and their dependence on psychic activity (Kolichestvennye kharakteristiki lokal'nogo mozgovogo krovotoka**

**cheloveka i ikh zavisimost' ot psikhicheskoi deiatel'nosti).** A. R. Shakhnovich, A. E. Razumovskii, L. S. Milovanova, V. T. Bezhanov, and S. B. Dubova (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Zhurnal Vysshei Nervnoi Deiatel'nosti,* vol. 24, Mar.-Apr. 1974, p. 313-320. 20 refs. In Russian.

Continuous monitoring of local cerebral blood flow, with the aid of brain-implanted electrodes, by the polarographic method, following neurosurgery, is shown to indicate the dependence of the local blood flow on the functional activity of the brain (reading, speech, counting, or optokinetic nystagmus). Fixed cerebral area records of local blood flow show variations of a different character during the performance of differing functional tasks. M.V.E.

**A74-32896 # Human capacity for absolute estimates of short-sound durations (Sposobnost' cheloveka k absoliutnoi otsenke dlitel'nosti korotkikh zvukov).** S. N. Gol'dburt, M. A. Osmanov, and E. E. Shchekanov (Leningradskii Gosudarstvennyi Universitet, Leningrad, USSR). *Zhurnal Vysshei Nervnoi Deiatel'nosti,* vol. 24, Mar.-Apr. 1974, p. 321-327. 16 refs. In Russian.

The efficiency of sound duration perception for sounds lasting less than 150 milliseconds is shown not to exceed 40 to 45% when 3 to 5 signals are presented for identification. This low efficiency is due to the residual sound sensation that persists beyond the actual sound duration relatively the longer, the shorter the actual sound duration is. M.V.E.

**A74-32897 # Effect of specific and nonspecific afferentation on the electromiographic activity of human articulation muscles (Vliianie spetsificheskoi i nespetsificheskoi afferentatsii na elektromiograficheskuiu aktivnost' artikuliatsionnykh myshts cheloveka).** G. Iu. Volynkina (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR). *Zhurnal Vysshei Nervnoi Deiatel'nosti,* vol. 24, Mar.-Apr. 1974, p. 328-336. 16 refs. In Russian.

**A74-32898 # Dynamics of gross and spike activity of the striate area of the cerebral cortex under conditions of positive alimentary automatic reinforcement (Dinamika summarnoi i impul'snoi aktivnosti striarnoi oblasti kory golovnogo mozga v rezhime polozhitel'nogo pishchevogo avtomatizirovannogo podkrepleniia).** V. V. Ur'iash (Akademiia Meditsinskikh Nauk SSSR, Leningrad, USSR). *Zhurnal Vysshei Nervnoi Deiatel'nosti,* vol. 24, Mar.-Apr. 1974, p. 356-361. 25 refs. In Russian.

**A74-33100 # Effect of the advance notice of reactions on the reaction time (Welche Wirkung hat die Vorankündigung von Reaktionen auf die Reaktionszeit).** M. Amelang and F. Lasogga (Hamburg, Universität, Hamburg, West Germany). *Zeitschrift für experimentelle und angewandte Psychologie,* vol. 21, 1st Quarter, 1974, p. 1-24. 8 refs. In German.

In complex reaction-time experiments on human subjects an additional stimulus was given in advance of the actual stimulus. This informed the subject which bulb would be illuminated in a semicircular array of bulbs corresponding to a similar array of reaction buttons under the subjects hand. The duration of the first stimulus, length of the interval between the two, and the order of presentation of stimuli with different intervals were varied for each subject. Reaction time decreased with increase of the interval between stimuli, but never below the value obtained in simple reaction-time experiments. Longer presentation of the additional stimulus produced longer reaction times. J.K.K.

**A74-33276 International Symposium on the Origin of Life, 4th, Barcelona, Spain, June 25-28, 1973, Proceedings.** *Origins of Life,* vol. 5, Jan.-Apr. 1974. 179 p.

Subjects in cosmochemistry are discussed, giving attention to galactic clouds of organic molecules, perspectives for exobiology in the outer solar system, and catalytic reactions in solar nebula and their significance for interstellar molecules. Topics considered in paleobiology include natural evidence for chemical and early biological evolution, aspects of the geologic history of seawater, homeostatic tendencies of the earth's atmosphere, microfossils from the middle Precambrian McArthur group, and the development and diversification of Precambrian life. Aspects of primordial organic chemistry are also explored, taking into account the atmosphere of the primitive earth and the prebiotic synthesis of amino acids, biomolecules from HCN, and the prebiotic synthesis of oligonucleotides. Other subjects examined are related to precellular organization.

Individual items are announced in this issue. G.R.

**A74-33279 * The outer solar system - Perspectives for exobiology.** T. Owen (New York, State University, Stony Brook, N.Y.). *(International Symposium on the Origin of Life, 4th, Barcelona, Spain, June 25-28, 1973.) Origins of Life,* vol. 5, Jan.-Apr. 1974, p. 41-55. 49 refs. Grants No. NGR-33-015-141; No. NGR-33-015-169; No. NGR-33-015-165.

An attempt is made to summarize the current knowledge about the composition and structures of outer planet atmospheres with special emphasis on Jupiter, Saturn, and Titan. The nature of the substances which are responsible for the yellow coloration observed on both Jupiter and Saturn is discussed. The analysis of planetary conditions conducted shows that the outer solar system offers a variety of environments in which natural experiments in prebiotic organic synthesis must be taking place at the present time. G.R.

**A74-33282 * Homeostatic tendencies of the earth's atmosphere.** J. E. Lovelock (Reading, University, Reading, Berks., England) and L. Margulis (Boston University, Boston, Mass.). *(International Symposium on the Origin of Life, 4th, Barcelona, Spain, June 25-28, 1973.) Origins of Life,* vol. 5, Jan.-Apr. 1974, p. 93-103. 35 refs. Research supported by Shell Research; Grant No. NGR-22-004-025.

The concept is developed that the atmosphere of the earth flows in a closed system controlled by and for the biosphere. The environmental factors delimiting the biosphere are examined. It is found that neither oxygen nor pressure per se limit the distribution of life as a whole. Rather the major physical variables determining the distribution of organisms are solar radiation, temperature, water abundance, and the concentrations of hydrogen and other ions and elements. An attempt is made to model temperature and atmospheric composition of a lifeless earth. G.R.

**A74-33283 Microfossils from the middle Precambrian McArthur group, Northern Territory, Australia.** M. D. Muir (Royal School of Mines, London, England). *(International Symposium on the Origin of Life, 4th, Barcelona, Spain, June 25-28, 1973.) Origins of Life,* vol. 5, Jan.-Apr. 1974, p. 105-118. 11 refs.

On present evidence the age of McArthur group rocks appears most likely to be about 1600 m.y. The two major divisions of the McArthur group are the Batten subgroup and the Umbolooga subgroup. Microfossils have so far been found in two subdivisions of the Umbolooga subgroup, including the HYC pyritic shale member of the Barney Creek formation and the Amelia Dolomite. The microfossils described show a variety of forms from single celled and colonial to multicellular forms. G.R.

**A74-33284 * The development and diversification of Precambrian life.** J. W. Schopf (California, University, Los Angeles, Calif.). *(International Symposium on the Origin of Life, 4th, Barcelona, Spain, June 25-28, 1973.) Origins of Life,* vol. 5, Jan.-Apr. 1974, p. 119-135. 46 refs. NSF Grant No. GB-37257; Grant No. NGR-05-007-407.

The temporal relationships among various prominent events occurring in the evolution of life are considered. It is seen that the Precambrian encompasses an enormous segment of geologic time and includes more than 80% of the history of life on this planet. As a result of the studies of the past decade it appears that living systems were probably extant as early as 3300 m.y. ago. Photoautotrophs, apparently including blue-green algae, originated earlier than 3000 m.y. ago. Blue-green algae were the dominant components of earth's

biota for the period extending from about 3000 to 1000 m.y. ago. The nucleated, eukaryotic cell type had become established at least as early as 900, and possibly prior to 1300 m.y. ago. G.R.

**A74-33290 Coacervate systems and origin of life.** T. N. Evreinova, T. V. Mamontova, V. N. Karnaukhov, S. B. Stefanov, and U. R. Khrust (Moskovskii Gosudarstvennyi Universitet; Akademiia Nauk SSSR, Institut Biofiziki, Moscow, USSR). *(International Symposium on the Origin of Life, 4th, Barcelona, Spain, June 25-28, 1973.) Origins of Life,* vol. 5, Jan.-Apr. 1974, p. 201-205. 9 refs.

The study of coacervate systems has relevance to theories concerning the origin of life. The hydrophylic coacervate systems consist of drops (0.5 to 640 microns in diameter) and equilibrium liquid. A characteristic feature of such systems is the cooperation or association of molecules in the coacervate drops. The present work presents experimental results showing how enzymatic reactions in coacervate systems affects the stability and structure of drops. P.T.H.

**A74-33291 Transfer RNA and the translation apparatus in the origin of life.** A. Rich (MIT, Cambridge, Mass.). *(International Symposium on the Origin of Life, 4th, Barcelona, Spain, June 25-28, 1973.) Origins of Life,* vol. 5, Jan.-Apr. 1974, p. 207-219. 10 refs.

The present work summarizes most recent theory and experiment concerning the molecular structure of transfer RNA (tRNA). The fundamental interactions which govern the translation of nucleic acid sequences into polypeptide chains involves the detailed positioning of tRNA molecules on a messenger RNA strand in a sequential order. During protein synthesis, tRNA molecules enter the ribosome where they are positioned on a messenger RNA strand. An electron density map is shown which illustrates the connections between adjacent segments of a polynucleotide chain. The role of tRNA in primitive biosynthesis is discussed. P.T.H.

**A74-33292 A hypothetic scheme for evolution of probionts.** A. I. Oparin (Academy of Sciences, Institute of Biochemistry, Moscow, USSR). *(International Symposium on the Origin of Life, 4th, Barcelona, Spain, June 25-28, 1973.) Origins of Life,* vol. 5, Jan.-Apr. 1974, p. 223-226.

The origin of life on earth cannot be regarded as a single, uninterrupted, continuous chain of events. From thermodynamic considerations, it appears that the forerunners of living systems underwent repeated decomposition and reevolution, especially in the multimolecular phase-separated systems (probionts) interacting with their surrounding solutions in the manner of open systems. These systems would maintain growth by natural selection in the original Darwinian sense of the term and later would be stabilized by the then appearing nucleic acids. In all instances the process would remain highly episodic and reversible. J.K.K.

**A74-33293 * From proteinoid microsphere to contemporary cell - Formation of internucleotide and peptide bonds by proteinoid particles.** S. W. Fox, J. R. Jungck, and T. Nakashima (Miami, University, Coral Gables, Fla.). *(International Symposium on the Origin of Life, 4th, Barcelona, Spain, June 25-28, 1973.) Origins of Life,* vol. 5, Jan.-Apr. 1974, p. 227-237. 31 refs. Grant No. NGR-10-007-008.

**A74-33295 Pre-enzymic origin of metabolic redox processes and of the energy storage processes.** R. Buvet, L. Le Port, and F. Stoetzel (Paris, Université, Laboratoire Energétique Biochimique, Créteil, Val-de-Marne, France). *(International Symposium on the Origin of Life, 4th, Barcelona, Spain, June 25-28, 1973.) Origins of Life,* vol. 5, Jan.-Apr. 1974, p. 253-262. 6 refs.

A treatment of the energetic conditions which regulate the nonequilibrium occurrence of metabolic redox processes associated with degradations of carbon chains or formations of condensed bonds shows that such processes are conditioned by the nature of the substrates and not by the preexistence of enzymic catalysts of cellular ultrastructures. An experimental program has been initiated to spectrophotometrically, electrochemically, and chemically detect which redox components appear during model studies of chemical evolution, operating from simple mixtures of CH4, NH3, H2, and water and from the same mixtures with added phosphorus or sulfur derivatives and metal cations. (Author)

**A74-33297 Life's beginnings - Origin or evolution.** J. Keosian (Marine Biological Laboratory, Woods Hole, Mass.). *(International Symposium on the Origin of Life, 4th, Barcelona, Spain, June 25-28, 1973.) Origins of Life,* vol. 5, Jan.-Apr. 1974, p. 285-293. 33 refs.

Critical evaluation of the prebiological systems theory of the origin of life and gene theory. The alleged disproof of the concept of spontaneous generation is examined. The heterotroph hypothesis and the uniqueness of biopoesis are questioned. The origin of life is viewed as a part of the general evolution of matter that takes place throughout the universe. M.V.E.

**A74-33396 * Drug effects on neuroendocrine regulation; Proceedings of the International Symposium, Snowmass-at-Aspen, Colo., July 17-19, 1972.** Symposium sponsored by the National Institute of Mental Health, NASA, et al.; Grant No. NGR-36-008-168. Edited by E. Zimmermann (California, University, Los Angeles, Calif.), W. H. Gispen (Utrecht, Rijksuniversiteit, Utrecht, Netherlands), B. H. Marks (Ohio State University, Columbus, Ohio), and D. de Wied (Utrecht, Rijksuniversiteit, Utrecht, Netherlands). Amsterdam, Elsevier Scientific Publishing Co. (Progress in Brain Research. Volume 39), 1973. 510 p. $69.

Subjects related to the characterization of neuroendocrine systems are discussed, taking into account the need for the precise identification and rigorous description of their operations. Steroid effects on neuroendocrine system performance are considered along with biogenic amine effects on neuroendocrine systems and the influence of drugs of abuse on neuroendocrine behavior. Other topics explored include pituitary-adrenal influences on avoidance and approach behavior of the rat, the adrenocortical mediation of the effects of early life experiences, and the implication of noradrenaline in avoidance learning in the rat.

Individual items are announced in this issue. G.R.

**A74-33397 Neuroendocrine systems - The need for precise identification and rigorous description of their operations.** J. C. Porter (Texas, University, Dallas, Tex.). In: Drug effects on neuroendocrine regulation; Proceedings of the International Symposium, Snowmass-at-Aspen, Colo., July 17-19, 1972.
, Amsterdam, Elsevier Scientific Publishing Co., 1973, p. 1-6. 20 refs. Research supported by the Population Council of New York; Grant No. NIH-AM-01237.

**A74-33398 Hypothalamic monoamine levels and gonadotrophin secretion following deafferentation of the medial basal hypothalamus.** R. I. Weiner (Southern California, University, Los Angeles, Calif.). In: Drug effects on neuroendocrine regulation; Proceedings of the International Symposium, Snowmass-at-Aspen, Colo., July 17-19, 1972. (A74-33396 15-04) Amsterdam, Elsevier Scientific Publishing Co., 1973, p. 165-170; Discussion, p. 170. 20 refs.

**A74-33399 * Brain serotonin and pituitary-adrenal functions.** J. Vernikos-Danellis, P. Berger, and J. D. Barchas (NASA, Ames Research Center, Biomedical Research Div., Moffett Field; Stanford University, Stanford, Calif.). In: Drug effects on neuroendocrine regulation; Proceedings of the International Symposium, Snowmass-at-Aspen, Colo., July 17-19, 1972.
Amsterdam, Elsevier Scientific Publishing Co., 1973, p. 301-309; Discussion, p. 309, 310. 28 refs. Research supported by the Grant Foundation.

It had been concluded by Scapagnini et al. (1971) that brain serotonin (5-HT) was involved in the regulation of the diurnal rhythm of the pituitary-adrenal system but not in the stress response. A study was conducted to investigate these findings further by evaluating the effects of altering brain 5-HT levels on the daily fluctuation of plasma corticosterone and on the response of the

pituitary-adrenal system to a stressful or noxious stimulus in the rat. In a number of experiments brain 5-HT synthesis was inhibited with parachlorophenylalanine. In other tests it was tried to raise the level of brain 5-HT with precursors. G.R.

**A74-33421 Error quantization effects in compensatory tracking tasks.** R. A. Hess (U.S. Naval Postgraduate School, Monterey, Calif.) and W. M. Teichgraber (U.S. Navy, San Diego, Calif.). *IEEE Transactions on Systems, Man, and Cybernetics,* vol. SMC-4, July 1974, p. 343-349. 7 refs. Research supported by the U.S. Naval Postgraduate School.

A series of experiments were performed to determine the effect of error signal quantization on human operator compensatory tracking performance. Single-axis, dual-axis, and cross-coupled critical tracking tasks were utilized with a variety of quantization formats. The controlled element dynamics were chosen so as to force the operator to generate varying amounts of lead equalization. The single- and dual-axis critical tasks served as sensitive indicators of display format effects, with the single-axis task yielding information concerning the operator's effective time delay while tracking. The cross-coupled task allowed measurement of the operator's attentional workload margin while using the quantized displays. The results indicate increased operator time delays and attentional workload when using the quantized display formats. (Author)

**A74-33544 * Effects of angular acceleration on man - Choice reaction time using visual and rotary motion information.** B. Clark (San Jose State University, San Jose, Calif.) and J. D. Stewart (NASA, Ames Research Center, Moffett Field, Calif.). *Perceptual and Motor Skills,* vol. 38, June 1974, pt. 1, p. 735-743. 36 refs. Grant No. NGL-05-048-002.

This experiment was concerned with the effects of rotary acceleration on choice reaction time (RTc) to the motion of a luminous line on a cathode-ray tube. Specifically, it compared the (RTc) to rotary acceleration alone, visual acceleration alone, and simultaneous, double stimulation by both rotary and visual acceleration. Thirteen airline pilots were rotated about an earth-vertical axis in a precision rotation device while they observed a vertical line. The stimuli were 7 rotary and visual accelerations which were matched for rise time. The pilot responded as quickly as possible by displacing a vertical controller to the right or left. The results showed a decreasing (RTc) with increasing acceleration for all conditions, while the (RTc) to rotary motion alone was substantially longer than for all other conditions. The (RTc) to the double stimulation was significantly longer than that for visual acceleration alone. (Author)

**A74-33816 # Effect of rectilinear accelerations on man with a stable or changing position of the otolith apparatus (Vozdeistvie na cheloveka priamolineinykh uskorenii pri postoiannom i izmeniaiushchemsia polozhenii otolitovogo apparata).** F. A. Solodovnik. *Akademiia Nauk SSSR, Izvestiia, Seriia Biologicheskaia,* May-June 1974, p. 334-341. 10 refs. In Russian.

Vestibular stability and physiological reactions were studied in subjects during rocking in sagittal and frontal planes with or without simultaneous rotation at angular velocities of 15, 30, 90 or 180 deg per sec. The heart beat and respiration rates of the subjects showed similar changes during rocking in both planes, and the rates gradually decreased when rocking was combined with rotation. Motion sickness was more frequent during rocking in a frontal plane, in combination with rotation in particular. V.Z.

**A74-33817 # Coriolis acceleration and precessional angular acceleration as adequate stimulants of various sections of the vestibular apparatus (Koriolisovo uskorenie i pretsessionnoe uglovoe uskorenie-adekvatnye razdrazhiteli raznykh podrazdelenii vestibuliarnogo apparata).** I. Iu. Sarkisov and A. A. Shipov (Moskovskii Fiziko-Tekhnicheskii Institut, Moscow, USSR). *Akademiia Nauk SSSR, Izvestiia, Seriia Biologicheskaia,* May-June 1974, p. 425-428. 10 refs. In Russian.

Classical mechanics considerations are set forth to formulate a concept of precessional angular accelerations which are adequate stimulants of semicircular canal receptors as distinguished from Coriolis accelerations which are adequate stimulants of otolith receptors. Adequate stimulants of the vestibular apparatus are analyzed in man who is moving with one of two systems which move relative to one another. Precessional angular accelerations are calculated for vestibular tests under ground conditions and under a simulated force of gravity in a space station. V.Z.

**A74-33847 Results of an audiogram analysis in a light bomber wing (Ergebnisse einer Audiogrammanalyse in einem leichten Kampfgeschwader).** W. Bickert. *Wehrmedizinische Monatsschrift,* vol. 18, June 1974, p. 170-174. 10 refs. In German.

The investigation included the analysis of 1075 audiograms of military and civilian personnel. It was found that hearing on the left side on a percentage basis was more often impaired than hearing on the right side. The reason for this phenomenon can be traced to traumatic noise effects of military rifle practice. The investigation points also to the existence of an individual disposition for hearing impairment. Hearing impairment due to aircraft engine noise occurs less frequently than previously expected. G.R.

**A74-33876 Cardiovascular response of young men to diverse stresses.** J. J. Smith, M. L. Bonin, V. T. Wiedmeier, J. H. Kalbfleisch, and D. J. McDermott (Wisconsin, Medical College, Milwaukee, Wis.). *Aerospace Medicine,* vol. 45, June 1974, p. 583-590. 35 refs.

A battery of eight stress tests was administered to 13 young men, 19 to 26 years of age, in order to compare their responses to postural, cold pressor, Valsalva, and exercise stresses. Noninvasive methods were used and the entire battery was repeated in ten of the subjects. Both postural tests i.e., 70-deg head-up tilt and free standing - induced a mean diastolic pressure (DP) of +12 mm Hg and a mean heart rate (HR) of +28/min. The cold pressor test elicited a mean of +18 mm Hg in both systolic pressure (SP) and DP with a significant correlation between the mean SP and mean DP (r = +0.72). During the Valsalva maneuver, there were marked and consistent alterations in HR and HR increments with indications that HR analysis may be a useful index of Valsalva response. (Author)

**A74-33878 Personality differences between male and female air traffic controller applicants.** S. Karson and J. W. O'Dell (Eastern Michigan University, Ypsilanti, Mich.). *Aerospace Medicine,* vol. 45, June 1974, p. 596-598. 8 refs.

Differences in personality structure between 9886 male and 217 female applicants for air traffic control positions were examined, using the Sixteen Personality Factor Questionnaire. Data were analyzed through the analysis of variance and by factor analytic techniques. It was shown through both methods that the personality structure of male and female applicants for these positions is much more similar than dissimilar. (Author)

**A74-33879 Susceptibility to anxiety and shift difficulty as determinants of state anxiety in air traffic controllers.** R. C. Smith and C. E. Melton, Jr. (FAA, Civil Aeromedical Institute, Oklahoma City, Okla.). *Aerospace Medicine,* vol. 45, June 1974, p. 599-601. 6 refs.

The State-Trait Anxiety Inventory (STAI) was used to assess the anxiety of air traffic controllers who had experienced difficult and easy work shifts. Eighty volunteers completed the STAI before and after two or more 8-hr work shifts. Controllers relatively high in anxiety proneness tended to report higher levels of anxiety in association with control work than those relatively low in anxiety proneness. The mean A-state score after shifts was higher than the mean score before shifts. It was also determined that the increase in anxiety during shifts was greater for difficult shifts. (Author)

**A74-33880 * Comparison of five levels of motion sickness severity as the basis for grading susceptibility.** E. F. Miller, II and A. Graybiel (U.S. Naval Aerospace Medical Research Laboratory,

Pensacola, Fla.). *Aerospace Medicine,* vol. 45, June 1974, p. 602-609. 11 refs. NASA Order T-81633; NASA Order T-5904B.

The motion sickness susceptibility of 275 healthy male subjects was measured quantitatively by a standardized laboratory procedure using a Stille rotational chair. The results, in terms of velocity of the chair and the number of active head movements, were combined into a single numerical score that represented the total stressor stimulus sustained in reaching, in turn, each of five specific criteria for diagnosing the severity of motion sickness. The stressor value (E factor) of a single head movement at each test rpm was adjusted to yield an equivalent susceptibility score (Coriolis Sickness Susceptibility Index, or CSSI) independent of the endpoint selected. Close agreement among the CSSI scores obtained at each endpoint was found in intercorrelations, test-retest reliability coefficients, and frequency distributions, which reflected the orderliness and stability in the appearance, ramification, and intensification of the acute symptomatology evoked in progressing from mild malaise to frank sickness. (Author)

**A74-33881 * Sleep and waking in a time-free environment.** W. B. Webb and H. W. Agnew, Jr. (Florida, University, Gainesville, Fla.). *Aerospace Medicine,* vol. 45, June 1974, p. 617-622. 19 refs. Grant No. NGR-10-005-058.

The sleep and waking of 14 subjects in time-free environments were studied for 14 days. Half of the subjects had a heavy exercise regime. All subjects exhibited a longer-than-24-hr rhythm, but the groups did not differ from each other in this extension of the rhythm. There were large individual differences between subjects and large variations from the projected sleep and waking times. The overall amount of sleep increased in the environment, and there were marked increases in both shorter and longer sleep and waking period lengths. Exercise did not increase the overall amount of sleep but did increase the variability in the distribution of sleep. The overall distribution of sleep stages during sleep did not differ from baseline measures or between groups. (Author)

**A74-33882 * Gravitational force as a determinant of turtle-shell growth and shape.** C. C. Wunder, C. H. Dodge, G. A. Walkup, M. E. Clark, J. O. Rice, and M. T. Edwards (Iowa, University, Iowa City, Iowa). *Aerospace Medicine,* vol. 45, June 1974, p. 623-629. 17 refs. Grants No. NGR-16-001-031; No. NIH-GM-K3-4756; Contract No. NAS2-6064.

Chronic low-gravity simulation (pedestal support, suspension by wires or foam, and/or clinostat tumbling) of 11 aquatic red-eared sliders, Pseudemys scripta elegans, and of nine box turtles, Terrapine carolina, resulted in continued but slower linear carapace growth. Decreased shell height was accompanied by drastic plastron infolding. Chronic centrifugation (1.4, 1.8, 2.8, 5, or 8.1 g) of 81 box turtles caused an eventual decrease (12% per g) in linear growth rate. No consistent decrease occurred with aquatic turtles centrifuged at below 6 g. Maximum growth of length and roundness appears near 5 g for aquatic environments and near 1 g in land environments. Present results suggest that some gravity is necessary for normal bone growth. (Author)

**A74-33883 Psycho-social studies in general aviation. II - Personality profile of female pilots.** J. R. Novello (Michigan, University, Ann Arbor, Mich.) and Z. I. Youssef (Eastern Michigan University, Ypsilanti, Mich.). *Aerospace Medicine,* vol. 45, June 1974, p. 630-633. 20 refs.

A battery of psychological tests were administered to 87 female general-aviation pilots. The battery consisted of the Edwards Personality Preference Schedule (EPPS), a modified Early Memories Test, and the General Aviation Psycho-Social Inventory. Results indicate that female pilots have a distinctive EPPS personality profile. As compared to norms established for U.S. adults, the EPPS means of female pilots are more similar to those of male adults than female adults. Moreover, the EPPS personality profile of female pilots is more similar to the male general-aviation pilot profile than to either the adult female or the adult male norms. Female pilots and male pilots deviate in the same direction from means of the EPPS female norms on 15 of the 16 scales. Thus, female pilots have more personality traits in common with male pilots than they have with women in the U.S. population at large. These findings demonstrate the existence of a 'pilot's personality' transcending sex distinctions. (Author)

**A74-33884 Development of criterion for skin burns.** A. Takata (IIT Research Institute, Chicago, Ill.). *Aerospace Medicine,* vol. 45, June 1974, p. 634-637.

Development of a criterion for skin burns based on experiments which involved exposing approximately a dozen areas on the sides of over 100 pigs to flames generated by the controlled burning of JP-4 fuel with a furnace. These studies involved a variety of thermal fluxes, exposure times, and skin conditions to ensure a variety of burns. To assess the effects of temperature on the damage, temperatures were calculated above and below the depths of irreversible damage. By examining a variety of such situations, the rates of thermal damage were determined as a function of temperature. (Author)

**A74-33885 Influence of changing time zones on air crews and passengers.** R. A. McFarland. *(International Meeting on Aerospace Medicine, Melbourne, Australia, Oct. 30-Nov. 2, 1972.) Aerospace Medicine,* vol. 45, June 1974, p. 648-658. 30 refs.

A brief analysis is presented of the basic physiological rhythms of the body in both man and animals. The findings are then related to air crews and passengers. The specialized studies simulating air transport schedules are then discussed from the point of view of suggested solutions. An example is 'Project Pegasus,' carried out by Christie and associates, on the effects of air travel across nine time zones. Emphasis is then placed on various factors which may influence or accentuate the effects of rapid flights across time zones. The application of in-flight studies are reviewed, and recommendations are made for air crews and passengers. (Author)

**A74-33886 Approach to a reliable program for computer-aided medical diagnosis.** R. E. Birk, L. Endres, J. C. McDonald, L. D. Proctor, J. A. Rinaldo, and C. E. Rupe (Saint John Hospital, Detroit, Mich.). *Aerospace Medicine,* vol. 45, June 1974, p. 659-663. 5 refs.

The weight summation analysis appears to be a reliable computer-aided medical diagnostic method, comparing very favorably with the Bayes theorem program. It must be emphasized that, for either method, the data base is an important governing factor as to the program's reliability. The practical application of these methods in assisting physicians in diagnostic procedures appears to have a potential in increasing the accuracy of medical diagnosis and the saving of a physician's time to be used for the more 'clinical' demands upon him. (Author)

**A74-33887 Period analysis of EEG signals during sleep and post-traumatic coma.** C. S. Lessard, A. Sances, Jr., and S. J. Larson (USAF, Medical Research Laboratory, Wright-Patterson AFB, Ohio; Milwaukee County General Hospital, Milwaukee, Wis.). *Aerospace Medicine,* vol. 45, June 1974, p. 664-668. 10 refs. Grant No. DADA17-71-C-1093.

The purpose of this investigation was to study EEG signal characteristics for classification of sleep stages and identification of EEG patterns for possible prediction in post-traumatic coma. Nocturnal electroencephalographic recordings were collected from normal sleep subjects and closed head injury comatose and drug ingested comatose patients. This pilot study was designed to reduce long-term data on small laboratory digital computers readily available in most hospitals. Conclusions reached from the study are: (1) that visual scoring of sleep into stages may not be essential, since a display of the cyclic EEG pattern appears sufficient for prognosis of coma, and (2) that the scattergrams of delta versus total zero crossings may prove useful in trend analysis of the cerebral state. (Author)

**A74-33888 Comparison of the effectiveness of a conventional presentation vs. a media presentation of naval aerospace**

physiology refresher training. W. F. Cunningham (U.S. Navy, Naval Aviation Schools Command, Pensacola, Fla.). *Aerospace Medicine*, vol. 45, June 1974, p. 671-674. 6 refs.

**A74-34064** **Biomedical science and cardiovascular dynamics.** Edited by G. Juznic (Ljubljana, Univerzitet, Ljubljana, Yugoslavia). Basel, S. Karger AG (Bibliotheca Cardiologica, No. 31), 1973. 329 p. $35.65.

The subjects considered are in the areas of physics, physiology, pharmacology, clinical medicine, and medical practice. The instrumentation accuracy for cardiovascular clinical observations and measurements is considered along with the electrical equalization of electromanometry and phonocardiography systems, progress in transcutaneous aortovelography, and the noninvasive sensing of cardiac, vascular, and pulmonary volume dynamics. Other topics discussed include the noninvasive measurement of the arterial pressure contour in man, the higher dynamic functions of the rabbit heart, the effect of nitroglycerine on the quantitative ballistocardiogram, and high-frequency direct body ballistocardiography. G.R.

**A74-34065** **Hemodynamic stress and relief of the heart.** Edited by G. Juznic (Ljubljana, Univerzitet, Ljubljana, Yugoslavia). Basel, S. Karger AG (Bibliotheca Cardiologica, No. 30), 1973. 195 p. $26.05.

The early diagnosis of arterial atherosclerosis by means of resonance electrosphygmography is considered along with the effects of valve disease on the heart, questions concerning the BASH method, and the transmission characteristics in quantitative ballistocardiography. Other topics discussed include the physiological aspects of circulatory dynamics especially related to ageing as studied by cardiovascular methods, the role of the ballistocardiogram in clinical pharmacology, and cardiovascular dynamics studied by ballistocardiographic and similar mechanical methods. G.R.

**A74-34094** # **Correlative relationships of response patterns between body temperature, sweat rate and sodium concentration in sweat during heat exposure in man.** K. Ohara, H. Sato, and S. Takaba (Nagoya City University, Nagoya, Japan). *Japanese Journal of Physiology*, vol. 24, Feb. 1974, p. 19-34. 22 refs. Research supported by the Ministry of Education of Japan.

**A74-34125** # **A comparison of three maximal treadmill exercise protocols.** V. F. Froelicher, Jr., H. Brammell, G. Davis, I. Noguera, A. Stewart, and M. C. Lancaster (USAF, School of Aerospace Medicine, Brooks AFB, Tex.). *Journal of Applied Physiology*, vol. 36, June 1974, p. 720-725. 16 refs.

The purpose of the reported study was to compare maximal oxygen consumption and other physiological parameters measured during exercise testing and to evaluate their reproducibility using the standard Bruce, Balke, and Taylor protocols. Fifteen volunteers were used in the study. No significant difference was found in the mean maximal heart rates obtained in the three treadmill protocols. However, the Taylor protocol yielded a higher mean maximal oxygen consumption than either the Bruce or Balke protocols. G.R.

**A74-34126** * **Control of skin blood flow, sweating, and heart rate - Role of skin vs. core temperature.** C. R. Wyss, G. L. Brengelmann, J. M. Johnson, L. B. Rowell, and M. Niederberger (Washington, University, Seattle, Wash.). *Journal of Applied Physiology*, vol. 36, June 1974, p. 726-733. 33 refs. Grants No. NIH-HL-09773; No. NIH-RR-37; No. NIH-GM-00260; No. NIH-HL-05889; No. NGR-48-002-082.

A study was conducted to generate quantitative expressions for the influence of core temperature, skin temperature, and the rate of change of skin temperature on sweat rate, skin blood flow, and heart rate. A second goal of the study was to determine whether the use of esophageal temperature rather than the right atrial temperature as a measure of core temperature would lead to different conclusions about the control of measured effector variables. G.R.

**A74-34127** * **Effects of simulated weightlessness on responses of untrained men to +Gz acceleration.** L. B. Jacobson, K. H. Hyatt, and H. Sandler (U.S. Public Health Service Hospital, San Francisco; NASA, Ames Research Center, Moffett Field, Calif.). *Journal of Applied Physiology*, vol. 36, June 1974, p. 745-752. 16 refs.

This study documents bedrest-induced metabolic and physiologic changes in six untrained men exposed, following a two-week period of simulated weightlessness, to possible +Gz acceleration profiles anticipated for Space Shuttle vehicle travel. All subjects demonstrated decreased +Gz tolerance following simulated weightlessness. While only one of six subjects could not tolerate the +Gz profile in the control phase of the study, three of the six could not complete the postbed-rest study. The use of an inflated standard Air Force cutaway G-suit improved +Gz tolerance in all subjects, but two of six subjects still failed to complete the profile. These findings are discussed in reference to the selection of untrained humans for Space Shuttle vehicle travel. (Author)

**A74-34179** **Remote measurement of eye direction allowing subject motion over one cubic foot of space.** J. Merchant, R. Morrissette (Honeywell Radiation Center, Lexington, Mass.), and J. L. Porterfield (USAF, Aerospace Medical Research Laboratories, Wright-Patterson AFB, Ohio). *IEEE Transactions on Biomedical Engineering*, vol. BME-21, July 1974, p. 309-317. USAF-sponsored research.

The remote oculometer is a new instrument for the remote measurement of eye direction and pupil diameter. The electrooptical sensor unit is located several feet from the subject, who is free to move the eye being sensed throughout 1 cu ft of space. The video processing is performed in real time by a standard minicomputer. The oculometer processor (minicomputer) provides automatic calibration and linearization to each subject and can supply the output eye-direction information in the form of either fixation-point coordinates on any specified fixation plane, azimuth and elevation, or direction cosines. The oculometer measures line-of-sight to an accuracy of 1 deg for eye rotation angles, relative to the sensor unit, of from 0 to +30 deg elevation and from -30 to +30 deg azimuth. (Author)

**A74-34279** * # **Analytic model for assessing the thermal performance of scuba divers.** L. D. Montgomery (NASA, Ames Research Center, Moffett Field, Calif.). *Journal of Hydronautics*, vol. 8, July 1974, p. 108-115. 14 refs.

A biothermal model with a physically-controlled subsystem and a dynamically-controlled subsystem is developed to simulate the thermoregulatory system of man under immersed conditions. The model is consistent with experimental data for seminude subjects immersed to neck in cool to temperate water and for 'wet-suited' subjects immersed to neck in cold water. Equations are derived for predicting body temperatures under various dive conditions. V.Z.

**A74-34504** * **Wave transmission characteristics and anisotropy of canine carotid arteries.** W. E. Moritz (Washington, University, Seattle, Wash.) and M. Anliker (Washington, University, Seattle, Wash.; Zürich, Universität; Eidgenössische Technische Hochschule, Zurich, Switzerland). *Journal of Biomechanics*, vol. 7, Mar. 1974, p. 151-154. 12 refs. Grant No. NGL-05-020-223.

A method was developed to generate and record three types of small amplitude waves (pressure, torsion and axial) in the exposed carotid artery of anesthetized dogs. The pressure waves were studied with the aid of miniature pressure transducers; electro-optical tracking units monitored the axial and circumferential surface displacements. Results from 6 dogs are presented in the form of the phase velocities and attenuation of three types of waves. The data demonstrate incompatibility with an isotropic elastic model for the mechanical behavior of the artery. The measured damping appears to be primarily due to the viscoelastic properties of the vessel wall material. (Author)

**A74-34505** # **Angiocardiographic diagnosis of aortic insufficiency in cases of ventricular septal defect associated with partial prolapse of the aortic valve.** R. Plass, W. Münster, S. Ivanov, and U. Stürmer (Humboldt Universität, Berlin, West Germany). *Cardiology*, vol. 58, no. 5, 1973, p. 257-272. 30 refs.

**A74-34515** **A sector scanner for real time two-dimensional echocardiography.** J. M. Griffith and W. L. Henry (NIH, National Heart and Lung Institute, Bethesda, Md.). *Circulation*, vol. 49, June 1974, p. 1147-1152. 21 refs.

Description of a sector scanning system which uses an ultrasonic pulse-echo technique for obtaining two-dimensional real-time echocardiograms. Images are produced in this system at rates of thirty complete sectors (or frames) per second by angling rapidly a single transducer through a 30-degree sector from a fixed spot on the patient's chest. The use of a large-diameter high-sensitivity transducer ensures a sufficient signal strength and an adequate visualization of cardiac structures with real time imaging. Experience with more than 100 patients showed that two-dimensional echocardiograms of diagnostic quality could be obtained by this technique even faster than one-dimensional echocardiograms by current techniques. V.Z.

**A74-34516** **Echocardiographic features of congestive cardiomyopathy compared with normal subjects and patients with coronary artery disease.** B. C. Corya, H. Feigenbaum, S. Rasmussen, and M. J. Black (Marion County General Hospital; Indiana University, Indianapolis, Ind.). *Circulation*, vol. 49, June 1974, p. 1153-1159. 28 refs. Research supported by the Herman C. Krannert Fund and Indiana Heart Association; Grants No. NIH-HL-06308; No. NIH-HL-05749; No. NIH-HL-09815; No. NIH-HL-05363.

**A74-34521** **Remote manipulators as aids in the manned exploration of planetary space (Telemanipulatoren als Hilfsmittel zur Erschiessung der Planetenräume durch den Menschen).** H. Kleinwächter. *(Hermann-Oberth-Gesellschaft, Raumfahrtkongress, 22nd, Feucht, West Germany, Oct. 5, 1973.) Astronautik*, vol. 11, no. 2, 1974, p. 44-49. In German.

Description of a synchronous remote manipulation system consisting of a human operator who controls an anthropomoid machine through a so-called exoskeleton strapped onto the operator's limbs. This exoskeleton is a lightweight articulated system which is fitted to the body of the operator in such a way that it moves together with the bone skeleton of the operator. The movements of the master's exoskeleton are transformed into electrical currents, which are transmitted to the slave, whose limbs are made to imitate the movements of the master by means of electromotor and pneumatic muscles. The most important data transmission system in this connection is a two-eyed stereo TV device. The machine is driven by a low-inertia, iron-free, dc disk rotor motor of harmonic drive gear type. A.B.K.

**A74-34652** **Biochemistry, ultrastructure and physiology of cerebral anoxia, hypoxia and ischemia.** Edited by M. M. Cohen (Rush Medical College, Chicago, Ill.). Basel, S. Karger AG (Monographs in Neural Sciences. Volume 1), 1973. 137 p. $13.75.

Papers reviewing the effects of cerebral oxygen insufficiency on the biochemistry, ultrastructures and physiology of the cerebrum are given. Among the topics covered are biochemical processes related to energy production, alteration of cerebral components by oxygen deficiencies, tolerance to anoxia, agents remedying anoxia effects, experiments on animals and tissue samples, and effects of hypoxia on neural mechanisms.

Individual items are announced in this issue. V.Z.

**A74-34653** **Biochemistry of cerebral anoxia, hypoxia and ischemia.** M. M. Cohen (Rush Medical College, Chicago, Ill.). In: Biochemistry, ultrastructure and physiology of cerebral anoxia, hypoxia and ischemia. Basel, S. Karger AG, 1973, p. 1-49. 156 refs. Grant No. NIH-1-PO1-NB-07463.

Studies concerning the biochemical aspects of cerebral anoxia, hypoxia and ischemia are reviewed, covering glycolysis, tricarboxylic acid cycle metabolism, electron transport, alterations in other cerebral components, tolerance to anoxia, oxygen deficiency in the developing animal, and agents counteracting anoxia effects. The principal conclusions of the studies are summarized as follows: augmentation of glycolysis by increased lactic acid production is the earliest biochemical change under oxygen insufficiency conditions; survival under oxygen deprivation conditions is primarily due to continuing brain stem function; a fetal animal is markedly more resistant to anoxia than an adult; and the deleterious effects of anoxia can be counteracted by agents and therapeutic measures. V.Z.

**A74-34654** **Cerebral ultrastructure in experimental hypoxia and ischemia.** J. F. Hartmann, R. A. Becker, and M. M. Cohen (Rush Medical College, Chicago, Ill.). In: Biochemistry, ultrastructure and physiology of cerebral anoxia, hypoxia and ischemia. Basel, S. Karger AG, 1973, p. 50-64. 25 refs. Grants No. NIH-NB-07463-91-A1; No. NIH-NB-05591.

A review of cerebral ultrastructure studies in experiments with hypoxia and ischemia on intact animals and excised tissues indicates that some consistent results have been obtained regarding the effects of oxygen insufficiency on cerebral ultrastructures. Listed in decreasing order of frequency these effects are swelling of mitochondria, astrocytes and endoplasmic reticulum, Golgi changes, loss and clumping of synaptic vesicles, disruption of myelin, and rarefaction of RNP granules. V.Z.

**A74-34655** **Neurophysiological effects of hypoxia.** J. A. Michael (Rush-Presbyterian-St. Luke's Medical Center, Chicago, Ill.). In: Biochemistry, ultrastructure and physiology of cerebral anoxia, hypoxia and ischemia. Basel, S. Karger AG, 1973, p. 65-121. 216 refs.

The effects of hypoxia on the neuron and neural mechanisms are discussed in an extensive review of literature on the subject. Particular attention is given to the effects of hypoxia on the neural membrane which are noted as ones known much better than other effects. These effects are characterized as the cause of a depolarization which eventually leads to total neural inexcitability. V.Z.

**A74-34802** **What's next in energy absorption of restraint systems.** J. F. Gamble (Pacific Scientific Co., City of Commerce, Calif.). *Society of Automotive Engineers, Business Aircraft Meeting, Wichita, Kan., Apr. 2-5, 1974, Paper 740372.* 4 p. Members, $1.25; nonmembers, $2.00.

A description is presented of developmental history of a rather unique design concept which reduces impact loading of occupants during a crash situation by absorbing a portion of the impact energy in the restraint system. Conventional restraint systems considered consist only of lap belts and shoulder straps. A comparison of an energy absorbing system and a conventional system is considered. Various methods of energy absorption can be incorporated into restraint system components from a simple stainless steel cable to the fairly sophisticated system used in the modified Ma-6 reel. G.R.

**A74-34815** **Space biophysics and cosmic rays.** H. Bücker. In: Lectures on space physics. Volume 1. Düsseldorf, Bertelsmann Universitätsverlag, 1973, p. 287-295.

The principal types of radiation encountered in space and their effect on living matter are discussed. Galactic radiation, the trapped radiation of the Van Allen belts, and solar radiation are treated. The average extraterrestrial dosage of these species is estimated, and fluctuations in the dose level due to special effects are described. J.K.K.

**A74-34816** **Radiobiological considerations of heavy particle beams and high energy radiation.** J. Baarli. In: Lectures on space physics. Volume 1. Düsseldorf, Bertelsmann Universitätsverlag, 1973, p. 297-320. 14 refs.

Radiobiological experiments with heavy ion beams are considered, giving attention to tests involving the radiation exposure of

human kidney cells. The characteristics of normally observed experimental survival curves are mathematically analyzed, taking into account the relation between the doses which produce the same biological effect. Radiobiological problems involving very high energy radiation are investigated along with questions regarding high energy particle beams and beam dosimetry. A number of radiobiological experiments are also discussed. G.R.

**A74-34818** **Radiobiological considerations on space research.** H. Fritz-Niggli and H. Blattmann. In: Lectures on space physics. Volume 1. Düsseldorf, Bertelsmann Universitätsverlag, 1973, p. 331-338.

The peculiar characteristics of the radiobiological mode of action are considered in connection with a study of the effects of cosmic rays on living material. Chemical effects can directly or indirectly lead to ultimate biological radiation damage. The stages of the pathway of reactions are considered along with various parameters influencing the pathway of radiation events. Multicellular reaction mechanisms are discussed and attention is given to experiments conducted with yeast cells. G.R.

**A74-34819** **Biostack experiment on board of Apollo 16 to investigate the biological effects of individual heavy ions of cosmic rays.** H. Bücker. In: Lectures on space physics. Volume 1. 34803 16-29) Düsseldorf, Bertelsmann Universitätsverlag, 1973, p. 339-345. 7 refs.

The radiation damage to biological matter due to exposure to heavy ionizing particles was studied with the biostack apparatus flown on board the Apollo 16 spacecraft. In this experiment, physical track detectors were made to alternate with monolayers of small biological objects. In this way, it was possible to correlate individual particles with the damage that they caused. The incidences and effects of the various particles are listed in tables. J.K.K.

**A74-34820** **Radiobiological space flight experiment.** G. Horneck. In: Lectures on space physics. Volume 1. Düsseldorf, Bertelsmann Universitätsverlag, 1973, p. 347-353. 20 refs.

Space factors affecting the viability of terrestrial resistant living forms are reviewed in the light of results obtained from space-flight-simulating and spacecraft-borne experiments using various microorganisms. Special attention is given to the influence of space flight response to radiation. M.V.E.

**A74-34835** **Annual Scientific Meeting, Washington, D.C., May 6-9, 1974, Preprints.** Meeting sponsored by the Aerospace Medical Association. Washington, D.C., Aerospace Medical Association, 1974. 237 p. Members, $10.00; nonmembers, $15.

Aircraft escape and survival experiences of Navy prisoners of war, parachute opening shock experienced by humans and human analogs, and the effects of personal protective equipment upon the arm-reach capability of Air Force Pilots are among the topics covered in papers concerned with flight safety research. Other areas covered include those of problems associated with the use of sedatives and tranquilizers by aircrews, aerospace medical implications of nonionizing radiation, and the intelligent use of oxygen as a drug. M.V.E.

**A74-34944** **An analysis of the left ventricular response to isometric exercise.** M. A. Quinones, W. H. Gaasch, E. Waisser, H. G. Thiel, and J. K. Alexander (Baylor University; Ben Taub General Hospital, Houston, Tex.). *American Heart Journal*, vol. 88, July 1974, p. 29-36. 17 refs.

Routine diagnostic cardiac catheterization was performed at rest and during isometric exercise on a group of 29 cardiac patients in the postabsorptive state following premedication with 10 mg of intramuscular Diazepam. The sustained isometric exercise was performed with a hand-grip dynamometer at 25% of maximum voluntary contraction. Ten patients responded to exercise with a marked increase in left ventricular end-diagnostic pressure but little change in left ventricular stroke work while five patients showed only a minor change in the former and no improvement in the latter. Normal responses to exercise were observed in nine patients with normal resting hemodynamics. V.Z.

**A74-35087** # **Effect of combined UHF and gamma radiation on hemopoiesis (Vliianie kompleksnogo SVCh i gamma-obluchenila na krovetvorenie).** V. S. Tikhonchuk. *Kosmicheskie Issledovaniia*, vol. 12, May-June 1974, p. 478-482. 9 refs. In Russian.

Laboratory mice exposed to daily doses of UHF radiation for a month and then subjected to gamma radiation showed a greater sensitivity to the ionizing radiation than did mice which had received no UHF treatment. It is concluded that UHF radiation is synergistic with ionizing radiation, acting to diminish the recuperative powers of the hemopoietic system. J.K.K.

# STAR ENTRIES

**N74-25627*#** Webb Associates, Yellow Springs, Ohio.
**CYCLES IN METABOLISM AND HEAT LOSS**
James F. Annis, Samuel J. Troutman, and Paul Webb [1974] 63 p refs
(Contract NAS9-12683)
(NASA-CR-134293) Avail: NTIS HC $6.25 CSCL 06P

Using calorimetric techniques, subjects' metabolism, thermoregulation, and body temperatures were monitored continuously for 24-hour days, using three types of experimental routines. A water cooling garment (WCG) was used for direct calorimetry, while partitional calorimetry was used to establish a non-suited comparison for one of the routines. In this replicated routine, called the quiet day, the subjects were sedentary throughout the daytime hours and slept normally at night. Results indicate that the WCG may act to reduce 24-hour total oxygen consumption (VO2) or heat production, possibly due to the lowered energy cost of thermoregulation. Author

**N74-25628*#** Techtran Corp., Glen Burnie, Md.
**BLOOD SUPPLY CHANGE IN THE AREA OF THE LOWER EXTREMITIES AS RESULT OF INACTIVITY AND ITS CONTROL BY TRASYLOL**
P. Pauschinger, P. Matis, and H. Rieckert Washington NASA May 1974 8 p refs Transl. into ENGLISH from Medizinische Welt (Stuttgart), no. 51, Dec. 1968 p 2822-2824
(Contract NASw-2485)
(NASA-TT-F-15599) Avail: NTIS HC $4.00 CSCL 06S

A clinical study was made of blood circulation deceleration in the lower extremities in the case of lengthy immobilization. Data show that inactivity results in a decelerating increase in blood supply, increase in input into the venous storage corresponding to loss of reestablishing force of the peripheral venous system in the direction of a decrease in the peripheral reflux requirement, and an increased susceptibility to edema. Experimental tests show that, 400,000 E Trasylol i.v. effectively controls all the above symptoms. Author

**N74-25629*#** Linguistic Systems, Inc., Cambridge, Mass.
**METABOLISM OF LIPIDS AND GLUCIDES IN THE WHITE RAT DURING TWO TYPES OF STRESS: FORCED IMMOBILIZATION AND HEAT VARIATIONS**
M. Prioux-Guyonneau and L. Buchel Washington NASA Jun. 1974 11 p refs Transl. into ENGLISH from Compt. Rend. Soc. Biol. (Paris), v. 166, 17 Oct. 1972 p 1277-1283
(Contract NASw-2482)
(NASA-TT-F-15605) Avail: NTIS HC $4.00 CSCL 06P

The effects of restraint and sudden variation of environmental temperature on the lipid and glucide metabolism of rats were studied. In the free rat, cooling caused an increase in plasma-free fatty acid content and hyperglycemia. With animals kept in restraint and at normal temperature, a decrease occurred in the plasma-free fatty acid content and an increase occurred in glycemia. A combination of the two stresses did not change the plasma-free fatty acid content, but induced pronounced hypoglycemia and hypothermia. Author

**N74-25630*#** Scientific Translation Service, Santa Barbara, Calif.
**BLOOD TEMPERATURE AND HEAT REGULATION**
F. H. Koenig Washington NASA Jun. 1974 26 p refs Transl. into ENGLISH from Arch. Ges. Physiol. (Berlin), v. 246, 1943 p 693-708
(Contract NASw-2483)
(NASA-TT-F-15630) Avail: NTIS HC $4.75 CSCL 06P

Mechanisms of human thermoregulation are considered. For purposes of the study the body was divided into a core and shell, each with its heat content, and with the shell serving as a cooler for the core. Heat can be transferred between core and shell in either direction. One major effect is that the difference between skin temperature and environmental temperature is reduced, preventing excessive heat flow in or out. Author

**N74-25631*#** Linguistic Systems, Inc., Cambridge, Mass.
**CONTRIBUTION ON THE THERAPY OF SYSTEMIC LUPUS ERYTHEMATOSUS WITH A COMBINATION OF CYCLOPHOSPHAMIDE (ENDOXAN) AND CORTICOSTEROIDS**
E. Muhl and A. Adorf Washington NASA Jun. 1974 9 p refs Transl. into ENGLISH from Med. Welt (Stuttgart), v. 25, no. 9, 1974 p 366-367
(Contract NASw-2482)
(NASA-TT-F-15657) Avail: NTIS HC $4.00 CSCL 06E

The course of a systemic Lupus erythematosus is described of a 27-year old female in which, after negative results with the methods of treatment customarily used up to now, a combined therapy of corticosteroids with a cytostat (Endozan) brought a decisive turn in the course of the disease and a hardly-expected results. The period of observation of this case extended over ten months, with initially 3 months of stationary treatment and, thereafter, 7 months of ambulatory treatment. Author

**N74-25632*#** Kanner (Leo) Associates, Redwood City, Calif.
**SPINAL INJURY AFTER EJECTION**
R. Auffret and R. P. Delahaye Washington NASA Jun. 1974 88 p refs Transl. into ENGLISH from the French report
(Contract NASw-2481)
(NASA-TT-F-15702) Avail: NTIS HC $7.50 CSCL 06P

Ejection statistics obtained from the air forces of seven nations, are analyzed, including figures on the incidence of death, the incidence of fracture and multiple fractures, and preferential fracture sites. A basic review of the anatomy of the spine is followed by a discussion of the mechanics of spinal fracture. It is difficult to determine the stage of ejection at which fractures are most likely to occur -- expulsion from the aircraft or landing -- but the position of the pilot at the moment of ejection is considered to be of prime importance. A study of X-ray procedure deals in detail with the appearance of spinal fractures of varying degree and the characteristics distinguishing them from congenital abnormalities or the effects of disease. Treatment procedure is reviewed and the systematic use of X-ray examination is recommended. Finally, current standards for aircrew fitness are discussed, with the conclusion that in general these criteria are excessively strict. Author

**N74-25633#** Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
**PROBLEM OF CORONARY INSUFFICIENCY IN PATIENTS SUFFERING FROM VIBRATION DISEASE CAUSED BY THE EFFECT OF GENERAL VIBRATION**
A. G. Genkin 4 Feb. 1974 8 p refs Transl. into ENGLISH from Uch. Zap. Nauchno Issled. Inst. Gigieny (Moscow), 1968 p 46-48
(AD-775119; FTD-HT-23-1028-74) Avail: NTIS CSCL 06/19

From the first consultation with patients suffering from vibration disease one is struck by the number of complaints which might be associated with certain disturbances in the functional state of the cardiovascular system. Many molders complain of tachycardia, a sensation of interruption in the functioning of the heart, pains in the vicinity of the heart, and pains of an angiospastic nature in the arms and legs. The authors analyzed the complaints of 204 molders suffering from vibration disease caused by the effect of general vibration. GRA

**N74-25634#** Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
**SPACE LEVKOI**
Ya. Golovanov 25 Mar. 1974 7 p Transl. into ENGLISH from Komsomolskaya Pravda (USSR), no. 299, Dec. 1973 p 2
(AD-776944; FTD-HT-23-1531-74) Avail: NTIS CSCL 22/1

The flights of Soviet and American astronauts made it possible to note certain general regularities in well-being during the so-called transition period during the first days of flight when

the organism is becoming adjusted to the conditions of weightlessness. Gravity is absent, the heart does not have to expend energy for raising the blood from the lower parts of the body to the upper. But the heart still doesn't know about this and it continues to pump blood as it pumped it on earth. There is a redistribution of blood. An excess of it, making up around eleven percent, flows into the chest cavity and into the brain. In some this redistribution doesn't have any effect on efficiency. Others experience a heaviness in the head, they become motion sick, and naturally it is more difficult for them to work in space.
GRA

**N74-25635#** Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
**CONVERSATION WITH SPACE**
B. Knonovalov 26 Mar. 1974 8 p Transl. into ENGLISH from Izv. (Moscow), no. 30, 26 Dec. 1973 p 3
(AD-776933; FTD-HT-23-1532-74) Avail: NTIS CSCL 22/1
Experiments being carried out on the effects of weightlessness on plants and animals are described on the Soyuz 13 flight.
GRA

**N74-25636*#** Howard Univ., Washington, D.C.
**SUMMER INSTITUTE IN BIOMEDICAL ENGINEERING, 1973 Final Report**
Eugene M. DeLoatch and Anna J. Coble Feb. 1974 107 p refs
(Grant NGT-09-011-051)
(NASA-CR-138462; X-207-74-103) Avail: NTIS HC $8.50 CSCL 06B
Bioengineering of medical equipment is detailed. Equipment described includes: an environmental control system for a surgical suite; surface potential mapping for an electrode system; the use of speech-modulated-white-noise to differentiate hearers and feelers among the profoundly deaf; the design of an automatic weight scale for an isolette; and an internal tibial torsion correction study. Graphs and charts are included with design specifications of this equipment.
S.K.W.

**N74-25637*#** Industrial Ecology, Inc., Los Angeles, Calif.
**THE DESIGN AND FABRICATION OF A PROTOTYPE TRASH COMPACTING UNIT Final Report**
1 Apr. 1973 33 p
(Contract NAS1-11031)
(NASA-CR-134292) Avail: NTIS HC $4.75 CSCL 06I
A prototype trash compactor, that is compatible with the anticipated requirements of future long-term space missions, is described. Preliminary problem definition studies were conducted to identify typical types and quantities of waste materials to be expected from a typical mission. Bench-scale compaction tests were then conducted on typical waste materials to determine force/compaction curves. These data were used to design a boilerplate compactor that was fabricated to prove the feasibility of the basic design concept. A final design was then prepared from which the deliverable unit was fabricated. Design concepts are presented for suggested further development of the compactor, including a version that is capable of handling wet biodegradable wastes.
Author

**N74-25638#** Forschungsinstitut fuer Anthropotechnik, Meckenheim (West Germany).
**A CONCEPT OF OPERATOR WORKLOAD IN MANUAL VEHICLE OPERATIONS**
D. W. Jahns Dec. 1973 48 p refs
(FB-14) Avail: NTIS HC $5.50; Forschungsinst. fuer Anthropotech., Meckenheim, West Ger. 10 DM
A conceptual structure (or model) of operator workload relying on the data available in workload literature is presented. The interrelationships among various workload assessment techniques are pointed out. It is concluded that each of the aspects of workload: input load, operator effort, and work result, must be quantitatively scaled before the complex problem of task interference and crew system design criteria in vehicle operations can be treated comprehensibly.
Author (ESRO)

**N74-25639#** Defence Research Information Centre, Orpington (England).
**PLASMA ARC WELDING AND PLASMA ARC CUTTING SEEN FROM THE VIEWPOINT OF INDUSTRIAL HEALTH**
Hans Spelbrink Jan. 1974 11 p refs Transl. into ENGLISH from Zbl. Arbeitsmed., 1972/1973 p 76-80
(DRIC-Trans-3453; BR30727) Avail: NTIS HC $4.00
The changing concept of plasma to thermic plasma as seen by the natural scientist is explained. Basic technical and physical facts of plasma arc welding and cutting are briefly described so that possible health risks may be understood. Potential areas of technical application (temperatures up to 30,000 C) in thermochemistry, space technology, and surface welding are mentioned. Health risks which may be caused by excessive noise, ultraviolet radiation, and fumes, smoke, and gas formation are indicated various points are summarized in table form, presenting a synopsis of preventative measures for both outdoor and indoor work.
Author (ESRO)

**N74-25640#** Institute for Perception RVO-TNO, Soesterberg (Netherlands).
**THE ROLE OF STEREOSCOPIC VISION IN GROUND TO GROUND TARGET ACQUISITION**
W. A. Lotens and J. Walraven 1974 20 p refs
(Contract A72/KL/075)
(IZF-1974-2; TDCK-64149) Avail: NTIS HC $4.00
The role of stereoscopic vision in target detection was investigated at three light levels, varying from broad daylight to deep twilight. Three viewing conditions - binocular, biocular and monocular vision - were compared, using color slides of natural scenes with and without targets (camouflaged persons). The detection scores, expressed in a criterion free measure, show that under all three light levels tested, target detection is significantly better with stereoscopic vision than with biocular or monocular vision. Furthermore, stereoscopy did not degrade with decreasing light level in the luminance range used, thus indicating that stereoscopic vision is particularly advantageous in night vision.
Author (ESRO)

**N74-25641#** Institute for Perception RVO-TNO, Soesterberg (Netherlands).
**ON THE TRAFFIC BEHAVIOR OF A MAN WITH HOMONYMOUS HEMIANOPSIA OF THE RIGHT HALF OF THE VISUAL FIELD [OVER HET VERKEERSGEDRAG VAN EEN MAN MET UITVAL VAN DE RECHTER HELFT VAN HET GEZICHTSVELD AAN BEIDE OGEN]**
J. J. Vos 1974 19 p refs In DUTCH: ENGLSIH summary
(IZF-1974-3; TDCK-63804) Avail: NTIS HC $4.00
The functional handicap of a man with right sided homonymous hemianopsia driving an automobile is described. The handicap was investigated by a simulation experiment in the laboratory and with a real traffic task in an instrumented car. This is concluded that great compensation for this defect is shown.
Author (ESRO)

**N74-25642#** Adviesbureau der Genie, The Hague (Netherlands).
**CALCULATION OF DOSES OF NUCLEAR RADIATION CAUSED BY FALLOUT**
W. VanEngelenburg Dec. 1973 36 p refs
(Rept-239; TDCK-63914) Avail: NTIS HC $5.00
Mellegers are used to calculate the dose of radioactive radiation received from fallout in the course of time under given conditions. Graphs are supplied. It was found that in an idealized fallout pattern 150 dose curves coincide with 150 dose rate curves.
Author (ESRO)

**N74-25643#** Instrument Flight Center, Randolph AFB, Tex.
**SUMMARY OF THE ALLOCATION OF CONTROL TASKS PROGRAM Final Report**
Gerald C. Armstrong 7 Jan. 1974 18 p refs
(IPIS Proj. SP-74-1)
(AD-775696; IFC-TR-74-1) Avail: NTIS CSCL 05/9
The study of control-sharing was accomplished in five major steps. The first step addressed the feasibility of the shared

control concept, wherein, one pilot flew pitch and power while the other controlled roll and yaw. The second step investigated the problem of what might be expected should the autopilot fail completely while employing shared control. The third step involved a study to determine the role of the copilot when autopilot failures occur. The fourth step examined the specific control responsibilities and control tasks for each pilot. The fifth step was a study to determine which control-sharing combinations produce precision through pilot unburdening and to define which crew duties provide control continuity when an AFCS failure occurs. GRA

**N74-25644#** Instrument Flight Center, Randolph AFB, Tex.
**PRECISION AND UNBURDENING STUDY Final Report**
Donald L. Carmack Dec. 1973 33 p
(AD-775699; IFC-TR-73-10) Avail: NTIS CSCL 05/9

The study was conducted to investigate pilot task allocations in conjunction with Automatic Flight Control Systems (AFCS) failure modes to identify crew procedures that provide greatest potential for performance and produce effective pilot unburdening. A series of six precision instrument approach sequences were flown to landings and go-arounds. The sequences contained twenty-five combinations of control conditions and crew procedures for the pilots to determine which combinations provided the greatest precision with the least burdening. During normal AFCS operation, the subject pilots agreed that the pilot should be assigned systems monitor and visual transition tasks and the copilot should be assigned the flight path monitor task. The copilot being heads-down, should be responsible for go-around execution. All pilots agreed that Force Wheel Steering was desirable for control inputs on final. All pilots felt that the task which allocated control of pitch, bank, power, and communications to one pilot during both manual and semiautomatic approaches was unacceptable. They unanimously expressed a desire for shared control when complete uncoupling or AFCS failure occurred. (Modified author abstract) GRA

**N74-25645#** Army Aeromedical Research Lab., Fort Rucker, Ala.
**INSTRUMENT FLIGHT PREFERENCE AND FIELD DEPENDENCE**
Eric R. George and Mark A. Hofmann Jan. 1974 38 p refs
(DA Proj. 3A0-62110-A-819)
(AD-776373; USAARL-74-8) Avail: NTIS CSCL 05/10

Research is reported on the possible relationship between field dependence-independence, as measured by the rod and frame test (RFT), and aviator attitudes regarding IFR flight. The degree of aviator preference for actual instrument flight, determined by questionnaires and personal interviews, served as the basis for division of an aviator sample of 43 pilots into high and low preference groups. These groups were examined relative to each of the three field dependency measures derived from RFT performance. In addition, demographic data of both subject groups were reduced and examined. (Modified author abstract) GRA

**N74-25646#** Modern Army Selected Systems Test Evaluation and Review, Fort Hood, Tex.
**PERSONNEL HOMING SYSTEM TEST REPORT ANALYSIS Final Analysis Report**
Morris G. Strickland 20 Mar. 1974 52 p refs
(AD-776935; MASSTER-TEST-1066) Avail: NTIS CSCL 17/3

The test was conducted to determine, through use of the Motorola prototype, if a personnel homing system (PHS) has significant military potential and to obtain insight into the desirable features of a PHS for the purpose of assembling parachutists or other forces in overt and covert operation or for alternate usages. Because of the technical difficulties of the PHS, it should not be considered for further testing until shortcomings noted in the test report analysis are corrected. Author (GRA)

**N74-26526*#** Southwest Research Inst., San Antonio, Tex.
**SOUTHWEST RESEARCH INSTITUTE ASSISTANCE TO NASA IN BIOMEDICAL AREAS OF THE TECHNOLOGY UTILIZATION PROGRAM Final Report, 25 Aug. 1972 - 15 Nov. 1973**
David F. Culclasure, John L. Sigmon, and Jean M. Carter 5 Nov. 1973 297 p refs
(Contract NASw-1867; SwRI Proj. 13-2538)
(NASA-CR-138502) Avail: NTIS HC $17.00 CSCL 06C

The activities are reported of the NASA Biomedical Applications Team at Southwest Research Institute between 25 August, 1972 and 15 November, 1973. The program background and methodology are discussed along with the technology applications, and biomedical community impacts. F.O.S.

**N74-26527#** Joint Publications Research Service, Arlington, Va.
**CURRENT PROBLEMS IN SPACE BIOLOGY AND MEDICINE**
14 Jul. 1972 162 p Transl. into ENGLISH of the publ. "Aktualnyye Voprosy Kosmicheskov Biologii i Meditsiny" Moscow, 1971
(JPRS-56499) Avail: NTIS HC $11.25

A collection of articles devoted to current research conducted in space biology and medicine using cosmonaut, animal, and plant life on the Soyuz spaceship are presented. Special attention was given to the function of body organs and physiological responses during space flight stress.

**N74-26528** Joint Publications Research Service, Arlington, Va.
**PULMONARY VOLUMES AND UNIFORMITY OF VENTILATION OF TWO COSMONAUTS MAKING AN 18 DAY SPACE FLIGHT**
V. A. Andretsov and V. A. Kiryanov *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 1-2 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 6-7

Pulmonary volumes and the uniformity of ventilation were studied by the open system method based on the expulsion of nitrogen from the lungs when breathing pure oxygen. The investigations were made in the mornings, while fasting, prior to onset of the 18-day flight, and on the fourth and eleventh days after its termination. In order to exclude the influence of terrestrial gravitation on blood redistribution in the body, the investigations were made in a water medium at the time of body immersion up to the neck level. All the data were reduced to BTPS. Author

**N74-26529** Joint Publications Research Service, Arlington, Va.
**QUANTITATIVE EVALUATION OF PHYSIOLOGIC INDICES OF COSMONAUTS DURING FLIGHT OF THE SOYUZ-6 - SOYUZ-8 SPACESHIPS**
L. V. Antonenko, A. A. Butusov, V. A. Dzerzhanovskaya, A. D. Yegorov, N. A. Ivashkina, G. G. Ignatova, V. R. Lyamin, A. P. Polyakova, and I. B. Svistunov *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 3-5 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 7-9

In conducting medical monitoring an evaluation of the health of cosmonauts during spaceflight is made on the basis of information received during radio conversations and television contacts, by an analysis of the registered physiologic parameters and the microclimatic parameters in the manned compartments, and by conducting medical self- and mutual-monitoring. In the process of decoding the physiologic parameters, the frequency of cardiac contractions and the respiration rate were ascertained, and the principal indices of the electrocardiogram and seismocardiogram were measured. The principal objectives of the quantitative evaluation and the statistical analysis of physiologic data are defined. Author

**N74-26530** Joint Publications Research Service, Arlington, Va.
**SOME RESULTS OF USING DISPERSION ANALYSIS FOR EVALUATING THE PHYSIOLOGIC REACTIONS OF COSMONAUTS DURING FLIGHT OF THE SOYUZ-3, SOYUZ-4, AND SOYUZ-5 SPACESHIPS**

V. I. Antonova, A. A. Butusov, V. A. Dzerzhanovskaya, A. D. Yegovor, N. A. Ivashkina, G. G. Ignatova, V. R. Lyamin, A. P. Polyakova, and I. B. Svistunov *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 6-8 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 9-11

During the space flight of the Soyuz-3, Soyuz-4, and Soyuz-5 ships, radiotelemetric systems were used in registering such physiologic parameters as the electrocardiogram (ECG), seismocardiogram (SCG), and pneumogram (PG). In processing this information it was possible to determine the frequency of cardiac contractions and the respiration rate, and the principal ECG and SCG indices for each cosmonaut were measured. The collected data were grouped in accordance with the stages in training and conducting space flight. Author

**N74-26531** Joint Publications Research Service, Arlington, Va.
**STUDY OF CHOLESTEROL METABOLISM IN DOGS EXPOSED TO THREE YEAR CHRONIC GAMMA IRRADIATION**
D. B. Antipenko and A. A. Akhunov *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 9-11 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 12-14

An investigation was undertaken to determine the effect of chronic irradiation over a three-year period on the cholesterol content in the serum of dogs. Observations were made on 30 male dogs who were irradiated daily for 22 hours using a Co-60 gamma irradiation source. The results indicate that chronic irradiation made it possible to detect definite impairments in the cholesterol content in the blood serum of dogs. Author

**N74-26532** Joint Publications Research Service, Arlington, Va.
**EXPERIENCE IN CONSTRUCTING A SYSTEM FOR THE AUTOMATIC PROCESSING OF PHYSIOLOGIC INFORMATION**
O. N. Apanasyuk, I. S. Shadrintsev, and A. A. Ignatov *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 12-14 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 16-19

Some results are presented of the practical application of the basic principles involved in constructing a system for the automated processing of physiological information (APPI) based on an M220-A computer. In addition to this computer, the APPI system includes a device for coupling the information sources to the computer at the input and for coupling the computer at the output with devices for the printout and representation of the processed information. Also included devices for the preliminary processing of physiologic signals (PPD) ensuring the compression of information prior to computer input or input into a magnetic recorder. Author

**N74-26533** Joint Publications Research Service, Arlington, Va.
**EFFECT OF ACCELERATIONS, PROLONGED HYPOKINESIA AND THEIR TOTAL EFFECT OF TOLERANCE TO A PHYSICAL LOAD TEST**
O. I. Boykova and T. V. Benevolenskaya *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 15-16 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 24-25

The objective was an investigation of a number of factors simulating spaceflight factors on tolerance to a physical load on the basis of EKG data. Tests were conducted on a bicycle-type ergometer a day before and a day after exposure to accelerations, 120-day clinostatic hypokinesia, and the combined effect of peak accelerations and 62-day hypokinesia. The intensity of the load was 500 kg.m/min and the working time was eight minutes. The EKG was registered when conducting the test. Forty clinically healthy males in the age group 23 to 45 years were studied, and the results are presented. Author

**N74-26534** Joint Publications Research Service, Arlington, Va.
**COLICINOGENIC CHARACTERISTICS OF ESCHERICHIA ISOLATED FROM HUMAN SUBJECTS DURING CONFINEMENT IN AN ISOLATION CHAMBER**
M. P. Bragina *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 25-26 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 17-18

A total of 540 cultures of coliform bacteria isolated from three subjects confined for a period of one month in an isolation chamber were investigated for ascertaining colicinogenic activity. The investigations revealed that colicinogenic enteric bacteria were detected prior to beginning of the experiment in all three subjects. During the experiment changes were observed in the dynamics of appearance of Escherichia with colicinogenic activity. This was expressed in an increase (subject Ch-v) or decrease (G-v and M-o) in the number of colicinogenic cultures. Individual differences were also in the quantitative content of colicinogenic strains in the subjects after the experiment. Author

**N74-26535** Joint Publications Research Service, Arlington, Va.
**EFFECT OF 120-DAY HYPOKINESIA ON HUMAN CHROMOSOMES**
N. N. Bobkova and L. P. Grinio *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 19-20 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 28-29

The chromosomes of four clinically healthy males in the 23 to 30 age group were studied in a culture of leukocytes of the peripheral blood. Chromosomal aberrations were determined in accordance with generally accepted practices. An analysis of the chromosomes in subjects prior to hypokinesia revealed that chromatid and chromosomal aberrations were observed, but the types of impairments and their number did not exceed the limits of physiological normalcy. After hypokinesia, the relative number of chromosomal impairments did not exceed the limits of variation of spontaneous aberrations. It was concluded that no cytogenetic effect in human subjects accurred during the 120-day hypokinesia experiment. Author

**N74-26536** Joint Publications Research Service, Arlington, Va.
**CHANGES IN THE MORPHOLOGICAL COMPOSITION OF THE BLOOD AND BONE MARROW DURING HYPOKINESIA AND PRESSURE CHAMBER TRAINING**
I. I. Britvan and M. A. Dotsenko *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 21-22 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 32-33

A study was made on common male rats to determine the effect of preliminary adaptation to hypoxic hypoxia on tolerance of the hypokinetic effect. Data on the morphological composition of the peripheral blood and bone marrow were used in the experiment. Stepped acclimatization to hypoxic hypoxia was accomplished by ascent of the animals in a pressure chamber for 10 days each to altitudes of 3,000 5,000, and 7,000 m. Thirty-day hypokinesia was created by placing them in special hypokinetic cages. The rats were divided into three groups. The first group underwent preliminary acclimatization to hypoxic hypoxia and were then subjected to hypokinesia; the second group were exposed to 30-day hypokinesia without preliminary acclimatization; the third group were control animals. It was found that preliminary adaptation to hypoxic hypoxia probably smooths out changes in the morphological composition of the blood and bone marrow caused by the influence of 30-day hypokinesia. However, the overall picture of changes in the cell composition, characterizing the hypokinetic effect, remains.
Author

**N74-26537** Joint Publications Research Service, Arlington, Va.
**PHYSIOLOGIC REACTIONS OF COSMONAUTS REGISTERED DURING FLIGHT OF THE SOYUZ-9 SPACESHIP**
A. A. Butusov, A. D. Yegorov, V. R. Lyamin, A. P. Polyakova,

and I. B. Svistunov *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 23-25 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 36-38

An assessment in made of the medical data obtained during the 18-day flight of Soyuz-9. The reactions of the circulatory system to a special functional test with a carefully measured standard physical load were registered, and an important place was given to medical self- and mutual monitoring carried out by the cosmonauts during the flight. Comparisons are drawn of the effect of various space flight factors on cardiac contractions, the dynamics of respiration rates, and arterial pressure. An analysis of the physiological reactions indicated that the cosmonauts remained in good health and achieved an adequate performance level. Author

**N74-26538** Joint Publications Research Service, Arlington, Va.
**CHANGE IN SOME SEISMOCARDIOGRAPHIC INDICES DURING 120-DAY HYPOKINESIA**
V. A. Boldov *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 26-27 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 49-50

The seismocardiography (SCG) method was used to obtain data on 10 healthy males durning a 120-day hypokinesia experiment. The subjects, from 22 to 46 years of age, were divided into three groups. The first was the control group; the second group was given pituitrin and DOSCA; and the third received nerabol. The SCG was studied every 10 days at the same time of day. The results show that 120-day hypokinesia causes a change in myocardial contractability which has a phase character. However, it was found that nerabol decreases these changes. Author

**N74-26539** Joint Publications Research Service, Arlington, Va.
**EVALUATING THE EFFECT OF ATMOSPHERIC PURIFICATION AND REGENERATION SYSTEMS ON THE DEGREE OF CONTAMINATION OF THE ATMOSPHERE BY MICROBES IN TIGHTLY SEALED SPACES**
A. N. Viktorov *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 28-29 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 57-58

Summary data presented on the results of comparative of air purification and regeneration systems. It was found that a system employing silica gel and synthetic zeolites maintained the microbial contamination of the atmosphere at a lower level than a system based on the use of peroxide compounds. Author

**N74-26540#** Joint Publications Research Service, Arlington, Va.
**ROLE OF THE ATMOSPHERE AS A FACTOR ON TRANSFER OF INFECTION DURING PROLONGED ISOLATION OF HUMAN SUBJECTS IN SEALED ROOMS**
A. N. Viktorov *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 30 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 61

Experimental results are summarized to show that during the prolonged isolation of human subjects in a tightly sealed room there is a considerable increase in the role played by the atmosphere in transfer of infectious agents. Author

**N74-26541** Joint Publications Research Service, Arlington, Va.
**STUDY OF RENAL FUNCTIONING IN HEALTHY SUBJECTS USING THE RADIOISOTOPIC RENOGRAPHY METHOD DURING A 120-DAY PERIOD OF EXPERIMENTAL HYPOKINESIA**
A. I. Grigoryev *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 31-32 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 85-86

Radioisotopic renography was carried out when the subjects were lying on their stomachs, twice during the background and restoration periods, and five times during the period of hypokinesia. The investigation was made using a gamma radiometric apparatus. The level radioactive radiation in the blood and in the kidneys was registered using a six-channel potentiometer. Three curves were registered: blood clearance, and separate renograms of the right and left kidneys. Many indices of water-mineral metabolism and kidney function were also determined. A definite interrelationship was found between changes in water-electrolyte metabolism, glomerular filtration rate, renal plasma flow, and data from a renographic investigation. During some experimental periods, circulation in the kidneys was the decisive factor in change in the rate of isotope absorption and evacuation; in others it was the secretory capacity of cells in the renal tubes. Author

**N74-26543** Joint Publications Research Service, Arlington, Va.
**DYNAMICS OF HUMAN CARDIAC SINUS RHYTHM IN EXPERIMENTS WITH INVERSION OF THE WORK AND REST SCHEDULE**
Ye. I. Gavrikov *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 40-41 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 97-98

The collected data indicate that a study of cardiac sinus rhythm can be used as a criterion for evaluating the rate and nature of human adaptation to inversion of the work and rest schedule. It is evident that individuals retaining more slowly with a predominance of vagotonic reactions during this period. Individuals with predominantly sympathicotonic reactions, that is, more labile individuals, restructure more rapidly and, subjectively, the restructuring for them transpires more easily. The research data make it possible to recommend individuals with the first type of reaction to prolonged sleeplessness for work requiring the assimilation of different new work and rest schedules. Author

**N74-26544** Joint Publications Research Service, Arlington, Va.
**UTILIZATION OF THE WASTES IN A BIOENGINEERING COMPLEX IN A LIFE SUPPORT SYSTEM**
T. S. Guryeva, N. A. Markova, and L. M. Krasotchenko *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 42-43 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 102-103

As the waste of higher plants contain a considerable quantity of mineral elements, a method was developed for extracting them without oxygen expenditures. The proposed method makes it possible to ensure return of up to 30% of the mineral elements to the closed cycle of the life support system. Author

**N74-26546** Joint Publications Research Service, Arlington, Va.
**EFFECT OF NARCOTICS ON ANIMAL BODY REACTIVITY DURING HYPOKINESIA**
L. Ya. Kolemeyeva and M. A. Seydametov *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 47-48 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 126-127

The influence of drugs on body reactivity in animals during hypoxia of different durations was investigated. Classical narcotics which have a predominant effect on different parts of the nervous system - hexanal, chloral hydrate, and urethane - were used. The experiments were made on white male rats. Results show: (1) an increased reactivity occured in experimental rats exposed to chloral hydrate at all times during the experiment and a decrease in reactivity to urethane. (2) Under the influence of hexanal there was an increase in reactivity on the first, thirtieth, and sixtieth days of hypokinesia and a decrease in reactivity during the remaining times. (3) In experimental animals

sleep occurred later after administration of the narcotics and was less prolonged than the control rats. Author

**N74-26547** Joint Publications Research Service, Arlington, Va.
**RESPONSE OF THE ANIMAL BODY TO CENTRAL NERVOUS SYSTEM STIMULANTS DURING HYPOKINESIA**
L. Ya. Kolemeyeva *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 49-50 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 127-128

A study was made of central nervous system stimulants with a predominant effect on different parts of the central system. The stimulants used were strychnine, phenamine, and caffeine. Change in body response of while rats to injections of the stimulants was evaluated from the time on onset of the following reactions: in the case of strychnine injection from onset of adynamia. Data show that during hypokinesia there is a decrease in body response of the animals to strychnine and phenamine and an increase in body response to caffeine. Author

**N74-26548** Joint Publications Research Service, Arlington, Va.
**DIET DURING A YEARLONG MEDICAL ENGINEERING EXPERIMENT**
A. N. Kozlova and G. N. Savelyeva *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 51-52 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 147-149

A physiologic-biochemical evaluation was made of an experimental diet designed for a yearlong medical engineering experiment. The following basic requirements were considered. (1) a constancy of good taste qualities and the external appearance of the foods, (2) adequancy of the foods for the anticipated physiologic requirements with retention of performance and human health, (3) a high assimilability of food products, (4) minimum weight and volume of the ration, and (5) prolonged (not less than a year) preservability of the foods. Results indicate that there is a definite possibility of formulating a prolonged human diet based on foods rehydrated from a dehydrated state. Author

**N74-26549** Joint Publications Research Service, Arlington, Va.
**EFFECT OF 120-DAY HYPOKINESIA AND SOME PHARMACOLOGICALLY ACTIVE SUBSTANCES ON THE METABOLIC INDICES OF VITAMINS E, C AND B6**
Ye. V. Kolchin *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 53-55 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 152-154

A study was made of the influence of 120 day hypokinesia and a combination of hypokinesia and administration of water-mineral and protein controlling pituitrin, DOCSA, and nerobal on the metabolic indices of vitamins E, C, and B 6. The experiment was conducted on healthy males distributed in three groups: group one for studying the effect of hypokinesia, group two for studying the joint effect of hypokinesia and pituitrin (and later DOCSA) on water-mineral metabolism, and group three for studying the joint effect of hypokenesia and nerobal on protein metabolism. The results show that 120 day hypokinesia does not exert an appreciable influence on the metabolism of vitamins C and B 6 in the first group. Injections of DOCSA in the second group led to a decrease in the excretion of vitamin C in the urine, whereas the administration of nerobal in the third group led to a decrease in the excretion of 4-pyridoxynic acid. Author

**N74-26550** Joint Publications Research Service, Arlington, Va.
**CONSTRUCTING MEDICAL MONITORING EQUIPMENT FOR TRANSMITTING DATA THROUGH A COMMUNICATION CHANNEL WITH LIMITED CAPACITY**
V. I. Kozharinov and N. V. Rozov *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 56-60 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 156-160

Procedures and equipment for compressing and transmitting physiological information through limited space communication channels were evaluated. Two principle classes of compression methods were considered: (1) those techniques which ensure retention of signal shape at the receiving end of the radio link within the limit of a stipulated error and (2) techniques which provide for measuring definite characteristics of the signal, including the statistical characteristics. E.H.W.

**N74-26551** Joint Publications Research Service, Arlington, Va.
**SYSTEMATIC APPROACH IN MEDICAL SUPPORT OF LONG SPACE FLIGHTS**
L. M. Komarova *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 61-63 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 160-163

Some aspects of the application of the systematic approach to the creation of a medical research information system for the onboard hospital are investigated. E.H.W.

**N74-26553** Joint Publications Research Service, Arlington, Va.
**EFFECT OF SKILL IN UNDERWATER ORIENTATION ON PERCEPTION OF THE GRAVITATIONAL VERTICAL**
S. N. Makarov and B. B. Bokhov *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 69 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 175-176

A vertical instrument was used to study the differential sensitivty (up and down position) of the vestibular, skin, and motor analyzers of human underwater. Attempts were made to establish a correlation between training and sensitivity. Six groups were used to test the theory. Group one consisted of athletes engaged in underwater orientation, group two was composed of second class adult and third class youth categories, groups three and four were composed of underwater swimmers with less experience (100 to 500 hrs.), divers made up group five, and group six was made up of subjects with no experience in underwater dives. All tests were made on land. The results indicated a high accuracy in orientation in the first group in comparison with the control group. The magnitude of the error in the third and fourth groups was approximately the same, but on the average was less than in the control group. In the fifth group, consisting of divers, the indices did not differ from the control data. Thus, immersion in water increases orientation accuracy under definite conditions. Author

**N74-26554** Joint Publications Research Service, Arlington, Va.
**EFFECT OF TEN-DAY PRESENCE IN A HYPEROXIC ATMOSPHERE ON THE CIRCULATORY REACTION UNDER A MAXIMUM PHYSICAL LOAD**
V. M. Mikhaylov *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 70-72 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 180-182

An experiment was conducted on the admissible time for human exposure in an atmosphere with an increased oxygen content. For this purpose an experiment was conducted in which two subjects for a period of ten days were exposed in a pressure chamber with a hyperoxic mixture containing 53.8%. Twice a day, for 30 minutes the subjects performed a complex of physical exercises. A day before and a day after ending the experiment a test was conducted with a maximum physical load using an electric bicycle-type ergometer. Subject one exhibited an increase duration of the cardiac cycle and the tension period at the expense of the isometric contraction phase. The time of asynchronous contraction and blood expulsion period did not change, arterial pressure varied little from the control levels. Subject two exhibited a decrease in the duration of cardiac cycle and expulsion period. There was a corresponding increase in the asynchronous contraction phase and the expulsion period by 0.01 sec. Some increase in pulse amplitude occurred and the final systolic blood pressure increased. Author

**N74-26555** Joint Publications Research Service, Arlington, Va.
**PHYSICAL PERFORMANCE AND FUNCTIONAL STATE OF THE CARDIORESPIRATORY SYSTEM IN MAN AFTER TEN-DAY CONFINEMENT IN A HYPEROXIC MEDIUM**
G. V. Machinskiy *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 73-74 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 182-184

An investigation was made of the effect of prolonged confinement in an atmosphere with a high O2 content on human physical performance. The functional state of the cardiorespiratory system as well as the level of physical performance of the subjects was investigated prior to onset of the experiment and a day after its termination using a test with an increasing physical load, performed on a bicycle-type ergometer. A comparison of the results of the background and post experimental examinations revealed that ten-day confinement in a hyperoxic medium exerted no appreciable influence on the quantitative indices of maximum physical performance. However, the pulse rate with which the subjects ended work after the experiment became greater than that prior to the experiment in one subject by 8% and in another by 14%. The maximum O2 consumption decreased in both subjects. Author

**N74-26556** Joint Publications Research Service, Arlington, Va.
**STUDY OF THE HUMAN CARDIOVASCULAR SYSTEM REACTION WHEN PERFORMING FUNCTIONAL TESTS DURING A YEARLONG EXPERIMENT**
G. A. Manovtsev and A. A. Savilov *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 75-76 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 187-188

An investigation was made of the orthostatic stability and physical performance of subjects during a yearlong experiment in a ground experimental complex of life support systems. Tests were made of pulse rate, arterial pressure, and ECG, and the change in the chronocardiogram, the cardiac stroke, and minute volumes. The results obtained show that during the first months of confinement there was an increase in the physical conditioning of the subjects. During the second half of the experiment there was a tendency toward a decrease in physical performance. Examinations after the experiment also revealed some decrease in orthostatic stability of the subjects: during the course of the tests there were unpleasant subjective sensations, expressed autonomic reactions, and indications of blood stagnation in the lower extremities, as well as a change in the studied hemodynamic indicies. Author

**N74-26557** Joint Publications Research Service, Arlington, Va.
**STUDY OF PSYCHIC PERFORMANCE DURING MODIFICATION OF THE DAILY SCHEDULE**
A. L. Narinskaya *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 77-78 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 199-200

The results of a study on individual characteristics of the dynamics of psychic performance during man's adaptation to an unusual work and rest schedule are presented. Two pairs of subjects were selected from two groups segregated during an experiment with 72-hour sleeplessness. Both pairs of subjects were exposed successively to two 45-day experiments in an isolation chamber. During the first stage of the 45-day experiments the dynamics of performance was studied for a normal daily regime. On the 11th day there was an inversion of the daily schedule: a shift by 12 hours. After the shift psychic performance was studied using the same psychological methods. The results of the study indicate an individual character of the process of adaptation to a new regime. The decrease in the indices of psychic performance for the more rhythmic subjects was greater than for less rhythmic subjects. Author

**N74-26558** Joint Publications Research Service, Arlington, Va.
**DYNAMICS OF PSYCHIC PERFORMANCE DURING CONTINUOUS 72-HOUR WAKEFULNESS**
A. L. Narinskaya *In its* Current Probl. in Space Biol. and Med. (JPRS-564499) 14 Jul. 1972 p 79-80 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 201-202

An investigation was made of psychic performance during a 72 hour period of continuous wakefulness. Experiments were made using male subjects in the age group from 25 to 36 years. Tests cover (1) reproduction of a tex (cognitional voluntary memory), (2) complicated conversion of figures into letters, (3) addition of numbers with switching, (4) making corrections, and (5) number and letter combinations (capacity for working when a time deficit prevails). The collected data indicate that performance levels for all methods during the 72 hour period decreased in all subjects. Data also show a deterioration in the productivity of mental performance, concentration and stability of attention, a slowness in mental processes, and difficulties in working when there was a deficit. Author

**N74-26559** Joint Publications Research Service, Arlington, Va.
**SOME PECULIARITIES OF COMMUNICATION PROCESSES IN SMALL GROUPS**
T. V. Novikova *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 81-82 Transl. into ENGLISH from the Publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 207-208

A study was made of the influence of phenamine on oral communication processes in 12 pairs of healthy subjects performing interdependent activity which consisted of a number of homeostatic problems of increasing complexity. During the course of their activity the subjects were afforded the opportunity of using a conversation device. All problems were classified according to their complexity: (1) simple problems not requiring separation of the function, (2) complex problems for successful solution requiring separation of the tactics of the subjects by type of leader, and (3) conflicting (irresolvable) problems. An analysis of the number of oral reactions of the subjects revealed that in solving problems of the first type a minimum number of oral communications is used. In the process of solving problems of the second type this number increased in the background experiment by a factor of five, with the administration of phenamine by a factor of six, and in solving conflicting problems, in the background experiment by a factor of 24 and with the administration of phenamine by a factor of 18. Author

**N74-26560** Joint Publications Research Service, Arlington, Va.
**STATE OF THE HUMAN GASTRIC SECRETORY FUNCTION WITH INTAKE OF AN ARTIFICIAL RATION**
L. S. Potemkina *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 83 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 213

A study was made of the reaction of gastric glands in human subjects to a diet of an artificial nature for 45 days. Data show that there was a tendency toward a decrease in the acid forming function in the subjects and a depression of exosecretion and incretion of pepsinogen. This reaction of the secretory processes in the stomach was probably associated with the peculiarities of the experimental ration: the use of casein as a protein source. It is known that casin is a protein with an uncoiled configuration of molecules and this affords a good possibility for its digestion by the proteolytic enzymes in the digestive system. The denaturation of casein is not accompanied by an increase in the rate of proteolysis, as is characteristic for ordinary globular proteins, but by its decrease. Author

**N74-26561** Joint Publications Research Service, Arlington, Va.
**COMPARATIVE CHARACTERISTICS OF MORPHOLOGICAL CHANGES IN THE KIDNEYS OF RATS DURING MULTI-HOUR EXPOSURE TO TRANSVERSE AND LONGITUDINAL ACCELERATIONS WITH AN INTENSITY OF FOUR G**

A. S. Pankova *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 84-88 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 215-219

A study was made of morphological changes in the kidneys of rats exposed to accelerations depending on the duration and direction of the exposure, and the detection of compensatory-adaptive reactions caused by the influence of hypothalamic-hypophyseal neurosecretory system. Consideration was also given to the decrease in hemodynamic disorders. Author

**N74-26562** Joint Publications Research Service, Arlington, Va.
**STUDY OF THE SUCCESSIVE EFFECT EXERTED ON THE BODY BY CENTRIPETAL ACCELERATIONS WITH A VARIABLE VECTOR AND CORIOLIS ACCELERATIONS**
B. I. Polyakov and V. G. Andreyeva *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 89-91 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 220-222

A comparative evaluation was made of the level of vestibular stability of human subjects before and after their rotation on a centrifuge. The subjects (seven clinically healthy males in nonflight occupations in the age group 23-46 years) were subjected to transverse accelerations of 4 g with a duration up to 10 minutes or 6 g with a duration up to five minutes and simultaneously rotation about their own longitudinal axis with velocities of 15 and 60 deg/sec. The level of vestibular stability was determined by tolerance to a test with cumulation of Coriolis accelerations which was conducted twice: a day prior to rotation on the centrifuge and 40 to 150 minutes afterwards. The criterion for tolerance to the test was the time from its onset to the appearance of autonomic reactions of the first and second degree. Results are given in tables. Author

**N74-26563** Joint Publications Research Service, Arlington, Va.
**SOME PARAMETERS OF HEMODYNAMICS AND ENERGY EXPENDITURES OF CREW MEMBERS OF THE SOYUZ-6, 7 SPACESHIPS**
Yu. D. Pometov and V. V. Shchigolev *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 92-93 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 227

A study of hemodynamics and gas exchange of crew members of the Soyuz-6 and 7 ships was made under basal metabolism conditions a month before the launching and also on the second and fourth days after the flight was completed. The minute volume of circulation (MVC) was determined by the method of return breathing of CO2 and gas exchange (oxygen consumption and release of carbon dioxide --(VO2, VCO2) was ascertained by the modified Douglas-Holden method. On the second day after landing all the cosmonauts exhibited an increase in the MVC averaging 4.01 + or - 0.13 to 4.75 + or - 0.28 liters/minute or by 14.7%. In a repeated determination on the fourth day the MVC increased on the average for the group by 5% in comparison with the preceding investigation. Author

**N74-26566** Joint Publications Research Service, Arlington, Va.
**POSSIBILITY OF APPLYING THE AUTOGENIC TRAINING METHOD FOR COSMONAUTS**
A. P. Ragulin *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 96 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 234

The inclusion of the autogenic training method in the training of cosmonauts was proposed. Physiologically, the method is based on the relationship between the functional state of the central nervous system and the tone of the striated muscles. After a three month training period, medical observation and test data show a decrease in fatigue and also a shortening of the recovery period after exercises in the experimental group as compared to the control group. E.H.W.

**N74-26566** Joint Publications Research Service, Arlington, Va.
**CHANGES IN OXYGEN CONSUMPTION BY THE HUMAN BODY UNDER THE INFLUENCE OF RESTRICTED DIET, HYPOKINESIA AND CENTRIFUGE ACCELERATIONS**
G. I. Smirnova *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 97-98 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 242-243

An investigation was made of oxygen consumption in healthy males between the ages of 23 and 36 while under the influence of restricted diet, hypokinesia, and centrifugal accelerations. Six of the subjects in the first series were confined to a hospital without a special restriction of motor activity. During the second and third series the investigated persons during the 15 days of the EP adhered to a bedrest regime with a rigorous restriction of motor activity. In addition, in the third series prior to the onset and after ending of the bedrest regime the subjects were exposed to transverse accelerations on a centrifuge. Results show the VO2 (gas exchange) gradually decreased in the first experiment and the subjects lost weight on the average of 3 kg. In the second experiment there was a decrease in VO2 by the end of the bedrest confinement. Subjects in this group lost an average of 4 kg. in the third test series a marked decreased occurred in VO2 after centrifuge tests. In the middle of the experimental period VO2 increased sharply but decreased by the end of the bedrest period. Mean weight losts for the subjects was 2 kg. Author

**N74-26567** Joint Publications Research Service, Arlington, Va.
**SOME INDICES OF PROTEIN AND LIPID METABOLISM IN HUMAN BEINGS WHEN CONSUMING A RATION DEVELOPED FOR SPACESHIP CREWS DURING FLIGHT WITH A DURATION UP TO A MONTH**
T. A. Smirnova and O. S. Khokhlova *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 99-101 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 245-247

Healthy males from 19 to 34 years of age were used to study the effects of space rations on protein and lipid metabolism. The rations consisted of canned meats, dehydrated meat and dairy products, meat pies and chocolate in tubes, confectionary items, and other foods. There were 2708 calories in the diet broken down as follows: 144 g protein, 106 g fats, and 276 g carbohydrates. Mean averages for the above processes are given in tables. Data show that such a diet did not cause reliable changes in protein and lipid metabolism and that the indicies are within the limits of accepted physiologic variables. Author

**N74-26568** Joint Publications Research Service, Arlington, Va.
**EXPERIMENTAL STUDY OF A METHOD FOR THE PARTIAL OXIDATION OF THE PRODUCTS OF MAN'S VITAL FUNCTIONS**
G. S. Sinyak, T. S. Guryeva, M. V. Kuzmenko, V. V. Popov, and G. I. Chizhizhikova *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 102-103 Transl. into ENGLISH from the oubl. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 254-255

Attempts were made to establish the partial oxidation method as a viable technological procedure for processing the products of man's vital functions. Experiments were carried out on waste products taken from subjects placed on a definite diet. The use of catalysts caused a considerable decrease in oxidation temperature during the vapor phase, a more complete oxidation of the components in the gas phase, and an improvement in the quality of the condensate. Test results show that the method makes it possible to determine more accurately technological paramenters and principle computation formulas for processing human waste. E.H.W.

**N74-26569** Joint Publications Research Service, Arlington, Va.
**RELIABILITY OF ARTERIAL PRESSURE MEASUREMENTS MADE BY PERSONS NOT HAVING A MEDICAL EDUCATION**

V. F. Turchaninova and T. G. Chernysh *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 104-105 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 259-260

Investigations were made of ways of developing a method for teaching the measurement of arterial pressure (AP) to individuals not having a medical education and for evaluating the reliability of the data which they collect. Seven males in the age group from 25 to 35 years were taught to measure AP by the Korotkov method. Teaching involved familiarization of the trainees with the earlier formulated instructions on measuring AP and conducting three exercises with themo. An evaluation of the accuracy of AP measurement by the trainees was made during the 20 to 30 days following training. The results indicate that individuals not earlier having appropriate skills but who acquire them in a short time (three exercises) measure AP with an adequate accuracy. Author

**N74-26570** Joint Publications Research Service, Arlington, Va.
**EFFECT OF A MODIFIED ATMOSPHERE ON BLOOD ACID-ALKALI EQUILIBRIUM**
S. I. Tokarev *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 106-107 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 260-262

A study was made of blood acid-alkali equilibrium during prolonged experiments. During man's five day confinement in a medium with a high CO2 content (PCO2 22.8 to 45.6 mm Hg) there was a decrease in the pH and an increase in P(a)CO2 and the level of true bicarbonates. A shift in the active reaction of the blood in an acidic direction of a respiratory nature was completely compensated during presence in an atmosphere with PCO2 = 22.8 mm Hg. With PCO2 = 30.4 mm Hg, on the first day there was evidence of decompensation, but on the days which followed acidosis was also completely compensated. A further increase in PCO2 in the surrounding medium led to the development of decompensated shifts in pH of a respiratory and metabolic nature. Accordingly, during prolonged (up to five days) presence in a hypercapnic medium the human body can adapt quite fully to an increased CO2 concentration (up to 22.8 mm Hg. Author

**N74-26571** Joint Publications Research Service, Arlington, Va.
**MODELING THE RELIABILITY PARAMETERS OF ORGANS USING ONE TYPE OF FINITE AUTOMATIC DEVICES**

A. M. Tarko *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 108-109 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 262-263

Proposals were made for the design of finite automatic devices for evaluating the reliable operation of body organs during prolonged space flight stress. The proposals were based on the premis that organs consist of great number of elements of the same type operating on an all or nothing principle. They have the characteristics of excess and fatigability, making it possible for the elements to operate for very long periods. Author

**N74-26572** Joint Publications Research Service, Arlington, Va.
**CHARACTERISTICS OF THE METHOD FOR REGISTERING THE INDICES OF PHYSIOLOGIC FUNCTIONS ON THE SOYUZ-9 SPACESHIP**
V. A. Talavrinov, A. G. Zerenin, I. V. Sokolov, and V. F. Turchinova *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 110-111 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 265-267

A procedure for collecting physiological data from cosmonauts wearing ECG electrodes without causing skin irritations was investigated. Important characteristics of the procedure are that: (1) the cosmonauts themselves put on and took off the systems of physiologic sensors, and (2) every day, in cases of continuous wearing, the ECG electrodes were moved to other parts of the skin on such a way that on each of the skin sectors designated for the purpose, the electrode was present for one day and the skin was free from it for three days. The cosmonaut himself processes the skin with a degreasing fluid, applies conducting paste to the electrodes, and also regulates the degree of tension of the elastic straps holding the electrode sensors in position. Test data show that using such a procedure did not cause skin irritations on prolonged space flights. Author

**N74-26573** Joint Publications Research Service, Arlington, Va.
**EXPERIMENTAL DATA ON DECOMPRESSION DISORDERS ACCOMPANYING ATMOSPHERIC RAREFRACTION**
R. T. Tyurina and N. Yu. Leontyeva *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 112-114 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 267-269

An investigation was made of decompression disorders arising due to atmospheric rarefaction. Tests were carried out on cats for determining minimum altitude at which visible emboli appear in the blood, and dogs for studying external symptoms of high altitude decompression disorders. Test results show that in cats visible bubbles appear in individual animals at different altitudes. Minimum altitude at which bubbles were detected was 6,500 m. For external symptoms, no typical symptoms of the bends type were observed in dogs at altitudes of 10,000, 11,000, and 12,000 m. However when the animals were held from 5 to 8 hours in a RMK recompression chamber at excess pressures of 0.5, 0.8, 1.0, 1.2, 1.5, and 1.8 atm, and ascended to 10,000 m, a deterioration in general condition occurred. These syptoms, associated with an air embolism, were expressed to a greater or lesser degree depending on the pressure the animal was exposed to in the recompression chamber. The test data also revealed that symptoms of the bends type in a rarefied atmosphere do not develop as easily as with emergence from deep water. E.H.W.

**N74-26574** Joint Publications Research Service, Arlington, Va.
**UNDERWATER TRAINING AS ONE OF THE FACTORS INCREASING VESTIBULAR-AUTONOMIC STABILITY** c05
A. A. Chirkov, L. N. Kornilova, and S. N. Markov *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 115-117 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 286-287

The effect of underwater training on the somatic and autonomic components of the vestibular reactions was studied using healthy males in the age group from 29 to 37. The training, conducted under a specially formulated program, included different exercises performed under water: acrobatics (rotation in different planes and different types of figure swimming), diving and swimming in outfit No. 2 (with an aqualung) using a compass oriented by markers on the bottom and on the sun, underwater hunting, and motion picture surveys underwater. There was a total of 14 underwater training sessions, of which seven were directed to improving underwater orientation. Test data revealed that as a result of underwater training most of the persons in the main group exhibited an increase in vestibular-autonomic stability, a decrease in some vestibular-somatic reflexes, and an increase in the accuracy of orientation in two dimensional space. Author

**N74-26579** Joint Publications Research Service, Arlington, Va.
**THEORETICAL EVALUATION OF THE PERCENTAGE OF PARTICLES OF A MONODISPERSE AEROSOL REACHING THE ALVEOLAR ZONE OF THE LUNG**
N. A. Isanin *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 135 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 308

A theoretical analysis was made of the percentage of monodispersed aerosols reaching the aveolar of the lungs and the dependence between particle size and flowthrough. Computa-

tions were based on only one precipitation mechanism: gravity. It was also assumed that the spatial orientation of the bronchi is random. E.H.W.

**N74-26580** Joint Publications Research Service, Arlington, Va.
**SOME DATA ON THE FUNCTIONAL STATE OF THE HUMAN CARDIOVASCULAR SYSTEM DURING PROLONGED PRESENCE IN A TIGHTLY SEALED SPACE UNDER THE INFLUENCE OF HIGH CARBON DIOXIDE CONCENTRATIONS**
I. I. Moykovskiy *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 136-138 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 309-311

The functional state of the human cardiovascular system during prolonged (200 hours) presence in a tightly enclosed room with a modified atmosphere was examined. The O2 content was 17 to 18% and the CO2 content was 4%. The pulse and respiration rates were registered constantly for each of the six subjects. In a study of the collected data a clear diurnal rhythm of the pulse rate and respiration rate was noted. During exposure to the modified atmosphere the diurnal rhythm of these parameters remains true and even becomes more clearly expressed. Beginning with the second or third day of the experiment some impairment in the diurnal rhythm was exhibited. In subject M-n beginning on the fifth to sixth day of the experiment, there was a clearly expressed tachycardia. It was concluded that a healthy person can remain in an atmosphere with 4% CO2 and 17 to 18% content O2 for a period of 200 hours. This is not the limit of duration. The changes in activity of individual parts of the cardiovascular system, sometimes marked, have the nature of adaptations and do not assume pathologic levels. Author

**N74-26581** Joint Publications Research Service, Arlington, Va.
**CHANGE IN HUMAN HEAT EXCHANGE INDICES UNDER THE INFLUENCE OF MICROCLIMATIC STRESSORS**
S. S. Losev and I. I. Moykovskiy *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 139-140 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 311-312

Heat exchange indices were studied in nine healthy male volunteers over a seven-month period. The volunteers were subjected to 30 days isolation, during which twice each five days extremal conditions were created: first factor -- increase in ambient temperature to 34 C and increase in absolute humidity to 33 mm; second factor -- temperature increase to 33 C and absolute humidity to 22 mm and carbon dioxide to 2%. The following were registered by remote control: body temperature, skin temperature at five points, temperature of the exhaled air and mucosa, heat flux, perspiration, heat and pain thresholds of heat sensations. Data analysis show that the subjects experienced the greatest stressing of heat regulating mechanism during the period of exposure to the first factor. All the studied heat exchange indicies increased with a reliability greater than 98 to 99.9%, other than the heat flux, which decreased sharply and the temperature difference between the pain and heat thresholds, which also decreased. Exposure to the second factor produced no such stress of the heat regulating apparatus. Author

**N74-26583** Joint Publications Research Service, Arlington, Va.
**EFFECT OF HYPOXIA AT NORMAL BAROMETRIC PRESSURE ON THERMOTOGRAPHY OF THE SKIN AND HUMAN BODY TEMPERATURE**
I. R. Abramov *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 143-144 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 320-321

The influence of hypoxia at normal barometric pressure on human body temperature was studied. Studies were made on clinically healthy persons who breathed a gas mixture impoverished in oxygen (O2 8-10%) at an external temperature of 18 to 20 deg and a relative humidity of 45 to 50%. The results of a thermometric study revealed that under these conditions the subject first exhibits a temperature shift in some parts of the skin. For example, the skin temperature of the forehead increased by 0.5 to 0.70 deg, whereas on the back and chest it was 1.3 to 1.50 deg. The temperature remained virtually unchanged on the extremities and for some subjects even decreased. With respect to body temperature (rectal temperature), it decreased in the range of 0.4 to 0.7 C. Author

**N74-26584** Joint Publications Research Service, Arlington, Va.
**HUMAN SKIN THERMOTOPOGRAPHY AND BODY TEMPERATURE DURING PROLONGED EXPOSURE IN A HYPERCAPNIC ATMOSPHERE AT NORMAL AND REDUCED BAROMETRIC PRESSURES**
I. R. Abramov, I. I. Antonov, and R. T. Tyurina *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 145-146 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 321-323

Rectal and skin temperatures were studied in an environment containing from 3 to 6% CO2, in normal and reduced barometric pressures, and at altitudes corresponding to 5,000 m. Analysis of thermometric data revealed that at normal barometric pressure and 3% CO2 the skin and rectal temperatures during the first two days were within the limits of physiologic variations. Beginning with the third day there was an intensive increase in skin temperature primarily in the region of the distal parts of the extremities. At the same time there was a temperature increase in the rectum. With 4% CO2 there were no qualitatively different shifts in heat regulation. In a 5% hypercapnic medium the skin temperature increase began at the end of the first day. Subjects did not show an increase in rectal temperature. Experiments in the 6% range show temperature changes started the first day and were accompanied by a decrease in rectal temperature. Skin temperature remained virtually unchanged during this period. A normal pressures and 4% CO2, there was an increase in both skin and rectal temperature. At 5% CO2 rectal temperature did not increase and skin temperature increased insignificantly.
Author

**N74-26585** Joint Publications Research Service, Arlington, Va.
**CHARACTERISTICS OF HUMAN GAS EXCHANGE IN A HYPEROXIC GAS MEDIUM AT NORMAL ATMOSPHERIC PRESSURE AND AT DIFFERENT AMBIENT TEMPERATURES**
I. I. Antonov and I. R. Abramov *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 147-149 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 323-325

Thermoregulatory shifts in the human body during hypoxia at different ambient temperatures were analyzed. The results revealed that under thermally neutral conditions during the first four hours of exposure there is a small increase in heat production. Later it begins to decrease gradually, attaining a maximum by the end of the first day. Under cold conditions the intensity of heat production during the first hours was more clearly expressed. Later it remained at the same level to the end of the experiment. At high ambient temperature there was no increase in heat production. At the end of the experiment when over heating occurred heat production increased. Skin temperature under the same condition did not show significant changes during a period of 18 to 20 hours. By the end of the first day skin temperature showed an intensive decrease. Under cold conditions, there was a marked decrease in skin temperature during the first hours, increasing as time passed. At high temperature at the very beginning of exposure there was an intensive increase in skin temperature
Author

**N74-26586** Joint Publications Research Service, Arlington, Va.
**EVALUATING THE FUNCTIONAL CAPABILITIES OF THE BODY UNDER THE COMBINED INFLUENCE OF EXTREMAL FACTORS**
Ye. I. Sokolov, A. Ya. Tizul, Yu. S. Mdinaradze, and V. P. Khmelkov

*In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 150-151 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 326-327

The functional, tolerances, and adaptive capabilities of the human body to prolonged space flight were evaluated. Body systems considered include the nervous, cardiovascular, endocrinal, immunobiologic. Definite changes were noted in the function of the nervous system, manifested in a lability of autonomic reflexes, thermotopography of the skin, cerebral bioelectric activity, decrease in amplitude of bioelectric reactions to light stimuli, and a tendency to an increase in the number of slow waves in the frontal parts of the brain. Other changes observed include: (1) increased systolic pressure and minute volume, and a decrease in specific peripheral resistance in some subjects, (2) increased systolic pressure and minute volume combine to cause an increase in histamine secretion, and (3) immunobiologic resistance decreased in the properdine level. Author

**N74-26587** Joint Publications Research Service, Arlington, Va.
**CHANGE IN THE BALLISTOCARDIOGRAM OF HEALTHY AND SICK PERSONS WHEN BREATHING OXYGEN AT INCREASED INTRAPULMONARY PRESSURES**
I. P. Poleshchuk *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 152-154 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 330-332

A clinical analysis was made of the ballistocardiogram (BCG) of 24 healthy persons, 27 persons who had first stage hypertonia, 69 persons with initial symptoms of myocardial dystrophy of metabolic origin, and 41 patients with neurocirculatory dystonia of the hypersensitive type. At excess pulmonary pressure BCG indicies did not change significantly in either sick or healthy persons, and did not exceed normal limits. During inhalation, individuals with initial symptoms of cardiovascular disorders show no significant changes in BCG other than an increase in the LM segment for neurocirculatory dystonia and mycardiodystrophy individuals. During exhalation the BCG was greater in all groups studied. In patients with neurosecretary dystonia, there was an increase in KL intervals and a decrease in IJ amplitude, and JK segment; hypertonia patients show contraction of the J-K intervals and a decrease in amplitude of the corresponding agent. With myocardiodystrophy subjects, there was a decrease in I-J and J-K intervals and a decrease in the amplitude of HI, IJ, JK; and KL segments. Author

**N74-26588** Joint Publications Research Service, Arlington, Va.
**SANITARY-HYGENIC EVALUATION OF THE PROTECTIVE EFFECTIVENESS OF THE LEPESTOK MASK FOR FINELY DISPERSED AEROSOLS**
L. N. Savelyev, A. M. Bulygina, M. V. Glushinskiy, and G. F. Kovygin *In its* Current Probl. in Space Biol. and Med. (JPRS-56499) 14 Jul. 1972 p 155-156 Transl. into ENGLISH from the publ. "Aktualnyye Voprosy Kosmicheskoy Biologii i Meditsiny" Moscow, 1971 p 333-334

The effectiveness of the Lepestok mask was investigated under conditions characterized by atmospheric contamination by finely dispersed aerosols whose concentration in individual cases exceed the maximum admissible concentration. The results of the investigations revealed that the effectiveness of air purification in 53% of the cases exceeded 90%, and in 16% of the cases attained 100%. However, in 26% of the cases the effectiveness did not exceed 75%. The mean weighted effectiveness was 87%. It should be noted that when the respirator was put on again the effectiveness was reduced for the first 30 to 60 minutes. In addition, it was discovered that there was a tendency toward an increase in respirator effectiveness in the case of increased aerosol concentration. Author

**N74-26589#** Lincoln Lab., Mass. Inst. of Tech., Lexington.
**FIRST IMAGES OBTAINED BY AUTO-TELEVISION OF THE HUMAN BODY USING ITS RADIATION IN THE MIDDLE INFRARED REGION**
G. A. Boutry Apr. 1973 5 p ref Transl. into ENGLISH from J. Radiol., Electrol., Med. Nucl. (France), v. 48, 1967 p 24-26 (NTC-74-11927; Rept-73-123) Avail: NTIS HC $4.00; National Translations Center, John Crerar Library, Chicago, Ill. 60616

A television system operating in the vicinity of 3.5 micron wavelengths is briefly described, and infrared auto-television images of the human hand are discussed. F.O.S.

**N74-26590*#** Xavier Univ. of Louisiana, New Orleans. Dept. of Biology.
**SOME CHARACTERISTICS OF FRUCTOSE 1,6-DIPHOSPHATASE ACTIVITY IN RAT LIVER**
Portia U. Ashman, S. L. Lampkin, Lynette Dillon, and Rebecca Parks [1972] 31 p refs
(Grants NGR-19-007-004; RR-08008)
(NASA-CR-138599) Avail: NTIS HC $4.75 CSCL 06A

A reliable assay for hepatic fructose 1,6-diphosphatase in the rat was investigated. It was found that the greatest enzymic activity and highest protein levels were eluted from the colored portion of the homogenate. When the substrate concentration was 0.01M, the enzyme had optimal activity when incubated with 0.01M MgSO4 for 10 min. at 37 C in 0.05M Tris-HCL buffer, pH 7.5. Specificity for the substrate, fructose 1,6-diphosphate, was obtained at substrate concentration of 0.01M. Author

**N74-26591*#** Techtran Corp., Glen Burnie, Md.
**CARDIAC OUTPUT AND OXYGEN INTAKE AT REST AND DURING SUBMAXIMAL LOADS ON 8-14 YEAR OLD BOYS**
R. Mocellin, W. Sebening, and K. Buehlmeyer Washington NASA Jun. 1974 20 p refs Transl. into ENGLISH from Z. Kinderheilk. (Berlin), v. 114, 1973 p 323-339
(Contract NASw-2485)
(NASA-TT-F-15604) Avail: NTIS HC $4.00 CSCL 06P

Cardiac output, oxygen intake, and heart rate were investigated in 22 boys of ages 8 to 14 at rest and under application of two submaximal loads on the bicycle ergometer. The arteriovenous oxygen difference, stroke volume, and oxygen intake per kilogram of body weight were calculated from the measured values. The measured values were compared with values recorded in other studies with adults and older children and with the values expected on the basis of theory. Author

**N74-26592*#** California Univ., Berkeley. Dept. of Soils and Plant Nutrition.
**ENZYME ACTIVITY IN TERRESTRIAL SOIL IN RELATION TO EXPLORATION OF THE MARTIAN SURFACE Final Report**
A. D. McLaren 30 Jun. 1974 5 p refs
(Grant NGL-05-003-079)
(NASA-CR-138587) Avail: NTIS HC $4.00 CSCL 06M

Sensitive tests for the detection of extracellular enzyme activity in Martian soil was investigated using simulated Martian soil. Enzyme action at solid-liquid water interfaces and at low humidity were studied, and a kinetic scheme was devised and tested based on the growth of microorganisms and the oxidation of ammonium nitrite. M.C.F.

**N74-26593*#** Hawaii Univ., Honolulu. Botany Dept.
**TOXICOLOGY: MECHANISMS OF DEUTERIUM OXIDE ACTION, PART 2 Semiannual Report**
S. M. Siegel Dec. 1973 52 p refs
(Grant NGL-12-001-042)
(NASA-CR-138616; Paper-35) Avail: NTIS HC $5.75 CSCL 06T

The metabolism of winter rye seedlings (Secale cereale, L. cv. Winter) cultured in 99.6% D2O was investigated. Compared with water grown seedlings, the protein content was much lower in the D2O cultured seedlings and the incorporation of H(3)-leucine and H(3)-phenylalanine into medium to high molecular weight proteins was partially blocked. The synthesis of the enzyme peroxidase was also reduced in the D2O plants. Seedlings cultured in D2O incorporate H(3)-thymidine into DNA, but do not take

up H(3)-uridine. These results suggest that some of the toxic effects of D2O culture on higher plants can be attributed to a partial block of protein synthesis. Author

**N74-26594*#** Techtran Corp., Glen Burnie, Md.
**THE EFFECT OF FACTORS RELATED TO THE CONQUEST OF SPACE**
P. V. Vasilyev, A. R. Kotovskaya, P. D. Gorizontov, ed., and N. N. Sirotinin, ed. Washington NASA Apr. 1974 37 p refs Transl. into ENGLISH from the book "Patologicheskaya Fiziologiya Ekstremalnykh Sostoyaniy" Moscow, Meditsina Press, 1973 p 290-312
(Contract NASw-2485)
(NASA-TT-F-15322) Avail: NTIS HC $5.00 CSCL 06P

A review was conducted of the available literature and some original findings on the effect of two forms of accelerations on human and animal organisms. The accelerations dealt with the transverse and longitudinal accelerations. The most poorly tolerated type of acceleration with respect to man is the longitudinal form directed from head to seat. This form of acceleration causes acute redistribution of blood from the upper part of the body to the lower abdomen and the extremities, causing severe hypoxic disorders in the brain, disruption of vision and loss of consciousness. Various methods have been tried in order to reduce the adverse effects of acceleration on the human body. Much promise is attached to these methods of increasing man's endurance to g-forces, however, there are yet many questions of the effect of g-forces on the organism which require answers. Author

**N74-26595*#** Kanner (Leo) Associates, Redwood City, Calif.
**THE FOURTH NATIONAL CONFERENCE ON ACOUSTICS. VOLUME 3: PHYSIOLOGICAL, PSYCHOLOGICAL AND BIOLOGICAL ACOUSTICS**
Washington NASA Mar. 1974 176 p refs Transl. into ENGLISH of the publ. "A IV-a Conferinta Nationala de Acustica. Volume 3: Acustica Fiziologica, Psihologica si Biologica" Bucharest, Acad. of the Socialist Republic of Romania, 29-31 May 1973 237 p
(Contract NASw-2481)
(NASA-TT-F-15774) Avail: NTIS HC $12.00 CSCL 06S

Medical, social, psychological, and physiological problems raised by noise pollution are reported. Medical aspects of airport noise, noise induced hearing losses in various industries and noise annoyance are discussed. There are also several articles on the biophysical and medical effects of ultrasounds. Author

**N74-26596#** Joint Publications Research Service, Arlington, Va.
**SPACE BIOLOGY AND AEROSPACE MEDICINE, VOLUME 8, NO. 2, 1974**
24 May 1974 146 p refs Transl. into ENGLISH of Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 8, no. 2, Mar.-Apr. 1974 p 3-90
(JPRS-62082) Avail: NTIS HC $10.50

Articles are presented concerning the selection and training of cosmonauts; evaluation and analysis of accumulated data to facilitate the on-going transition from orbital to interplanetary flights; research aimed at guaranteeing safety on long flights and reliability of the human component of the man-spaceship system; space psychology and physiology; environmental problems and control (spacecraft habitability, effects of radiation and weightlessness) and telemetry.

**N74-26597#** Joint Publications Research Service, Arlington, Va.
**CYTOLOGICAL AND CYTOGENETIC EFFECTS IN THE CELLS OF BACTERIA AND MAMMALS UNDER THE INFLUENCE OF ACCELERATED HEAVY IONS**
Yu. G. Grigoryev, N. I. Ryzhov, B. S. Fedorenko, Ye. A. Krasavin, S. V. Vorozhtsova, L. A. Koshcheyeva, N. Ya. Savchenko, and V. F. Khlaponina *In its* Space Biol. and Aerospace Med., Vol. 8, No. 2, 1974 (JPRS-62082) 24 May 1974 p 1-8 refs Transl. into ENGLISH from Kosmich. Biol. i Aviatkosmich. Med. (Moscow), v. 8, no. 2, Mar.-Apr. 1974 p 3-8

Studies were made of the biological effectiveness of post-radiation recovery processes and factors modifying radiological effects brought about by the action of heavy ions and standard radiations on bacterial E. coli B cells and mammalian cells. Heavy ions exhibited a more pronounced biological effect. Bacterial and mammalian cells exhibited somewhat similar responses to radiations with high linear energy losses (LEL). This is suggested by a similarity in the direction and picture of damage. There were also significant qualitative and quantitative differences related to the species and organization of the biological objects tested. This applies mainly to the different relationships between the relative biological effect changes and LEL. Author

**N74-26598#** Joint Publications Research Service, Arlington, Va.
**EFFECT OF HYPOKINESIA ON THE LIPID COMPOSITION OF THE BLOOD AND TISSUES IN RABBITS OF DIFFERENT AGES**
Yu. P. Rylnikov *In its* Space Biol. and Aerospace Med., Vol. 8, No. 2, 1974 (JPRS-62082) 24 May 1974 p 9-15 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 8, no. 2, Mar.-Apr. 1974 p 8-13

Rabbits of two groups (older animals aged 2-2 1/2 years weighting 3.5 to 5.0 kg and younger animals aged 1-1 1/2 years weighing 2.5 to 3.0 kg) were confined in small cages. The exposure was accompanied by an increase in cholesterol in the blood, heart and liver. This increment was greater in animals of the older group. This was clearly expressed in the liver tissue (fivefold increase). The level of total lipids in the heart and liver increased, conforming to the same pattern. The content of phosphatids in the heart and aorta decreased at the expense of sphingomyelins, lecithin and kephalin in the older group and at the expense of lecithin and kephalin in the younger group. The dropoff in oxygen consumption was more clearly expressed in the older group. Accordingly, hypokinetic exposure in older age groups favors the development of atherosclerosis. Author

**N74-26599#** Joint Publications Research Service, Arlington, Va.
**CELL CHANGES IN RAT LIVERS DURING HYPOKINESIA**
S. Ye. Li and O. I. Kirillov *In its* Space Biol. and Aerospace Med., Vol. 8, No. 2, 1974 (JPRS-62082) 24 May 1974 p 16-23 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 8, no. 2, Mar.-Apr. 1974 p 13-17

Male rats of the Wistar line weighing 95-100 g were kept under hypokinetic conditions. Five to nine test and control animals were sacrificed after 12 hours, two, six, nine, and 14 and 19 days. The nuclear size, mitotic index and number of binucleate cells in the liver were determined. During hypokinesia the absolute weight of the liver decreased whereas its relative weight increased. Nuclear polidy decreased, the mitotic index declined and the number of binucleate cells more than doubled. It is assumed that some polyploid cells are transformed into binucleate cells which in turn are divided into mononuclear diploid cells. Author

**N74-26600#** Joint Publications Research Service, Arlington, Va.
**HYDROGEN BACTERIA AS A POSSIBLE SOURCE OF PROTEIN IN FOOD FOR MAN AND ANIMALS**
V. I. Fofanov, V. K. Kovalenkova, I. T. Troitskaya, L. A. Siletskaya, A. V. Novikova, and L. V. Vasilyeva *In its* Space Biol. and Aerospace Med., Vol. 8, No. 2, 1974 (JPRS-62082) 24 May 1974 p 24-28 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 8, no. 2, Mar.-Apr. 1974 p 17-20

A study was made of the nutritional value of proteins from a biomass of hydrogen bacteria Hydrogenomonas eutropha of the Z-1 group on a Schlegel medium in Vedenina's modification. Before feeding animals the polymer of beta-hydroxybutyric acid

was extracted with chloroform. A high biological value of the proteins from the biomass of hydrogen bacteria was demonstrated. Further investigations of the biochemical composition of the biomass are needed with respect to the changes noted in kidney tissues. Author

**N74-26601#** Joint Publications Research Service, Arlington, Va.
**EFFICIENCY IN USING THE PRODUCTS OF FORMALDEHYDE CONDENSATION IN THE SYNTHESIS OF CARBOHYDRATES**
V. A. Uspenskaya and G. M. Petrova *In its* Space Biol. and Aerospace Med., Vol. 8, No. 2, 1974 (JPRS-62082) 24 May 1974 p 29-35 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 8, no. 2, Mar.-Apr. 1974 p 20-24

The catalytic activity of synthetic carbohydrates formed during formaldehyde condensation was investigated. It was experimentally demonstrated that the formaldehyde condensate which was not treated with sorbents exhibited a higher capacity for activating the reaction of formaldehyde condensation to sugars. The efficiency of an organic cocatalyst increased substantially when a half-condensate was used in its place. This may help to reduce energy requirements and to bring about mild conditions for the synthesis. Author

**N74-26602#** Joint Publications Research Service, Arlington, Va.
**SYNTHESIS OF METHYL ALCOHOL FROM CO2 AND H2 AS AN INTERMEDIATE PRODUCT OF CARBOHYDRATE PRODUCTION**
M. G. Rozenfeld, M. T. Rusov, S. K. Sachenko, and Yu. Ye. Sinyak *In its* Space Biol. and Aerospace Med., Vol. 8, No. 2, 1974 (JPRS-62082) 24 May 1974 p 36-42 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 8, no. 2, Mar.-Apr. 1974 p 24-28

Parameters are given of methanol synthesis which provide the maximum level of carbon dioxide and hydrogen conversion and the maximum yield of methanol as an intermediate product of carbohydrate regeneration in a small enclosure. The maximum yield of methanol takes place when there is a stoichiometric ratio of the initial components. The maximum degree of gas utilization is dependent on their concentration in the initial medium. Author

**N74-26603#** Joint Publications Research Service, Arlington, Va.
**PECULIARITIES OF REACTION OF THE RAT CEREBELLUM TO EXPOSURE TO CENTRIPETAL ACCELERATIONS AFTER PROLONGED HYPOKINESIA**
L. D. Klimovskaya and N. P. Smirnova *In its* Space Biol. and Aerospace Med., Vol. 8, No. 2, 1974 (JPRS-62082) 24 May 1974 p 43-51 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 8, no. 2, Mar.-Apr. 1974 p 29-34

White rats kept under conditions of prolonged hypokinesia were exposed to transverse accelerations of 6 and 10 g. In acute experiments the induced activity of the cerebellar cortex was investigated in Nembutalanesthesized rats before, during and after rotation on a centrifuge. The amplitude of the electric response of the cerebellar cortex to stimulation of the sciatic nerve was found to increase on the 14th day of hypokinesia; later the induced potential did not differ from the control. The cerebellar response to acceleration, which was measured with respect to inhibition of the induced potential, decreased on the 35th-40th days of hypokinesia and increased on the 55th-60th days. A decrease in kinesthetic afferentation and a general increase in excitation due to stress effects contributed to the development of functional disorders in the cerebellar cortex during hypokinesia. Author

**N74-26604#** Joint Publications Research Service, Arlington, Va.
**DYNAMICS OF CIRCULATORY INDICES IN THE CREW OF THE SALYUT ORBITAL STATION DURING AN EXAMINATION UNDER REST CONDITIONS**
V. A. Degtyarev, V. G. Doroshev, N. D. Kalmykova, Z. A. Kirillova, and N. A. Lapshina *In its* Space Biol. and Aerospace Med., Vol. 8, No. 2, 1974 (JPRS-62082) 24 May 1974 p 52-64 refs Transl. into ENGLISH from Kosmich. Biol. i Avtiakosmich. Med. (Moscow), v. 8, no. 2, Mar.-Apr. 1974 p 34-42

Results are given of complex investigations of blood circulation for the crew of the Salyut orbital station under hypokinetic conditions. It was found that the levels of arterial pressure, blood outputs, work and intensity of contraction of the left ventricle were relatively high. Despite a certain similarity to model experiments, the dynamics of the principal indices of circulation during weightlessness has its specific peculiarities. The syndrome of shortening of the phase of isovolumetric contraction of the left ventricle, a considerable amplitude of fluctuations of individual indices during repeated investigations, and an influence of accompanying factors associated with the crew's current activity aboard the station on the dynamics of circulation can be observed. Analysis of data in dependence on times of exposure to weightlessness did not exhibit a clear tendency in the change of most of the registered indices which could be related to the cumulative effect of weightlessness. Author

**N74-26605#** Joint Publications Research Service, Arlington, Va.
**SOME PROBLEMS IN INTERACTION BETWEEN THE VESTIBULAR AND VISUAL ANALYZERS**
A. Ye. Kurashvili and V. I. Babiyak *In its* Space Biol. and Aerospace Med., Vol. 8, No. 2, 1974 (JPRS-62082) 24 May 1974 p 65-75 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 8, no. 2, Mar.-Apr. 1974 p 42-50

A study was made of the influence of the vestibular analyzer on fixation and tracking motions of the eye. Stimulation of the vestibular apparatus was accomplished by the rotation and calorization methods; oculomotor reactions were registered using an improved electrooculogram method. The problem of visual perception of space coordinates and its modification under the influence of rotation and electric stimulation of the vestibular apparatus was studied. The conclusion was drawn that the vestibular system, as a system sensing extrasubjective gravitational space constants, is most important in the formation of visual concepts of space coordinates. These concepts are reflected in the objective characteristics of oculomotor reactions. Author

**N74-26606#** Joint Publications Research Service, Arlington, Va.
**CLINICAL-PHYSIOLOGICAL ASPECTS OF EARLY FORMS OF AUTONOMIC-VASCULAR DISORDERS**
A. Ya. Tizul and E. I. Matsnev *In its* Space Biol. and Aerospace Med., Vol. 8, No. 2, 1974 (JPRS-62082) 24 May 1974 p 76-82 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 8, no. 2, Mar.-Apr. 1974 p 50-54

Examinations of 71 persons with polymorphous autonomic-vascular disturbances allowed clinical and physiological characterization of early forms of the dysfunctions which develop in so-called clinically healthy persons in the age group 25-40 years. Autonomic disorders occurred in 33.8% of the intellectuals who were not regularly engaged in physical work or sports. Most patients with various mild clinical manifestations of autonomic dysfunctions exhibited a decline in the range of adaptive and compensatory capabilities of the human body which is manifested in an unsatisfactory tolerance to functional tests. In a small percentage of cases (12%) autonomic vascular dystonia was diagnosed mainly in relation to autonomic disturbances observed during functional tests. Author

**N74-26607#** Joint Publications Research Service, Arlington, Va.
**CHANGES IN THE ELECTROCARDIOGRAM DURING ACUTE HYPOXIA AND THEIR SIGNIFICANCE**
V. B. Malkin and V. I. Plakhatnyuk *In its* Space Biol. and

Aerospace Med., Vol. 8, No. 2, 1974 (JPRS-62082) 24 May 1974 p 83-92 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 8, no. 2, Mar.-Apr. 1974 p 54-61 (For availability see N74-26596 16-04)

The use of hypoxic hypoxia (ascent to an altitude of 5,000 m in a normal atmosphere) as a provocative test for detecting latent cardiac pathology is described and summarized. In 12,000 tests during which electrocardiographic studies were made of healthy male test subjects and subjects with neurocirculatory pystonia, in the age group 20-45 years, 3.66% of the cases exhibited ECG changes which were beyond the normal limits (conditionally pathological changes). In 82.93% of the cases conditionally pathological changes in the ECG were related to various disorders in the cardiac rhythm. Two categories of disorders were distinguished: (1) those developing together with the functional inadequacy of regulation of circulation during the hypoxic test and determining reduced tolerance to hypoxia, and (2) rhythm disorders producing no effect on altitude tolerance.

Author

**N74-26608#** Joint Publications Research Service, Arlington, Va.

**EFFECT OF AN INCREASED CARBON DIOXIDE CONTENT ON THE PHAGOCYTIC ACTIVITY OF NEUTROPHILS AND THE LEVEL OF SIALIC ACIDS IN THE HUMAN BLOOD**

M. V. Markaryan *In its* Space Biol. and Aerospace Med., Vol. 8, No. 2, 1974 (JPRS-62082) 24 May 1974 p 93-96 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 8, no. 2, Mar.-Apr. 1974 p 61-63

A five-day exposure of man to an increased (3-5%)carbon dioxide concentration in a small sealed chamber inhibited the phagocytic activity of neutrophils and reduced the level of sialic acids in the blood serum. A correlation was established between the carbon dioxide content in the inhaled air and the level of changes in the mentioned parameters. The highest level of phagocytic inhibition and decrease in sialic acid occurred when breathing a 5% carbon dioxide atmosphere. Author

**N74-26609#** Joint Publications Research Service, Arlington, Va.

**STUDY OF ORGANIZATION OF A FLIER'S ATTENTION DURING INSTRUMENT FLIGHT**

I. D. Malinin and V. A. Ponomarenko *In its* Space Biol. and Aerospace Med., Vol. 8, No. 2, 1974 (JPRS-62082) 24 May 1974 p 97-102 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 8, no. 2, Mar.-Apr. 1974 p 64-68

An attempt was made to examine the phenomenon of switching of attention during instrument flight from the point of view of probability theory. For solving the formulated problem the investigation used the method of evaluation of the distribution of attention of a flier from instrument to instrument using a concealed motion picture survey of the pilot's eyes. This enabled the observer to trace the movement of the flier's glance directly in flight in a trainer through an optical light conductor without distracting the flier's attention from piloting tasks. The motion picture films were interpreted using keys which represent the image of the fixed glance of the flier at the time of fixation of the eyes on each of the piloting-navigational instruments. Computations give every basis for assuming that the function of distribution and switching of attention of a flier during instrument flight is a determined and organized form of mental behavior of a flier in the aircraft control process. Author

**N74-26610#** Joint Publications Research Service, Arlington, Va.

**EVALUATION OF THE FUNCTIONAL STATE OF THE MYOCARDIUM IN FLIGHT PERSONNEL DETERMINED FROM CLINICAL-INSTRUMENTAL INVESTIGATIONS**

V. M. Kondrakov *In its* Space Biol. and Aerospace Med., Vol. 8, No. 2, 1974 (JPRS-62082) 24 May 1974 p 103-107 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 8, no. 2, Mar.-Apr. 1974 p 68-71

Electrocardiographic changes, polycardiographic and hemodynamic parameters were analyzed in 146 pilots in the age group 39-57. With respect to ECG changes, the subjects (in the second group) with diffuse ECG changes exhibited a phasic hypodynamic syndrome, a decrease in cardiac output, strength and output of the left ventricle. Thirty percent of the first-group subjects with a normal ECG exhibited changes in the early systolic phases, the energy parameters of cardiac activity indicating an inadequate contractability of the cardiac muscle. A comparative analysis of these changes helps in an objective evaluation of the functional capabilities of the cardiovascular system, in formulating a proper diagnosis of the disease, and in recommending rational treatment, as well as in making a well-substantiated expert decision.

Author

**N74-26611#** Joint Publications Research Service, Arlington, Va.

**PRINCIPLES IN FORMULATING OPTIMUM SLEEP AND WAKEFULNESS REGIMES FOR MAN DURING PROLONGED SPACE FLIGHTS**

A. N. Litsov *In its* Space Biol. and Aerospace Med., Vol. 8, No. 2, 1974 (JPRS-62082) 24 May 1974 p 108-115 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 8, no. 2, Mar.-Apr. 1974 p 71-75

The main steps which can be taken to prevent unfavorable responses of cosmonauts to changes in work-rest schedules are: development of optimum schedules, their good agreement with the biorhythmological peculiarities of every crew member, and preliminary adaptation of cosmonauts to the new cycle under favorable conditions on the earth. The optimum regimes are the routine regimes to which man normally adheres. Relatively optimum regimes are those which provide a rapid but incomplete rearrangement of the cycle. Nonoptimum regimes are those which are not followed by a synchronization of the basic functions of the human body and the altered environment. The optimum level of the diurnal cycle is dependent to a certain extent on the duration of sleep and wakefulness periods, their change and fractionation, distribution of work and rest, etc. During space flight static 24-hour cycles seem to be the best. Author

**N74-26612#** Joint Publications Research Service, Arlington, Va.

**AUTOMATIC MODELING OF SATURATION AND DESATURATION PROCESSES IN THE BODY BY AN INERT GAS WITH A CHANGE IN PRESSURE**

M. V. Propp *In its* Space Biol. and Aerospace Med., Vol. 8, No. 2, 1974 (JPRS-62082) 24 May 1974 p 116-126 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 8, no. 2, Mar.-Apr. 1974 p 75-82

A decrease in pressure of an atmosphere containing inert gases can cause different types of decompression disorders. The author examines methods for the automatic modeling of the process of saturation and desaturation of the body by an inert gas with a change in pressure using analog elements in which the gas is diffused through a porous barrier. The pressure change beyond the porous barrier corresponds to the pressure change in a definite group of tissues. Use of automatic computations with analog devices makes it possible to employ the optimum pressure decrease regime, shortens decompression time and makes it possible to avoid computations from tables. The instruments can be used in diving, caisson work, in high altitude and space flights. Author

**N74-26613#** Joint Publications Research Service, Arlington, Va.

**POSSIBILITIES OF USING A PHARMACOLOGIC AUTONOMIC BLOCKAGE (GANGLIOPLEGIA) IN AVIATION AND COSMONAUTICS**

F. Smolyarek *In its* Space Biol. and Aerospace Med., Vol. 8, No. 2, 1974 (JPRS-62082) 24 May 1974 p 127-132 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med.

(Moscow), v. 8, no. 2, Mar.-Apr. 1974 p 83-85

The effect of ganglioplegia for the prevention and treatment of damage which can arise in response to extremal factors in aviation and space flights was studied. Pharmacologic preparations which cause an autonomic blockade have been used for a long time, but without taking their ganglioplegic effect into account. These drugs include novocain and its derivatives and curare. Ganglioplegia came into use in 1946 (tetraethylammonium). Later such substances as hexamethonium, vegolysen, pantholin, homotrophine, dicolin, pendiomid, arfonad, and ecolid came into use. Since ganglioplegic drugs operate ampholytically they inhibit the functioning of the more stressed part of the autonomic nervous system, this is accompanied by general calming, a decrease in secretion of catechol amines, a change in microcirculation, and some tendency to gravitational blood movement. The latter is one of the few factors limiting use of ganglioplegia in aviation and cosmonautics and requires further investigations. Author

**N74-26614#** Joint Publications Research Service, Arlington, Va.

**EFFECT OF PROTAMINE-ADENOSINETRIPHOSPHATE ON THE VIABILITY OF LETHALLY IRRADIATED RATS**

T. P. Pantev, N. V. Bokova, and I. T. Nikolov *In its* Space Biol. and Aerospace Med., Vol. 8, No. 2, 1974 (JPRS-62082) 24 May 1974 p 133-135 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 8, no. 2, Mar.-Apr. 1974 p 85-86

Data are presented on the synthesis of protamine-adenosinetriphosphate (PATP) and the results of an experimental study of its antiradiation properties. Author

**N74-26615#** Joint Publications Research Service, Arlington, Va.

**INVESTIGATIONS IN THE FIELD OF AVIATION MEDICINE AT THE MILITARY-MEDICAL ACADEMY IMENI S. M. KIROV (ON THE 175TH ANNIVERSARY OF THE MILITARY-MEDICAL ACADEMY IMENI S. M. KIROV)**

G. I. Gurvich and Z. K. Sulimo-Samuyllo *In its* Space Biol. and Aerospace Med., Vol. 8, No. 2, 1974 (JPRS-62082) 24 May 1974 p 136-143 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 8, no. 2, Mar.-Apr. 1974 p 86-90

Development of aviation medicine in the Soviet Union is briefly reviewed along with specific examples of Soviet successes in aerospace medicine. A.L.

**N74-26616*#** Childrens Hospital Research Foundation, Washington, D.C.

**INVESTIGATION OF THE EFFECT OF STRESS ON THE CHEMISTRY, METABOLISM, AND BIOPHYSICS OF COLLAGEN Final Report**

John C. Houck 30 Aug. 1973 6 p
(Grant NGR-09-134-001)
(NASA-CR-138591) Avail: NTIS HC $4.00 CSCL 06A

The research is reported concerning the effect of stress on the chemistry in the connective tissue of the rat. It was found that within a day after administration of cortisol (stress harmone), a significant amount of the insoluble collagen dissappeared from the skin. It is concluded that the abrupt catabolism of cutaneous collagen releases peptides. These peptides are rapidly degraded to free amino acids which are active in effecting liver glycogen synthesis, and provide a major energy source to assist the animal in the fight or flight reaction. It is proposed that cutaneous collagen represents a reserve energy pool, which can be mobilized via stress harmones. F.O.S.

**N74-26617*#** Scientific Translation Service, Santa Barbara, Calif.

**FUNCTIONS OF THE CENTRAL NERVOUS SYSTEM UNDER THE COMBINED EFFECT OF STRESS FACTORS: IONIZING RADIATION, ACCELERATIONS AND VIBRATION**

N. N. Livshits, ed. Washington NASA Apr. 1974 202 p refs Transl. into ENGLISH of the book "Funktsii Tsentralnoy Nervnoy Sistemy pri Kombinirovannom Deystvii Stress-Faktorov (Ioniziruy-ushchey Radiatsii, Uskoreniy i Vibratsii" Moscow, Nauka Press, 1973 p 1-174
(Contract NASw-2483)
(NASA-TT-F-15363) Avail: NTIS HC $13.25 CSCL 06P

This collection presents experimental studies of the combined effect of dynamic factors (acceleration and vibration) and ionizing radiation on the functional state of the vestibular analysor, higher nervous activity and animal behavior. The article summarizing the results of these and previously published works substantiates the theory of the importance of intracentral processes in the reactions of the central nervous system to applied combined forces. The collection also includes studies of the importance of changes in oxidizing metabolism in brain tissues in modifying action on radiation. Author

**N74-26618#** Joint Publications Research Service, Arlington, Va.

**COSMONAUT FLIGHT PREPARATION**

A. Nikolayev 24 May 1974 20 p Transl. into ENGLISH from Krylya Rodiny (Moscow), no. 2, Feb. 1974 p 10-4 and no. 3, Mar. 1974 p 10-13
(JPRS-62083) Avail: NTIS HC $4.00

Replies to questions on cosmonaut training and the design and layout of the Soyuz ship are presented. Author

**N74-26619*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**IMPROVED METHOD OF DETECTING AND COUNTING BACTERIA Patent Application**

Grace L. Picciolo and Emmett W. Chappelle, inventors (to NASA) Issued 31 May 1974 20 p
(NASA-Case-GSC-11917-1; US-Patent-Appl-SN-475337) Avail: NTIS HC $4.00 CSCL 06M

A method for bacteria counting and detection is described. The problems solved by the equipment are identified as: (1) the lack of recognition that a quantity of nonbacterial ATP was bound to large molecules of particulate matter and would not be destroyed by apyrase unless freed, as in this case by a suitable buffer such as malic acid and (2) the sensitivity or lack of capability of a system to detect and count low bacteria levels. The solution was to concentrate the sample, by centrifuging for example, so that the ATP would effectively stand apart from the supernatant phase. NASA

**N74-26620*#** Kanner (Leo) Associates, Redwood City, Calif.

**AQUATIC PLANT SURVIVES IN SIMULATED JOVIAN ATMOSPHERE. FIRST STUDIES CONCERNING THE ASSIMILATION OF C-14 METHANE BY ELODEA CANADENSIS**

E. R. Koch Washington NASA Jun. 1974 6 p refs Transl. into ENGLISH from "Preprints of Lectures from the International Congress on Aviation and Space Medicine (21st)" Munich, 1973 p 117-118
(Contract NASw-2481)
(NASA-TT-F-15718) Avail: NTIS HC $4.00 CSCL 06C

Aquatic plants, Elodea canadensis, were kept in a reducing C-14 atmosphere. At the end of the experiments, radioactivity could be detected in the plants and in several intermediate metabolic products. Light induced incorporation of C-14h4 from methane in Elodea is concluded to be very probable on the basis of these preliminary studies. Author

**N74-26621*#** Catholic Univ. of America, Washington, D.C. Dept. of Biology.

**EFFECTS OF MUTATION AND SOME ENVIRONMENTAL FACTORS ON THE PHYSIOLOGY AND PATHOGENICITY OF SELECTED BACTERIA Final Report, 1 Oct. 1972 - 30 Sep. 1973**

Benedict T. DeCicco 10 Jun. 1974 9 p refs
(Grant NGR-09-005-098)
Avail: NTIS HC $4.00 CSCL 06M

Studies with mutants of Staphylococcus aureus lacking some virulence factors suggest that the presence of deoxyribonuclease correlates with mouse pathogenicity of S. aureus, while the ability to ferment mannitol or the possession of coagulases are not required for virulence. Autotrophy investigations on mycobac-

teria demonstrate a complete correlation between the ability to grow with hydrogen and the species of scotochromogenic mycobacterium tested. All tested strains of M. gordonae, a saprophyte, could grow autotrophically while none of the tested strains of M. scrofulaceum, a clinically important species, possessed this ability. A series of heat tolerant mutants of Pseudomonas fluorescenes were obtained which can grow at temperatures up to 54 C, in contrast to a maximum growth temperature of 37 C for the wild type. Author

**N74-26622#** Royal Aircraft Establishment, Farnborough (England).
**THE INFLUENCE OF AN ORAL ADMINISTRATION OF GLUCOSE ON HUMAN CARBOHYDRATE AND FAT METABOLISM DURING WORK, WITH PARTICULAR REGARD TO MUSCLE GLYCOGEN**
D. Muller-Wening, W. Ehrenstein, G. Hoffmann, and M. Kretschmer Feb. 1973 17 p refs Transl. into ENGLISH from Res. Exp. Med. (Heidelberg), v. 157, no. 4, 1972 p 325-335
(RAE-Lib-Trans-1702; BR37565) Avail: NTIS

Glycogen content of muscle, blood glucose, insulin, FFA, RQ, and lactate were investigated in 18 male subjects during 2 hours' work on bicycle ergometer corresponding to 50% of the V02 maximum. After work periods of 10 and 30 minutes, no significant change in glycogen content was observed, while after 2 hours a significant decrease of 2.10 g per 100g dry weight was found. During work the utilization of carbohydrates decreased, fatty oxidation increased. Continuous oral glucose application reduced the fall of glycogen. After 30 minutes there was an insignificant difference of 0.55 g%, after 2 hours 0.26 g%. The utilization of carbohydrates was increased and did not show any change during the work period. A micro-method is described for the determination of the glycogen content of specimens of human skeletal muscle. Author

**N74-26623#** Royal Aircraft Establishment, Farnborough (England).
**THE EFFECT OF ADAPTATION TO COLD ON THE ENERGY OF MUSCULAR ACTIVITY**
Yu. I. Bazhenov Apr. 1974 8 p refs Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 208, no. 5, 1973 p 1250-1252
(RAE-Lib-Trans-1749; BR41242) Avail: NTIS HC $4.00

Evidence is presented of increase and mechanism of increase in heat produced from muscles of rats secondary to cold adaption. Author

**N74-26624#** Naval Submarine Medical Research Lab., Groton, Conn.
**EVIDENCE FOR A POSSIBLE MEMORY IMPAIRMENT RESULTING FROM NITROGEN NARCOSIS IN THE RHESUS MONKEY Medical Research Progress Report**
Raymond T. Bartus 30 Aug. 1973 10 p refs
(MF51524004)
(AD-775871; NSMRL-751) Avail: NTIS CSCL 05/10

Three Rhesus monkeys were pressurized to 200 feet simulated depth and tested on the reversal of a previously trained visual distrimination problem. All three monkeys displayed a higher percentage of errors on this reversal problem then on another reversal problem tested on the surface. These data, supplemented by changes in the monkeys: post-response stimulus observation time, are interpreted as possible evidence for memory impairments resulting from nitrogen narcosis. Author (GRA)

**N74-26625*** National Aeronautics and Space Administration. Pasadena Office, Calif.
**MINIATURE MULTICHANNEL BIOTELEMETER SYSTEM Patent**
John B. Carraway (JPL) and Joe T. Sumida, inventors (to NASA) (JPL) Issued 4 Jun. 1974 9 p Filed 5 Jul. 1972 Sponsored by NASA
(NASA-Case-NPO-13065-1; US-Patent-3,815,109;
US-Patent-Appl-SN-269073; US-Patent-Class-340-207R;
US-Patent-Class-128-2.1A; US-Patent-Class-325-113;
US-Patent-Class-325-141; US-Patent-Class-340-183;
US-Patent-Class-340-203) Avail: US Patent Office CSCL 06B

A miniature multichannel biotelemeter system is described. The system includes a transmitter where signals from different sources are sampled to produce a wavetrain of pulses. The transmitter also separates signals by sync pulses. The pulses amplitude modulate a radio frequency carrier which is received at a receiver unit. There the sync pulses are detected by a demultiplexer which routes the pulses from each different source to a separate output channel where the pulses are used to reconstruct the signals from the particular source.
Official Gazette of the U.S. Patent Office

**N74-26626*** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
**APPARATUS AND METHOD FOR PROCESSING KOROTKOV SOUNDS Patent**
Donald P. Golden (Technol., Inc., Houston, Tex.), George W. Hoffler (Technol., Inc., Houston, Tex.), and Roger A. Wolthuis, inventors (to NASA) (Technol., Inc., Houston, Tex.) Issued 4 Jun. 1974 9 p Filed 24 May 1972 Sponsored by NASA
(NASA-Case-MSC-13999-1; US-Patent-3,814,083;
US-Patent-Appl-SN-256317; US-Patent-Class-128-2.05A;
US-Patent-Class-128-2.05S) Avail: US Patent Office CSCL 06B

A Korotkov sound processor, used in a noninvasive automatic blood measuring system where the brachial artery is occluded by an inflatable cuff, is disclosed. The Korotkoff sound associated with the systolic event is determined when the ratio of the absolute value of a voltage signal, representing Korotkov sounds in the range of 18 to 26 Hz to a maximum absolute peak value of the unfiltered signals, first equals or exceeds a value of 0.45. Korotkov sound associated with the diastolic event is determined when a ratio of the voltage signal of the Korotkov sounds in the range of 40 to 60 Hz to the absolute peak value of such signals within a single measurement cycle first falls below a value of 0.17. The processor signals the occurrence of the systolic and diastolic events and these signals can be used to control a recorder to record pressure values for these events.
Official Gazette of the U.S. Patent Office

**N74-26627*#** Hamilton Standard Div., United Aircraft Corp., Windsor Locks, Conn.
**HYDROGEN DEPOLARIZED CELL PAIR DEFINITION FOR SPACE STATION APPLICATION Final Report**
Cornelius R. Russell Mar. 1973 150 p
(Contract NAS9-12920)
(NASA-CR-134291; SVHSER-6229) Avail: NTIS HC $10.50 CSCL 10A

Evaluation testing of the cell pair design of an electrochemical carbon dioxide collection subsystem was conducted. The system is proposed for use with the space station prototype. The objectives of the analytical and miscellaneous tasks in support of the test program are explained. An analysis was made of the number of cells required for the space station prototype. It was determined that 33 cell pairs would satisfy the space station prototype performance. Author

**N74-26628*#** University of Southern Calif., Los Angeles. Dept. of Electrical Engineering.
**NEW TECHNIQUES FOR THE ANALYSIS OF MANUAL CONTROL SYSTEMS Final Technical Report, 15 Jun. 1965 - 15 Jun. 1971**
George A. Bekey 15 Jun. 1971 29 p refs
(Grant NGR-05-018-022)
(NASA-CR-138515) Avail: NTIS HC $4.50 CSCL 05E

Studies are summarized on the application of advanced analytical and computational methods to the development of mathematical models of human controllers in multiaxis manual control systems. Specific accomplishments include the following: (1) The development of analytical and computer methods for the measurement of random parameters in linear models of human operators. (2) Discrete models of human operator behavior in a multiple display situation were developed. (3) Sensitivity techniques were developed which make possible the identification of unknown sampling intervals in linear systems. (4) The adaptive behavior of human operators following particular classes of vehicle failures was studied and a model structure proposed.
D.L.G.

N74-26629*# Denver Research Inst., Colo.
**DIRECT OXIDATION OF STRONG WASTE WATERS, SIMULATING COMBINED WASTES IN EXTENDED-MISSION SPACE CABINS Final Report**
Laurence W. Ross 30 Apr. 1973 10 p refs
(Grant NGR-06-004-068)
(NASA-CR-138607) Avail: NTIS HC $4.00 CSCL 06I

The applications of modern technology to the resolution of the problem of solid wastes in space cabin environments was studied with emphasis on the exploration of operating conditions that would permit lowering of process temperatures in wet oxidation of combined human wastes. It was found that the ultimate degree of degradation is not enhanced by use of a catalyst. However, the rate of oxidation is increased, and the temperature of oxidation is reduced to 400 F. F.O.S.

N74-26630# Royal Aircraft Establishment, Farnborough (England).
**ASSESSMENT OF ORGANISM EFFICIENCY WHILE WORKING IN BREATHING APPARATUS**
Teresa Comte May 1973 20 p refs Transl. into ENGLISH from Prace Central. Inst. Ochrony Pracy (Warsaw), v. 21, no. 71, 1971 p 319-333
(RAE-Lib-Trans-1699; BR36225) Avail: NTIS HC $4.00

The following types of respiratory protective equipment were evaluated: (1) A mask type MA-1 fitted with a hydrogen cyanide absorber; (2) an apparatus type LA; and (3) a protective apparatus for sand blasting workers. Investigations carried out in industrial establishments were concerned with the following physiological indices: pulse rate, arterial blood pressure, minute pulmonary ventilation, frequency and volume of breathing, energy expenditure and face skin temperature. In laboratory investigations, additional factors considered were: temperature and humidity in the breathing apparatus dead space, pH and pCO2 of blood. Author

N74-26631# Committee on Commerce (U. S. Senate).
**AIR BAG DEVELOPMENT AND TECHNOLOGY**
Washington GPO 1973 174 p refs Hearing before Comm. on Com., 93d Congr., 1st Sess., 1 Aug. 1973
(GPO-23-080) Avail: Comm. on Com.

The status of air bag technology and development is considered. Emphasized are safety measure to prevent injuries in automobile accidents. G.G.

N74-26632# Advisory Group for Aerospace Research and Development, Paris (France). Aerospace Medical Panel.
**HELICOPTER AIRCREW FATIGUE**
I. C. Perry, ed. May 1974 25 p refs
(AGARD-AR-69) Avail: NTIS HC $4.25 CSCL 05E

A study was conducted to provide: (1) a definition of aviator fatigue, (2) a list of the effects of fatigue on operational effectiveness, (3) a statement of causal factors and diagnostic criteria, (4) a statement of preventive measures, and (5) a statement of methods of treatment of aviator fatigue. These specific aims were accomplished and are presented. In addition, the results are given of an aircrew opinion questionnaire and a review of 120 helicopter accidents. D.L.G.

N74-26633# Royal Aircraft Establishment, Farnborough (England).
**HUMAN FACTORS IN THE STUDY OF INFORMATION INPUT DEVICES**
J. C. Sperandio and Aj Bisseret Mar. 1974 41 p refs Transl. into ENGLISH from Coll. du CERP (France), v. 17, no. 4, 1968 p 269-294
(RAE-Lib-Trans-1728; BR41239) Avail: NTIS HC $5.25

One problem area in man machine systems is that of communication between man and machine. A good knowledge of the various communication devices and of their compatibility with the operator is therefore very useful when preparing the optimization of a working system. Keyboard and comparisons based on speed, accuracy, ease of training, users convenience are considered following, as a guideline, the development of input devices to permit higher speeds. The implications of parallel inputs (chord playing keyboards) and the consequent loss of flexibility are considered. Other non-keyboard systems are dealt with and some speculation as to usefulness of devices permitting perception and decoding of natural language is presented. Author

N74-26634# Royal Aircraft Establishment, Farnborough (England).
**FOUR CHANNEL MINIATURE TRANSMITTER FOR TRANSMITTING ELECTROENCEPHALOGRAMS FROM SMALL ANIMALS**
W. Kraft and F. Voegeli Apr. 1974 13 p refs Transl. into ENGLISH from AGEN-Mitt., v. 15, 1973 p 19-24
(RAE-Lib-Trans-1754; BR41243) Avail: NTIS HC $4.00

A description is given of the development of a 4-channel EEG transmitter, which is suited for long term experiments with rats or other small animals, because of its small dimensions and its low power consumption. The employment of a simple pulse interval modulation and the introduction of novel microwatt circuits made it possible to produce this transmitter. Author

N74-26635# Honeywell, Inc., Lexington, Mass.
**A REMOTE OCULOMETER PERMITTING HEAD MOVEMENT Final Report, 1972 - 1973**
John Merchant and Richard Morrisette Wright-Patterson AFB, Ohio AMRL Nov. 1973 39 p
(Contract F33615-72-C-1038; AF Proj. 7184)
(AD-776075; AMRL-TR-73-69) Avail: NTIS CSCL 06/2

The Cubic Foot Remote Oculometer is a new instrument for the remote measurement of eye direction and pupil diameter. The electro-optical sensor unit is located several feet from the subject, who is free to move the eye being sensed throughout 1 cubic foot of space. The video processing is performed in real-time by a standard minicomputer. The oculometer processor (minicomputer) provides automatic calibration and linearization to each subject, and can supply the output eye direction information in the form of either fixation point coordinates on any specified fixation plane, azimuth and elevation, or direction cosines. The Oculometer measures line of sight to an accuracy of 1 degree for eye rotation angles, relative to the sensor unit, of from zero to +30 degrees elevation and from -30 to +30 degrees azimuth. Author (GRA)

N74-26636# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
**AN EVALUATION OF THE HONEYWELL 7A HELMET-MOUNTED DISPLAY IN COMPARISON WITH A PANEL DISPLAY; TARGET DETECTION PERFORMANCE Final Report**
Harry L. Task and John P. Hornseth Jan. 1974 15 p
(AF Proj. 7184)
(AD-775993; AMRL-TR-74-3) Avail: NTIS CSCL 05/8

Target detection performance of two groups of eight subjects was compared. Subjects of one group wore the Honeywell Model 7A helmet-mounted display (HMD). A Hewlett-Packard Model panel display was used to present the imagery to the subjects of the other group. A 16mm movie projector and a TV camera were used to present the twenty-two target runs to terrain board imagery simulating inflight target search and detection. Performance scores obtained were average slant range to detection and number of correction identifications. Although performance (slant range and hits) with the panel display was slightly better than performance with the HMD, the difference in performance was not statistically significant. Implications for HMD design and evaluation are discussed. Author (GRA)

N74-26637# Perceptronics, Inc., Encino, Calif.
**EXPERIMENTAL STUDY OF MAN/MACHINE INTERACTION IN ADAPTIVE COMPUTER AIDED CONTROL**
Gershon Weltman, Randall Steeb, Amos Freedy, Michael Smith, and Richard Weisbrod Nov. 1973 60 p refs
(Contract N00014-72-C-0093; NR Proj. 196-118)
(AD-775879; TR-73-10) Avail: NTIS CSCL 05/5

The report presents the background and results of an experimental study focusing on human factors aspects of adpative computer aiding. Included are (1) a rationale for shared decision and control, (2) a description of the adaptive aiding computer

program and task simulation developed for the experimental study, (3) the experimental design, procedure, and measurement techniques along with a discussion of the results, and (4) the development and testing of a program providing on-line estimation of operator utilities for his own and machine control. GRA

**N74-26638#** School of Aerospace Medicine, Brooks AFB, Tex.
**AVIATOR'S BREATHING OXYGEN CONTAMINANT DETECTOR Interium Report, Oct. 1972 - Oct. 1973**
Kenneth G. Ikels, Walter L. Crow, and Herman J. Kilian Feb. 1974 14 p refs
(AF Proj. 7164)
(AD-775727; SAM-TR-74-2) Avail: NTIS CSCL 06/11

The routine and special analysis of liquid aviator's breathing oxygen (ABO) is a problem faced by all Air Force operational flying bases. A portable infrared system has been developed that can rapidly determine the quality of ABO at the base level in aircraft, service cart, or bulk supply. The analyzer system was specifically designed to analyze ABO at the point of delivery to the pilot. The excellent performance of the analyzer system during laboratory and field tests, including investigation of a physiologic incident and a survey of contaminants in aircraft oxygen systems, has prompted further evaluation. An extensive program of development, test, and evaluation has been initiated at four Air Force flying bases and is now providing analysis of oxygen quality from several different aircraft. (Modified author abstract) GRA

**N74-26639#** Kentucky Univ., Lexington. Dept. of Physiology and Biophysics.
**HUMAN LIMITATIONS IN OPERATION OF AEROSPACE SYSTEMS: CIRCULATORY REGULATION DURING COMBINED FLIGHT STRESSES Final Report, 1969 - 1973**
Ernest P. McCutcheon and Charles F. Knapp 31 Aug. 1973 259 p refs
(Contract F44620-69-C-0127; AF Proj. 9777; AF Proj. 6813)
(AD-777218; AFOSR-73-2321TR) Avail: NTIS CSCL 06/1

Of the various stresses imposed upon subjects performing critical tasks, time dependent accelerations (vibration) can produce some of the greatest discomfort and decrements in performance. The effects of this stress on the cardiovascular system are being investigated in the laboratory. Instrumented animals are used to evaluate the cardiovascular changes produced by whole body, sinusoidal vibration. Experiments are designed to evaluate the role of five major mechanisms which current evidence indicates are the main factors producing these changes. Cardiovascular, hematological, and mechanical variables are used to evaluate the overall stress level. GRA

**N74-26640#** California Univ., Los Angeles. School of Engineering and Applied Science.
**BIOCYBERNETIC CONTROL IN MAN-MACHINE INTERACTION Technical Report, period ending 31 Mar. 1974**
Jacques J. Vidal Apr. 1974 102 p refs
(Contract DAHC15-73-C-0303; ARPA Order 2434)
(AD-777720; UCLA-ENG-7430; TR-1) Avail: NTIS CSCL 06/4

The research program aims at incorporating EEG evoked responses in man-machine communication. Present work is toward developing a new model for the phenomena of evoked responses in the EEG based on sequential events of short duration in the bio-electric potentials. Author (GRA)

**N74-26891** Joint Publications Research Service, Arlington, Va.
**NONSTATIONARY MODEL OF WATER-HEAT REGIME OF VEGETATION COVER**
O. D. Sirotenko *In its* Meteorol. and Hydrol., No. 3, 1974 (JPRS-62052) 22 May 1974 p 107-118 refs Transl. into ENGLISH from Meteorol. Gidrol. (Moscow), no. 3, 1974 p 89-97

A theoretical method of calculating the heat and water regime of crops, based on the solution of nonstationary equations of turbulent thermal conducitivity, turbulent vapor diffusion in the space between leaves, thermal balance of surface phytomass, and also nonstationary quasilinear equations of moisture transfer and soil thermal conductivity, is suggested. The water balance relation of plants is used for closing the equation system. Author

# Subject Index

**AEROSPACE MEDICINE AND BIOLOGY** / *A Continuing Bibliography (Suppl. 132)* SEPTEMBER 1974

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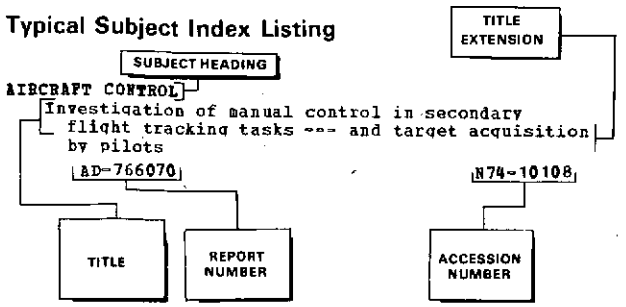


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## A

## B

## C

## D



## E

## F

## G



## H

## I

## J



## K



## L



## M

## N



## O

## P

## R

## S

## T

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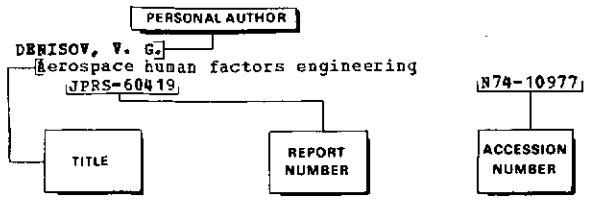


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## A



## B

## C

## D

## E



## F





## G

## H



## I



## J

## K

## L



## M

## N



## O



## P

## Q



## R



## S

## T

## U



## V



## W



## Y

## Z