on Aviation Medical Research. As an aid in the use of the abstracts, alphabetical indexes of authors and of subject matter have been appended. These indexes are reproduced by photographic reduction direct from a copy of the NRC publication "A History of the Associate Committee on Aviation Medical Research" issued in June 1946. Page references to the "History" have been removed, but the report serial numbers refer to the present bibliography, and can be used to locate specific abstracts. The indexes appear on the colored pages. (Author)

2,870

Kettle, D. J. 1958 GROUND PERFORMANCES AT TAKE-OFF AND LANDING. Aircraft Engineering 30(347): 2 January 1958.

2,871

Khazen, I. M. 1958 ON THE REGULATION OF FUNCTIONS OF THE ORGANISM DURING RADIAL ACCELERATION. Voyenno-Meditsinskiy Zhurnal 1958(3):55-60

ABSTRACT: To clarify the regulation of the functions of the organism during radial acceleration, experiments on animals were made studying the secretions of the saliva, stomach and intestinal glands, as well as the motion of an empty stomach. Experiments were conducted on dogs and human patients. Analysis of the results shows that while the effects on the saliva glands are operative for a brief period (tens of minutes), and on the stomach glands for a few hours, the secretory processes of the glands of the isolated intestinal loop are affected for days, and for weeks in the case of large accelerations. Increasing accelerations invariably caused cessation of the periodic motion of the stomach for several hours and almost simultaneously an increase in secretion. There are grounds for thinking that functional changes are governed by the direct influence of radial acceleration on tissue processes. (CARI)

2,872

Khazen, I. M. & I. L. Vaisfel'd 1962 MODIFICATION OF THE CONTENT OF BIOLOGICALLY ACTIVE SUBSTANCES IN RATS UNDER THE INFLUENCE OF RADIAL ACCELERATION. Vop. Med. Khim. 8:493-497, Sep.-Oct. 1962 (Russian)

2,873

Khazen, I. M. & I. L. Vaysfel'd 1962 CHANGE IN THE CONTENT OF BIOLOGICALLY ACTIVE SUBSTANCES IN RATS FOLLOWING THE ACTION OF RADIAL ACCELERATIONS. (Joint Publications Research Service, Washington, D. C.)JPRS-16956. ASTIA AD 401 074. Transl. from Voprosy Med. Khom. (Moscow), v. 8, no. 5, Sept.-Oct. 1962 In its Translations from Voprosy Meditsinskay Khimii (Problems of Medical Chemistry), pp. 1-9.

ABSTRACT: A study is made of the changes in the content of adrenalin, acetycholine, histamine, and serotonin in rats subjected to radial acceleration In rats, following single positive radial accelerations, the histamine content increases in the intestinal mucosa and decreases considerably in the longs and brain tissues. The diaminoxidase activity rises in the investigated tissues, especially in the longs and cerebral tissue. Following single negative accelerations, the histamine content and diaminoxidase activity decreases in the tissues. The content of adrenalin-like substances decreases in the intestinal mucosa and brain tissues. With multiple and frequently repeated positive accelerations, the examined tissues also show a reduction of the content of histamine and of adrenalin-like substances in the intestinal mucosa and brain tissues. Under similar experimental conditions, the excretion of 5-hydroxyindole acetic acid with the urine decreases. The changes in the excretion of this acid are also directly correlated with the intensity, frequency, and duration of the radial acceleration.

2,874

Khromushkin, A.I. 1944 PARASHIUTNYE PRYZHKI IZ STRATOSFERY (Parachute Jumps From the Stratosphere)
Tekhnika vozdoshnogo flota No. 8-9, P. 18-21

2,875

Kiel, F.W., J.R. Halstead, & F.M. Townsend 1962 THE BEAR AS AN EXPERIMENTAL ANIMAL. (Paper, 33rd Annual Meeting of the Aerospace Medical Assoc., 9-12 April 1962, Atlantic City, N.J.)

ABSTRACT: The bear was chosen as the test animal in the development phase of the B-58 escape capsule. This animal was selected because of the essential similarities to man, namely, spinal characteristics, erect posture and large size. The Armed Forces Institute of Pathology provided the pathology support for this endeavor. Eight bears were used in this series of tests and were exposed to various attitudes and decelerative forces. Five of the bears came through the tests well, two had traumatic lesions, and one bear was unsuitable, having congenital hydrocephalus. Complete autopsies were done on all animals, and no difficulty was encountered in interpretation of anatomy or lesions. It appears the bear would be a suitable test subject in lieu of man in a variety of mechanical and safety experiments. (Aerospace Medicine 33 (3):341, March 1962)

2,876

Kiel, Frank W. & Joe M. Blumberg 1963 SURVEY OF ROTARY WING ACCIDENTS
Aerospace Medicine 34(1): 42-47 Jan. 1963

ABSTRACT: Of 245 helicopter accidents involving at least 1 fatality, the most common type was found to be the in-flight crash to the ground (typically open land), with weather being a minor factor. Usually the aircraft was largely or totally destroyed, and there was often a fire on impact. Cardiovascular lethal injuries--ruptures of heart and aorta mainly--have been nearly as common as lethal head injury. As helmets seem to offer protection to the head, perhaps attention should next be turned to the prevention of injury to the heart and great vessels. Burns, lacerations, and drowning still claim quite a few victims. Future developments in the field of protecting helicopter occupants in accidents must be along the lines of safer and stronger helicopters. Ejection seats do not seem to be the answer, but an emphasis on parachute bailouts might be worthwhile.

2,877

King, B. C., M. C. Richardson 1957 AN EXPERIMENTAL STUDY OF ESCAPE AND SURVIVAL IN AIRCRAFT DITCHINGS. Flight Safety Foundation International Air Safety Seminar, Palo Alto, California (Nov. 1957).

ABSTRACT: The Civil Aeronautics Administration - U. S. Navy Norfolk ditching trials with a modified Martin 404 fuselage were carried out in 1955 in collaboration with components of the aviation industry and with other government groups. The detailed analyses of the film records of the experimental study have been completed. A comprehensive report is being prepared bringing together the experimental results, data from our earlier tests, and the lessons learned from a study and analysis of operational experience. This presentation is to report on some of the principal findings.

SECOND ABSTRACT: This report gives results of water ditching trials with a modified Martin 404 fuselage plus an analysis of the records of air carrier ditchings between 1946 and 1956.

2,878

King, B. G. 1954 SOME SURVIVAL LESSONS LEARNED FROM RECENT ACCIDENTS. (Paper, Flight Safety Foundation Air Safety Seminar, Santa Fe, New Mexico, 10-12 November 1954.)

2,879

Kingsley, H.D. & R.F. Rushmer 1945 EFFECTS OF ABRUPT DECELERATION ON THE ELECTROCARDIOGRAM (LEAD II) IN THE CAT IN THE SUPINE POSITION. (AAF School of Aviation Medicine, Randolph Field, Texas) Report No. 459-1

2,880

Kingsley, H. D., & R. F. Rushmer 1946 EFFECTS OF ABRUPT DECELERATION OF THE ELECTROCARDIOGRAM (LEAD II) IN THE CAT IN THE SUPINE POSITION. (School of Aviation Medicine, Randolph AFB, Texas) Proj. No. 459, Rept. No. 1; ASTIA AD-135 538; 21 Jan. 1946
See Also, Federal Proceedings 5(1):55-56, 1946

ABSTRACT: Electrocardiograms were recorded on thirty anesthetized cats in the supine position before and after exposure to peak decelerative forces averaging 1060 g. Transient bradycardia appeared within thirty seconds after impact in eight of ten control animals and in six of ten animals receiving physostigmine before deceleration. Tachycardia was noted in nine of ten animals which had been vagotomized. Depression or inversion of the T-wave on the electrocardiogram occurred in all experiments. Marked inversion occurred most frequently in the records of vagotomized animals, none of which developed conduction defects or ectopic contractions. Inversion of the T-wave in animals in the control group and in the majority of animals receiving physostigmine occurred in the same experiments in which conduction defects and/or ectopic contractions were found. Ectopic contractions and conduction defects occurred in three of the normal animals, in one of the vagotomized animals, and in five of the animals which had received physostigmine. The magnitude of the changes was greatest in the latter group. The vagus appeared to have an important role in the production of conduction defects and ectopic contractions. There was no evident relationship between the degree of the electrocardiographic change and the phase of the cardiac cycle at which impact occurred. Post-mortem examinations revealed that there were no gross injuries of the heart in any of the animals. The degree of injury to the internal organs had no obvious relationship to the type of degree of electrocardiographic changes. (AUTHOR)

2,881

Kiorboe, F., n.d. THE SIGNIFICANCE OF NYSTAGMUS OBSERVED IN ROUTINE OTOLOGIC EXAMINATION OF FLIGHT PERSONNEL (Military Hospital, Copenhagen) Rept. No. 1554

ABSTRACT: Since November 1952 when I became attached to the Danish Royal Air Force as otolaryngologic adviser, I have undertaken the otologic examinations of all student pilots who presented themselves before the Medical Examination Board of the Air Force. The number of candidates examined aggregates 1338 "normal" persons.

2,882

Kinney, G. F. 1955 TABLES FOR QUASI-EXPONENTIAL DECAY OF EXPLOSIVE SHOCK IN AIR. (U. S. Naval Postgraduate School, Monterey, California) Research Paper No. 8

2,883

Kirchner, O. E. 1954 CRASH FORCES AND CRASH SURVIVAL (Paper, Flight Safety Foundation Air Safety Seminar, Santa Fe, New Mexico, 10-12 November 1954)

2,884

Kirchner, O. E. 1958 CRASH FORCES AND SEATING. (Paper, Eleventh Annual International Air Safety Seminar, Atlantic City, New Jersey, November 11, 1958)

2,885

Kirchner, O. E. 1960 CRITICAL FACTORS IN APPROACH AND LANDING ACCIDENTS (PART I - STATISTICS) (Flight Safety Foundation, Inc., New York, N. Y.) 31 Dec. 1960

2,886

Kirkner, F. J. 1949 PSYCHOPHYSIOLOGICAL STUDIES OF MOTION SICKNESS AND AIRSICKNESS. J. Comp. Physiol. Psychol., 42:273-285.

2,887

Kirsch, R. E. 1945 A PHYSIOLOGICAL STUDY OF AVIATORS DURING COMBAT FLYING. J. Aviat. Med 16 (6)-376-384.

SUMMARY AND CONCLUSIONS:

1. Observations have been made upon certain objective physiological reactions of pilots and other personnel during actual flight on twenty-one missions over enemy held territory.

2. The typical objective changes observed occurred in the pulse rate, respiratory rate, blood pressure, axillary perspiration and palmar skin temperature; these objective changes closely paralleled the subjective reactions described by the pilots.

3. The greatest changes occurred upon first sighting the target and upon flight over those portions of the target known to be most heavily definded by anti-aircraft emplacements. The reactions were more marked when the target was first sighted than when actual flight over the target was begun, and the appearance of the first bursts of anti-aircraft fire was associated with a small definite increase in the observed cardiovascular reactions.

4. Upon completion of the mission there was consistently a rapid decrease of pulse rate and blood pressure; at this time these invariably fell to their lowest levels of the entire flight.

5. On one's first combat mission there are marked objective physiological changes which are commensurate with the subjective reactions of severe fright.

6. Considerable evidence is presented which establishes the fact that attention to one's duties while engaged in flight over the enemy plays a great role in alleviating this fright. The reputation of a target's defenses is a very important factor in determining an aviator's reactions, and repeated exposure to enemy fire does little to prevent the physiological reactions found to be characteristic of combat flying.

7. There was no evidence of either local or general retinal arterial spasm associated with the sudden, marked vascular hypertension observed in one subject on his first combat mission.

8. The observed physiological reactions were not affected during combat flight by periods of prolonged supplemental administration of oxygen.

9. The Schneider Index is of no value in predicting whether or not a given flier will undergo significant cardiovascular changes during combat flying.

10. Careful studies of changes in body weight of airmen during combat flying were undertaken . It was found that the loss of weight on even very hazardous and eventful flights is minimal.

2,888

Kitching, J.A. 1944 LIAISON REPORT TO ASSOCIATE COMMITTEE ON AVIATION MEDICAL RESEARCH FROM BANTING AND BEST DEPARTMENT OF MEDICAL RESEARCH. (National Research Council, Canada) Report #C-2686, 6 May 1944

ABSTRACT: This liaison report covers interviews and discussions with aviation medical research workers at the University of Southern California, Mayo Clinic, and Wright Field, U.S.A. dealing principally with the subject of pressure breathing but reporting also on subjects of acceleration, exposure suits, electrically heated suits, instruments for measuring the cooling power of the environment and frost bites.

2,889

Kittinger, J.W., Jr. 1960 STABLE VS. UNSTABLIZED FREE FALL FROM HIGH ALTITUDES. (Paper, 31st Annual Meeting of the Aerospace Medical Assoc., Americana Hotel, Bal Harbour, Miami Beach, Fla., May 9-11, 1960)

ABSTRACT: During November and December of 1959, two parachute jumps were accomplished from 76,000 and 75,000 feet, respectively. The jumps were made from a balloon-supported open gondola over the White Sands Missile Range. Though not planned, the subject did not have any stabilizing device on the first jump. On the second jump the subject was stabilized by means of an experimental multistage parachute. The results of the two types of free fall are compared, using the subjective reactions of the subject, and film showing gyrations to which the subject was subjected during the two types of free falls.

2,890

Kitts, W.W., A. Nakai, S.M. Prather, & J.H. Best 1960 INTERIM REPORT ON PARACHUTE RECOVERY AND IMPACT SYSTEMS
(Chance Vought Aircraft) 29 February 1960 ASTIA AD 263 499

ABSTRACT: This interim report contains information on the parachute recovery system for the Integrated Flight Capsule Program flight test vehicle. The various energy absorption systems investigated for the landing impact conditions are also discussed.

2,891

Kitzes, G. 1959 OCCUPATIONAL HEALTH PROBLEMS IN SPACE FLIGHT: IMPORTANT HEALTH PROBLEMS IN THE MAN-IN-SPACE STUDIES AT THE AERO MEDICAL LABORATORY Military Medicine 124 (10): 717-719, Oct. 1959.

ABSTRACT: Problems related to man's survival in space are briefly reviewed and categorized. The primary objectives of space-medical research are to provide an environment, workspace, and sustenance for the space traveller that will allow him to carry out his mission with maximum efficiency and protect him from irreversible injurious body changes. Basic requirements -- physiologic (Metabolic, environmental), psychologic (isolation, weightlessness, workspace, reduced sensory environment), and requirements pertaining to protection (from radiation, toxic chemicals and odors, noise and vibration, acceleration, natural infection, disorientation) are outlined.

2,892

Klee, J.B. & G.R. Wendt 1947 STUDIES OF MOTION SICKNESS. XVI. THE EFFECTS UPON SICKNESS RATES OF WAVES OF VARIOUS FREQUENCIES BUT IDENTICAL ACCELERATION. J. Exper. Psychol. 37:440-448

2,893

Klemin, A. 1933 CORSETS FOR AVIATORS. Scientific American, 149:80, Aug. 1933

ABSTRACT: Concerns acceleration and deceleration forces on pilots and protection devices to increase g tolerance.

2,894

Klemm, R.A. 1945 ATMOSPHERIC BLAST CONCUSSION: MEDICAL ASPECTS U.S. Nav. Med. Bull. 44:1228-1230.

2,895

Klenov, A. 1960 ASTRONAUTS, ON THE STARTING LINE. THE DAY IS NEAR.... Komsomol'skaya pravda P. 2; 2 December 1960.

2,896

Klier, Sol & Joseph W. Linskey 1960 SELECTED ABSTRACTS FROM THE LITERATURE ON STRESS.
(Naval Training Devices Center, Port Washington, New York. Contract No. N61339-565. Technical Report NAVTRADEVCEN 565-1 Nov. 1960 ASTIA AD 253 068.

ABSTRACT: This report is the result of a comprehensive literature search for information on stress pertinent to the training problem. It provides a source of background information from which specific hypotheses and variables will be delineated for study in a research program aimed at the introduction of stress in training devices and training programs.

From the literature on stress and anxiety 397 articles were selected and abstracted. In general, selection was made on the basis of the relevance of the study for determining and/or measuring the effects of stress or anxiety on human behavior.

2,897

Klumb, H., 1948 METHOD FOR PRODUCTION OF HIGH ACCELERATION OF MECHANICAL IMPACT. (Uber ein neus Verfahren zur Herstellung hoher mechanischer Stonbeschleunigungen und seine Verwendung der Entwichklung mechanischer Stobprufanlagen) (Central Air Document Office, Wright-Patterson AFB,Ohio) ASTIA ATI-43407 17 December 1948

ABSTRACT: An impact testing device was developed which permits the mechanical impact testing of machine parts used in the construction of machine tools, weapons, etc, which are subject to excessive acceleration. The apparatus was designed to withstand accelerations up to 10^5 g. The test specimens were of different size and weight throughout all the tests made. The construction of this apparatus is given in details, the impact velocity and maximum acceleration being measured through gas cushions consisting either of compressed air or in special cases of nitrogen and oxygen.

2,898

Knabengof, V.G., L.M. Dantsig & G.I. Simonyan 1943 INTERRELATIONSHIP BETWEEN HEMODYNAMICS AND RENAL FUNCTION DURING ACCELERATION
Klinicheskaia Meditsina (Moscow) 21(3): 47-50.

2,899

Knacke, T. 1946 ABSTRACT FROM INFORMATION REPORT CONCERNING THE INVESTIGATIONS AND DEVELOPMENTS OF THE PARACHUTE DIVISION OF THE FORSCHUNGS-ANSTALT GRAF ZEPPELIN, DATED 14 JULY 1945. (War Dept., Air Forces) TSEAA-660-99, Appendix C, February 1946.

2,900

Knacke, T. 1947 NOTES ON DECELERATION AT BAIL-OUT OF AIRCRAFT (U.S. AAF-AMC) Memorandum Report TSETE-672-22, April 10, 1947

2,901

Knackstedt, , tr. J. B. Bateman 1945 INVESTIGATION OF THE EFFECTS OF HIGH SLIP STREAM PRESSURES OF THE HUMAN BODY. (Luftfahrtforschungsanstalt Hermann Goring, Braunschweig) 20 Jan. 1943
Translated as Appendix 16 to Lovelace, W. R., E. J. Baldes, & V. J. Wulff, The Ejection Seat for Emergency Escape from High-Speed Aircraft, ATI No. 7245

SUMMARY: To test the effects on the human body of high wind blast pressures,

various subjects were placed in a high velocity wind tunnel at velocity of 650 kilometers per hour (403 miles/hr.). Tests showed that high pressures similar to the wind blast pressure developed on the forehead, eyes, nose, and chin. Lifting of the head from the head rest by the wind did not occur with the type of head rest tested. (AUTHOR)

2,902

Knerr, W. C. 1959 UNDERWATER ESCAPE PROGRAM: Description of High and Low-Level Test Drops Using F-9F and F86 Airplanes; and a 50-Foot Dummy Head Drop Test. (Naval Air Development Center, Johnsville, Pa.) Report no. 7, Proj. TED no. ADC AE-6307, NADC ED-5841; ASTIA AD 219 106.

ABSTRACT: The results and analysis of aircraft water-crash tests simulating the 50-foot fall from an aircraft carrier deck are presented in this report. Important pilot survival parameters such as water-impact forces, accelerations, canopy implosion characteristics, and aircraft rate of sink are fully discussed. These tests were conducted at Key West, Florida from April through July 1958 on completely instrumented F9F-series straight wing aircraft and F86 swept-wing aircraft. (Author)

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Knott, J. 1916 "AVIATOR'S SICKNESS." Med. Pr., 101:519-520

2,904

Knowles, W.R. 1958 "Crash Design from Crash Injury Research." U.S. Army Aviation Digest 4: 12-15.

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Knowles, W. R. 1960 IMPACT SURVIVAL IN ROTARY WING MILITARY AIRCRAFT (Aviation Crash Injury Research) March 1960

2,906

Knowles, Zelda D. 1958 BIOLOGY AND MEDICINE: A LIST OF RUSSIAN REVIEW PAPERS
(Office of Technical Services, Washington, D. C.) 62-15087

2,907

Knowlton, G. C., & G. A. Hallenbeck 1944 MEETING OF THE NATIONAL RESEARCH COUNCIL SUBCOMMITTEE ON ACCELERATION, ROCHESTER, MINNESOTA, 23 AND 24 FEBRUARY 1944. (Air Materiel Command, Wright-Patterson AFB, Ohio) AAF Memo Rept. ENG 49-696-59; ASTIA ATI-140 675; 11 March 1944

2,908

Koenen, R. & O.F. Ranke 1937 DER KREISLAUF UNTER BESCHLEUNIGUNG. BLUTIGE BLUTDRUCKMESSUNG AM HUND (The Circulation Under the Influence of Acceleration. Intravascular Determination of the Blood Pressure in the Dog.)
Luftfahrtmedizin 2: 14-26

ABSTRACT: In 6 anesthetized dogs the carotid blood pressure, under the influence of flight force exerted in longitudinal axis of the animal was determined. In the anesthetized dog the blood pressure drops as soon as acceleration begins (flight force in the gluteal region) and rises under low flight force within 18 to 20 seconds, in accordance with the reflex time of the carotid sinus. In flight force with acceleration beyond 4 g the carotid blood pressure remains constantly below zero. The pulse frequency drops in the dog as soon as the action of flight force sets in, in spite of good functioning of the carotid sinus. This is due to an unexplained vagus stimulus. The drop in blood pressure under the action of flight force is due to a reduction in the quality of circulating blood, caused by displacement of the blood into the parts of the body which are hydrostatically in lower position. Upon cessation of acceleration, the blood returns to the heart within a few seconds.

2,909

Kolcum, E. H. 1961 CHIMP SHOT RAISES HOPE THAT U. S. CAN ORBIT MAN BEFORE YEAR'S END.
Aviation Week and Space Technology, December 4, 1961, Pp. 27-28.

ABSTRACT: This article contains a detailed account of an Orbital flight of a chimpanzee-carrying Project Mercury capsule on a two-orbit mission. The Atlas MA-5 was launched at 10:07 A.M. EST on November 29, 1961.

2,910

Kolk, W. R. 1961 MODERN FLIGHT DYNAMICS. (Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1961)

2,911

Kolle, H.H. and H.J. Kaeppeler 1954 LITERATURVERZEICHNIS DER ASTRONAUTIK (BIBLIOGRAPHY OF ASTRONAUTICS)
(Tittmoning, Oberbayern: Pustet, 1954)

ABSTRACT: Lists 1,600 titles of original works on aviation and space-travel exploration. Includes a small section on artificial satellites.

2,912

Komendontov, G. & V. Kopanev 1962 MOTION SICKNESS, ITS PREVENTION AND CURE. Medit Gazeta, 5 Dec. 1962. FTD-TT-63-287

2,913

Komendantov, Docent G. & V. Kopanev 1963 MOTION SICKNESS: PROPHYLAXIS AND TREATMENT
Translation Services Branch, Foreign Technology Division, WP-AFB, Ohio
FTD-TT-63-287/1+4 April 2, 1963 (Original Source: Russian newspaper, Meditsinskaya Gazeta, December 5, 1962, p. 3) ASTIA AD 402 444

ABSTRACT: The problem of motion sickness has become significant owing to the rapid growth of all forms of transportation. Sea, air, car sickness, etc. are distinguished depending on the type of transportation. All of these ailments have a common cause -- the mechanical effect on the human vestibular system caused by changes in direction and speed of motion. Motion sickness is controlled by technical improvement of transportation facilities, the establishment of an optimal microclimatic environment for passengers, and the special selection and training of transportation workers. Conditioning of the vestibular system is the best preventive for all forms of motion sickness. Motion sickness is controlled by improving the general hygienic conditions at places of work: by establishing optimal temperature, humidity, and pressure, decontamination of air, etc. Diet during transportation should also be carefully reasoned out. Many drugs have also been proposed for the prevention and cure of motion sickness. These are mostly drugs which lower the parasympathetic tone of the central nervous system, which, as a rule, is raised in the rolling process.

2,914

Komendantov, G. L., V. I. Babushkin, P. N. Ivanov, V. B. Malkin, A. R. Mansurov, & V. V. Usachev 1955 THE EFFECT OF ACCELERATION UPON THE HUMAN ORGANISM. (Report at the Eighth All-Union Congress of Physiologists, Biochemists, and Pharmacologists, 24 May 1955)

2,915

Komendantov, G. L. 1956 CONTROVERSIAL PROBLEMS IN THE FIELD OF "PHYSIOLOGY OF ACCELERATION".
Voyenno-meditsinskiy Zhurnal (Military Medical Journal) 5:85-90, 1956.
(Translation in USAF Air Intelligence Information Report "Physiology of Acceleration: A Controversy between D. Ye. Rozemblyum and G. L. Komendantov." AF 1104152; IR-1407-57. 21 May 1957)

2,916

Konecci, E.B. 1957 PHYSICAL AND PHYSIOLOGICAL FACTORS IN MAJOR AIRCRAFT ACCIDENTS
(Directorate of Flight Safety Research, SAF, Norton AFB, California)
AFCFS-G-2, M-4-57, 13 February 1957.

2,917

Konecci, E.B. 1957 PHYSIOLOGICAL FACTORS IN USAF AIRCRAFT ACCIDENTS
Paper: Aero Medical Association, 28th Annual Meeting, Denver, Colorado, May 1957
See also: Journal of Aviation Medicine 28(6): 553-558

2,918

Konecci, E.B. 1957 PHYSIOLOGIC FACTORS IN AIRCRAFT ACCIDENTS IN THE U.S. AIR FORCE
J. Aviat. Med. 28(6): 553-558

ABSTRACT: In conclusion, we can say that factors affecting the normal physiologic state of the pilot (or crew) are contributing causes rather than primary causes of major aircraft accidents. A few physiologic conditions like hypoxia and vertigo/disorientation were primary causes. Fatigue appeared as a contributing factor in a number of accidents but the incidence appears to be decreasing, i.e., thirty-four cases in 1955 to thirteen in 1956. G forces and vibrations appeared as contributing factors in a large number of accidents; however, their significance could not be fully evaluated from the available data. The adversities of decompression, physical disturbances, hyperventilation, hypoglycemia, carbon monoxide poisoning, and air sickness do not seem to be primary problem areas.

2,919

Konecci, E. [illegible]. Trapp & M. W. Hunter 1960 MANNED NUCLEAR SPACE SYSTEMS, PART I - HIGH-THRUST NUCLEAR SYSTEMS.
Aero/Space Engineering 19(1):34 January 1960.

2,920

Konecci, E. B. 1961 REVIEW OF JANUARY 1961 LECTURES IN AEROSPACE MEDICINE (The Douglas Aircraft Co., Santa Monica)

ABSTRACT: Compiled to make the timely and valuable information presented during the Second Lecture Series in Aerospace Medicine promptly available to the large number of engineering and life sciences personnel. With the exception of three papers, the material was obtained from notes and photos taken during the five-day course. Speakers included de Vaucouleurs, Van Allen, Ney, von Braun, Flickinger, Crossfield, and Clamann.

2,921

Konecci, E. B. 1962 BIOASTRONAUTICS
Astronautics 7(11):104-109, Nov. 1962.

ABSTRACT: The National Aviation and Space Agency Biotechnology and Human Research Program is concerned with the human factors in all aspects of space flight. Human research considers man under normal and unusual conditions in order to determine the function of body systems under various environmental conditions, such as atmosphere, acceleration, radiation, and electrostatic, magnetic, and thermal conditions. Human psycholphysiological and behavioral sciences are also studied. The data obtained therefrom lead to design criteria for life-support systems, personal equipment, protective systems, and man-machine control, which include information handling, display, and controls. A representation of the Life Sciences Program is given in a table, along with a review of several government-and company-funded life science programs. A review of U. S. and Soviet space-suit development reveals some similarities, but differences in objectives and design. Reviewed briefly are some physiological aspects of the Vostok III and IV flights.

2,922

Konecci, E. B., & D. Flickinger 1963 INTERNATIONAL BIOASTRONAUTICS RESEARCH (Paper, 34th Annual Meeting of the Aerospace Medical Association, Statler-Hilton Hotel, Los Angeles, Calif., April 29-May 2, 1963)

2,923

Konstantinov, A. 1960 MAN GOES OUT INTO SPACE
Trud P. 2; 17 May 1960.

2,924

Koochembere, C.T. 1952 HUMAN FACTORS RELATIVE TO THE PROBLEM OF ESCAPE-EJECTION ACCELERATIONS. (Paper, Conference on Problems of Emergency Escape in High Speed Flight, 29-30 September 1952, at Wright-Patterson AFB, Ohio) ASTIA AD-14 347

ABSTRACT: This paper concerns itself with research work associated with ejection accelerations and how this data has been utilized in the development of equipment that will safely eject pilots from high performance aircraft. German and British experiments on human tolerance to acceleration are reviewed. On the basis of the data obtained in these experiments, the Martin Baker Aircraft Company developed a high-performance catapult, on which test subjects were exposed to 17-21 g over periods from 0.15-0.25 seconds. No injuries or undesirable side reactions were sustained. The firm developed a face curtain "for effectively maintaining the proper body and head position and relieving some of the loading on the vertebrae during ejection strokes without injury or notable discomfort.

2,925

Koochembere, C.T. 1957 PREVENTION OF BACK INJURIES RESULTING FROM THE CRASH LANDINGS OF F7U AIRCRAFT.
(Paper, 1957 Meeting of Aero Medical Association, Denver, Colo., May 6-8)

ABSTRACT: The Air Crew Equipment Laboratory has recently completed a project involving investigation of vertebral injuries of pilots encountered as a result of nose wheel failure type crashes aboard carriers and in land operations, and the subsequent solution of this problem. The system of an energy absorption cushion, which also eliminates the necessity of foot stirrups, and a fully annealed, stainless steel strap which elongates under a predetermined load allowing the seat and pilot to displace downward in the ejection rails, is presented. Data concerning the basic accelerations and loadings endured on the aircraft, seat, and pilot were obtained by crashing a full scale airplane. This information was then utilized in designing the energy absorption system.
(J. Aviation Med. 28(2):206)

2,926

Kooy, J. M. J. 1952 SOME PROBLEMS OF INTERPLANETARY TRAVEL Ingenieur 64:37-45, 1952 In Dutch.

ABSTRACT: "Calculation of satellite vehicle and escape vehicle. Discussion of overall mass-ratio as a function of exhaust velocity and acceleration."
(Brit. Interplan. Soc. J. 12:85, Mar. 1953.)

2,927

Kopanev, V. I. 1960 PROBLEM OF DARK ADAPTATION IN MOTION SICKNESS. Voyenno-meditsinskiy Zhurnal, No. 9, pp. 213-130, Sept. 1960. (Joint Publication Research Service, Washington, D. C.) JPRS-7875.

2,928

Kornfield, A.T. and J.R. Poppen 1949 HIGH VELOCITY WIND BLAST ON PERSONNEL AND EQUIPMENT.
J. Aviation Med. 20(1):24-28

ABSTRACT: The necessity for providing safe aids to escape from high speed aircraft under emergency conditions is firmly established by statistics on escape accidents. Two methods of escape which have been considered are the capsule and the ejection seat. The pilot in escaping by means of the ejection seat is exposed to several important physiological stresses; acceleration due to ejection and to the windstream; anoxia, if escape is performed at high altitudes and unless bailout oxygen equipment is provided; low temperatures of the higher altitude air; and wind blast. This paper will consider the effects of wind blast, as related to this problem.

2,929

Kornhauser, M. 1954 PREDICTION AND EVALUATION OF SENSITIVITY TO TRANSIENT ACCELERATIONS. J. Appl. Mechanics 21:371

2,930

Kornhauser, M. 1958 IMPACT PROTECTION FOR THE HUMAN STRUCTURE. APPLIED MECHANICS. (Paper, Western Regional Meeting, American Astronautical Society, 18-19 August 1958, Palo Alto, California) American Astronautical Society Preprint No. 58-38, Aug. 1958

ABSTRACT: The tolerance of humans to transient accelerations is presented in a form which permits rapid estimation of allowable impact velocities. As an example of the application of the human "impact sensitivity curve", detailed analysis is made of a manned capsule on impact with water and concrete. Although it is found that no special protection is required for low-speed impact, shock-mounting space requirements become significant at higher impact velocities. (DACO)

2,931

Kornhauser, M. 1958 IMPACT PROTECTION FOR THE HUMAN STRUCTURE
Applied Mechanics Memorandum No. 58, (Structures and Dynamic Oper. Aerosciences Laboratory, Missile and Ordnance Systems Department) July 24, 1958.

2,932

Kornhauser, M. 1958 DESIGN OF AN IMPACT TEST FOR DETERMINATION OF RESISTANCE OF MICE TO SHORT DURATION ACCELERATION.
In (Aero Science Laboratory, Missile and Space Vehicle Department, General Electric Company) Structures and Dynamics, Memo No. 63; 22 Oct. 1958.

2,933

Kornhauser, M. 1961 THEORETICAL PREDICTION OF THE EFFECT OF RATE-OF-ONSET ON MAN'S G-TOLERANCE
Aerospace Medicine 32(5):412-421, May 1961.

SUMMARY: The effects of build-up time and of total duration of acceleration-time pulses on man's G-tolerance are predicted within the framework of a simple thoretical mass-spring model. It is demonstrated both theoretically and experimentally that a short duration impact regime exists in which neither pulse shape nor pulse duration is significant, velocity change being the governing criterion of damage. At intermediate durations (0.1 to 1 second), theory indicates that both pulse duration and onset rate are of paramount importance; while response to the long duration pulses (duration greater than 1 second and $\Delta V > 500$ fps) of equal acceleration is shown theoretically to depend on rate-of-onset. For these long duration acceleration pulses, it is estimated that man's G-tolerance remains at the centrifuge value of about 20 g for onset rates less than 10 g/sec., dropping to about 10 g for onset rates above 100 g/sec. The difficulties in detecting these onset effects experimentally are discussed. (Author)

2,934

Kornhauser, M. and A. Gold 1961 THE IMPLICATIONS FROM MOUSE IMPACT STUDIES (Paper, Symposium On Impact Acceleration Stress, Brooks Air Force Base, San Antonio, Texas, November 27-29, 1961)

2,935

Kornhauser, M., & R. W. Lawton 1961 IMPACT TOLERANCE OF MAMMALS.
Planet. Space Science 7:386-394, July 1961
See also Reprint Proceedings of the Fourth AFBMD/STL Symposium "Advances in Ballistic Missile and Space Technology 3:386-394, 1961, (F)
See also Reprint Ballistic Missiles and Space Technology (Oxford, London, New York, Paris: Pergamon Press, 1961) 3:386-394

ABSTRACT: Correlation of experimental data on human impact tolerance, treating the test subject as a typical structural element, has led to the conclusion that impacts at velocities below about 80 ft/sec are tolerable regardless of the peak deceleration. The present paper is concerned with the empirical verification of the theory adopted in this study of human acceleration resistance, using mice as test specimens.
Impact tests were performed using a drop tester capable of velocity changes up to about 90 ft/sec, with various stopping devices for shaping the acceleration-time pulses. The practical ranges of impact parameters for the mouse "impact sensitivity curve" were recovered by varying the impact duration from less than 0.5 msec to about 2 msec and peak accelerations from about 500 g to about 10,000 g. The effects of acceleration, impact duration and velocity change were evaluated. The conclusions reached in this mouse impact study, when extended to larger mammals and humans by thorough experimentation, will have immediate application in the establishment of a simple design criterion for manned satellites and space vehicles on landing impact. (AUTHOR)

2,936

Kornhauser, M. and A. Gold 1961 APPLICATION OF THE IMPACT SENSITIVITY METHOD TO ANIMATE STRUCTURES
(Paper, Symposium on Impact Acceleration Stress, November 27-29, 1961, Brooks Air Force Base, San Antonio, Texas)

ABSTRACT: The method of presenting G-tolerance data in the form of a sensitivity curve was evolved at the United States Naval Ordnance Laboratory, White Oak, Maryland in the mid-1940's. Originally, this was a G-actuation presentation, since it described the performance of inertia-operated devices such as impact switches which consisted, typically, of a mass on a spring which would be displaced by the acceleration pulse until it closed an electrical circuit. The G-actuation data consisted of the threshold levels of acceleration, at various durations, sufficient to actuate the switch. Also, the sensitivity curve method of presentation proved useful when applied to structural failure, elastic and plastic deformation up to the failure point being analogous to the motion of the inertia mass restrained by its spring up to the point of actuation.
Application of this theory to man's impact tolerance was attempted, but the lack of sufficient test points prevented firm verification of the theory. The mouse impact studies described in this paper were therefore performed on large numbers of animals under well-controlled conditions in order to evaluate the sensitivity curve method of presenting G-tolerance data for mammals.

2,937

Kornhauser, M. & A. Gold 1962 APPLICATION OF THE IMPACT SENSITIVITY METHOD TO ANIMATE STRUCTURES
(In: Impact Acceleration Stress: Proceedings of a Symposium With a Comprehensive Chronological Bibliography, National Academy of Sciences, National Research Council, Publication No. 977, pp. 333-344)

ABSTRACT: Mouse impact studies were performed in order to verify a theory of impact tolerance of mammals. The theory, which expresses tolerance in terms of two significant parameters of the input or loading function, velocity change and average acceleration, has proved useful in presenting performance data for inanimate mechanical systems. Application of man's impact tolerance appeared to be successful, but with very few data points in critical regions. To test this hypothesis with animate structures, experiments were conducted with large numbers of mice in a free-fall impact facility, with velocity changes up to about 80 fps, and average decelerations up to 10,000 g. Results fit the theoretical model well, failures occurring at velocity changes above about 27 fps and at average decelerations above 650 g.

The primary results of the experimental program validated the theoretical model used for presentation of g-tolerance data. Other results of significance were the wide range of impact resistance in this uniform mouse population, and the finding that death resulted primarily from abrupt displacement of the central nervous system. Correlation of these experimental results with those for other animals showed an inverse relationship of g-tolerance with size, while tolerance to impulsive velocity change varied relatively little among different species.

2,938

Korsak, K. 1960 TRAJECTORIES OF OBJECTS EJECTED FROM AIRCRAFT.
Can. Aeron. Journal 6(1):3-9 Jan. 1960

Abstract: A method of calculating the trajectories of objects, such as occupied seats or capsules, ejected from an aircraft is presented.

2,939

Koshtoyants, Kh. 1960 TESTING SPACE SHIP CABIN
Pravda, May 19, 1960, p. 4, cols. 1-5

ABSTRACT: The pressurized cabin is the most important feature of the space ship satellite. Successful results have already been obtained in the regeneration of atmosphere. Biologists are solving the metabolic problem by transforming the pressurized cabin into a closed system with constant temperature, moisture, and atmospheric regeneration. Acceleration and weightlessness affect the nervous system, particularly its perceptive or receptory functions, which can cause the coordination of an organism's physiological functions to break down. (CARI)

2,940

Kositskiy, G. I. 1959 MAN IN COSMIC FLIGHT
Zdorov'ye (Moscow) 10:4-6, Oct. 1959

ABSTRACT: The first section, entitled "How the Weight of the Body Changes", deals with the physiological effects of weightlessness and high G forces, and means of counteracting them with centrifugal force and special anti-G suits. Sechenov's theory that brain activity is impossible without a continuous flow of nerve impulses from the sensory organs is reviewed; the author states that centrifugal force would provide the necessary vigorous stimulation of the sensory organs. According to recently obtained data on respiration and heart function in experimental animals, the absence of gravity alone does not seem to affect these functions in any special way; however, it is not yet clear how the activity of the higher branches of the brain would be affected under similar conditions. The second section, entitled "Insidious Dangers", discusses the oxygen-carbon dioxide balance necessary for the smooth functioning of the human organism. The third section, "In the Zone of Cosmic Radiation", discusses the possible effects of cosmic rays on the human organism. (CARI)

2,941

Kositskii, G.I. 1960 CHELOVEK V KOSMICHESKOM POLETE
(MAN IN SPACE FLIGHT) Zdorov'e (USSR) 10:4-6, 1959
(Air Technical Intelligence Ctr., Wright-Patterson AFB, Ohio)
Rept. No. ATIC-1419621, 17 June 1960.

ABSTRACT: The article deals with accelerative stress and other ecological problems of Space flight.

2,942

Kositskiy, G. 1961 MAN AND SPACE FLIGHT. (Chelovek i Kosmicheskii Polet)
Meditsinskiy rabotnik (USSR) 24(21:1, 4. 1961.
(Joint Publications Research Service, New York, N.Y.) 18 July, 1961.
JPRS: 9699.

ABSTRACT: Prof. G. Kositskiy states that G-stress is more difficult to withstand after a period of weightlessness and therefore recommends that re-entry stress should not exceed four to five G's as compared with seven to eight G's permissible for launch stress. Candidates should be carefully selected and trained in centrifuges and pressure suits. Automatic devices should be used to orient the cabin with respect to acceleration forces. The water immersion technique is unsatisfactory as a protective device because the astronaut would not be able to control the ship.

2,943

Kositsky, G. 1961 NOTES ON THE PHYSIOLOGY OF FLIGHT
Moscow News, May 20, 1961

ABSTRACT: The author discusses several problems of man during space flight. First among them is excess strain on the organism starting with acceleration. The most effective protection is a special anti-excess-strain suit and an adoption of the correct position. Weightlessness is a problem in space flight. However, Gagarin's flight proved that man adapts quickly to weightlessness and does not experience any particular inconveniences. An important problem is the maintenance of necessary living conditions in the cabin of a spaceship. Short flights have simply used a chemical process but longer flights will use biological methods such as a closed-cycle system. The problem of protection from radiation - hard x-rays and above all cosmic rays - is also difficult. (CARI)

2,944

Kosmarskaia, E.N. 1962 REAKTSIIA NERVNYKH KLETOK GOLOVNOGO MOZGA NA DLITEL'NOE UVELICHENIE RAZDRAZHENII OT PERIFERICHESKIKH RETSEPTOROV (REACTION OF THE NERVE CELLS OF THE BRAIN TO PROLONGED INCREASE OF STIMULI FROM THE PERIPHERAL RECEPTORS)
Biulleten' eksperimental'noi biologii i meditsiny (Moskva), 53 (6): 88-91. June 1962. In Russian, with English summary (p. 91)

ABSTRACT: The vestibular apparatus of adult rabbits was stimulated by horizontal rotation, i.e., the animals were rotated on a platform 2-3 times a day for 10-15 minutes for a total of 18-19 days. As a result of the increased vestibular stimulation the neurons in three nuclei (triangular nucleus and the nuclei of the oculomotor and abducens nerves) became hypertrophied, the greatest enlargement of the cell bodies occurring in the triangular nucleus. The cell nucleus in comparison with the cell body did not enlarge to a significant extent.

2,945

Kosmolinskii, F. P. 1960 MEDIKO-BIOLOGICHESKIE VOPROSY POLETOV V KOSMICHESKOE PROSTRANSTVO. OBZOR INOSTRANOI LITERATURY
(Biomedical Problems of Flight into Cosmic Space: A Survey of Foreign Literature)
Klin. Med. (Moscow), 38(5):8-12, May 1960, (in Russian).

ABSTRACT: This is a review of articles on physiological, psychological, and biological problems of space flight published in the West European and American aviation literature during the last decade.

2,946

Kotovskaya, A.R. & Ye. M. Yuranov 1960 [EFFECT OF LONG-ACTING TRANSVERSAL ACCELERATIONS ON THE ANIMAL ORGANISM]
Voyenno-meditsinskiy Zhurnal 4: 90

2,947

Kottenhoff, H., & L. E. H. Lindahl 1958 VISUAL AND EMOTIONAL FACTORS IN MOTION SICKNESS: PRELIMINARY COMMUNICATION. Percept. Mot. Skills 8(3):173-174, Sept. 1958

ABSTRACT: To test the hypothesis that locomotor nystagmus is the pathogenic "visual" factor in motion sickness, 12 adults and 16 children fixated a rotating Barany drum for five minutes, and were rhythmically rocked and rolled while wearing visual-field-inverting spectacles. Mann-Whitney tests were used in comparing results for adults and children. Forty-nine other subjects tested on the moving chairs also were given tests of personality and of psycho-galvanic reflex.

2,948

Kousnetzov, A. G. 1958 SOME RESULTS OF BIOLOGICAL EXPERIMENTS IN ROCKETS AND SPUTNIK II
J. of Aviation Medicine 29(11):781-784, November 1958

ABSTRACT: Scientific research work investigating the effect of space flight upon living organisms has been carried on in the Soviet Union since 1949. Penetration of the upper air layers by animals is achieved with the help of rockets. The first thing was to place the animals in specially equipped and hermetically-sealed cabins which were supplied with an air-conditioning system allowing to keep up the gas composition of the air, the temperature, and humidity at the required level so as to make the normal vital activity of the organism possible. The next task was to find out the possibility of separation from the rocket, with the help of a catapult, with a subsequent descent of the animals by parachute. The third stage of the experiments was started in 1958. The launching of animals into space with the help of rockets was effected at the height of 473 km. (294 miles). Changes noticed in the physiological functions of the animal were brought about by the sudden effect upon the latter of external irritants: acceleration, noise and vibration which appeared at the start and continued when the rocket was placed in orbit. The return to normal of the blood circulation and breathing during the zero-gravity state, when the Sputnik is in orbit, seems to prove that this factor caused no considerable changes nor any stable changes in the physiological functions of the animal.

2,949

Kovalenko, E. A., V. L. Popkov & I. N. Cherniakov 1963 INTRAVITAL STUDY OF OXYGEN TENSION IN BRAIN TISSUES DURING PROLONGED ACCELERATIONS
Biull. Eksp. Biol. Med. 55:43-48, Jan. 1963 (Russian)

2,950

Kozachenko, B. 1960 [DREAM BECOMES FACT]
Gudok P. 4; 20 May 1960

2,951

Kozlov, A. V. 1962 [PRINCIPLES AND CALCULATIONS OF HYDRAULIC LINEAR ACCELERATION CHAMBERS]. Inzhenernyy sb. 1961(31):179-187
Abstract: Referativnyy zhurnal, Mekhanika 1962(1):20, Abstract No. 1A167

2,952

Kraft, C. C., Jr. 1959 SOME OPERATIONAL ASPECTS OF PROJECT MERCURY.
(Presented at the Annual Meeting of the Society of Experimental Test Pilots, Los Angeles, Calif., Oct. 9, 1959).

2,953

Kraft, C. C., Jr. 1961 FLIGHT PLAN FOR THE MR-3 MANNED FLIGHT.
In: Conference on Results of the First U. S. Manned Suborbital Space Flight, June 6, 1961. Pp. 7-10. ASTIA AD 259 061.

ABSTRACT: This paper presents some of the preflight preparations for the manned Mercury-Redstone (MR-3) flight and gives an outline of the flight plan. Also, a brief description of the recovery operations is given. The preflight operations deal with the preparations that were carried out, and the flight plan is based on the times that the events occurred during the flight test.

2,954

Kraft, C. C., Jr., T. Roberts, E. F. Kranz & C. F. Matthews 1962 FLIGHT CONTROL AND FLIGHT PLAN.
In: Results of the First U. S. Manned Orbital Space Flight, February 20, 1962. (NASA Manned Spacecraft Ctr.) Pp. 69-76.

SUMMARY: A number of malfunctions occurred during this flight which caused some concern to the flight control team. These included the malfunction of the auto-

matic control system, and what later proved to be the false indication of heat-shield deployment. However, the presence of the astronaut onboard the spacecraft made these malfunctions of a minor nature. The astronaut's ability to evaluate the performance of the spacecraft systems and take corrective action, and his excellent method of reporting these results to the ground, resulted in the successful completion of the MA-6 flight.

2,955

Kraft, J. A. 1957 AIRCREW STRESS AND FATIGUE PROBLEMS DURING EXTENDED ENDURANCE FLIGHT.
(Lockheed Aircraft Corp. Marietta, Georgia) AF Contract No. 33-(616)-3745, 24 April 1957.

2,956

Kramer, S.B. & R.A. Byers 1960 A MODULAR CONCEPT FOR A MULTI-MANNED SPACE STATION
In: Proceedings of the Manned Space Stations Symposium, Inst. Aeronautical Sciences, New York, 1960, Pp. 36-73

ABSTRACT: Contains a section on the Micro-Encology which is broken down into the following subsections: Biochemical (Respiratory, Nutritional, Waste): Psychological (Termal, Vibratory and Aurol, Gravitational); External Phenomena (Radiation, Meteors): and Hardware (Micro-Atmosphere System, Equipment Weights plus Power).

2,957

Krause, R. and W.F. Haldeman 1958 VERTICAL DESCENT TRAJECTORIES INCLUDING RE-ENTRY INTO THE ATMOSPHERE.
(USAF Missile Development Center, Holloman Air Force Base, New Mexico) Tech. Rept. 58-4, March 1958.

ABSTRACT: Trajectories for bodies descending vertically through the atmosphere have been calculated for a wide range of initial altitudes and body characteristics to provide information required for design purposes. Parameters and equations used, as well as the method of calculation by means of an analog computer, are discussed. The results are plotted as velocity-versus-altitude and time-versus-altitude. A guide for using the graphs is included, and deceleration data are evaluated and plotted.

2,958

Kraus, R. N. 1959 DISORIENTATION: AN EVALUATION OF THE ETIOLOGICAL FACTORS Paper: Meeting of Aero Medical Association, Statler Hilton Hotel, Los Angeles, April 27-29, 1959.

ABSTRACT: Dr. Isaac H. Jones described the role of the labyrinth in relation to equilibration in 1918 when he wrote: "Equilibration in general depends upon impulses from three sources -- the kinetic - static sense, the sight and the muscle sense." Subsequent experience proved that orientation cannot be maintained while flying without a visual reference. Although the usefulness of the turn indicator, which provided a visual reference, was demonstrated by Ocker, in 1918, the practicability of "blind flight" was not generally accepted for over ten years. Today, no one questions the necessity for visual references while flying. Instruments are installed in all aircraft which provide adequate visual cues. Nevertheless, almost all pilots have been disoriented at one time or another. This report will point out some of the factors that lead to disorientation. The length of time required for a pilot in a jet aircraft to transition from VFR to IFR, variations in flight attitude while copying an ATC clearance, and procedures which prevent the pilot from monitoring his flight instruments, will be reported.

2,959

Kraus, R. N. 1959 DISORIENTATION: AN EVALUATION OF THE ETIOLOGIC FACTORS. (School of Aviation Medicine, Brooks AFB, Texas) Technical Rept. 59-90; ASTIA AD-231 542; Aug. 1959

SUMMARY: A brief history of the development of instrument flight is presented, and the physiological mechanisms involved in maintaining aerial orientation are reviewed. Each of three subjects flying in F-100F aircraft completed transition from VFR to IFR in an average time of 24, 27, and 26.5 seconds, respectively. No abnormal changes in the attitude of the aircraft or in the flight path took place during the transition. An aircraft flying at 10,000 feet can assume an attitude from which recovery is impossible in as little time as 20 seconds if the pilot does not have a visual reference. The period of time that the pilot deliberates -----from the instant when he loses his outside visual reference until he initiates transition to IFR----is the critical factor in disorientation accidents A jet aircraft can assume an attitude from which recovery is impossible while the pilot is completely unaware that a change in attitude has occurred. (AUTHOR)

2,960

Kraus, R. N. 1959 DISORIENTATION IN FLIGHT. Aerospace Med. 30(9):664-673.

SUMMARY: A brief history of the development of instruments flight has been presented. The physiologic mechanisms involved in maintaining aerial orientation have been reviewed. Each of three subjects flying in F-100F aircraft completed

transition from VFR to IFR in an average time of 24, 27 and 26.5 seconds, respectively. No abnormal changes in the attitude of the aircraft or in the flight path took place during the transition. An aircraft flying at 10,000 feet can assume an attitude from which recovery is impossible in as little time as 20 seconds if the pilot does not have a visual reference. The period of time that the pilot deliberates from the instant when he loses his outside visual reference until he initiates transition to IFR is the critical factor in disorientation accidents. A jet aircraft can assume an attitude from which recovery is impossible while the pilot is completely unaware that a change in attitude has occurred.

2,961

Kraus, R. N. 1960 EVALUATION OF A SIMPLE CORIOLIS TEST FOR VESTIBULAR SENSITIVITY. (Paper, 31st Annual Meeting of the Aerospace Medical Association Americana Hotel, Bal Harbour, Miami Beach, Fla., May 9-11, 1960)

ABSTRACT: The duration of the primary turning sensation resulting from voluntarily induced Coriolis stimulation was measured in highly qualified pilots and control subjects of the same age group. The stimulation was presented repetitively and changes in the duration were studied. The role of prolonged and intensive training is considered. (Aerospace Medicine 31(10):852-855.)

2,962

Kraus, R. N. 1961 EARLY DIAGNOSIS OF HYDROPS OF THE LABYRINTH. In Bergeret, P., ed., Escape and Survival: Clinical and Biological Problems in Aero Space Medicine. (Advisory Group for Aeronautical Research and Development, Paris) AGARDograph No. 52. ASTIA AD 261 881.

ABSTRACT: While no definite conclusions can be drawn from the cited case presentations, the following facts concerning hydrops of the labyrinth were clearly demonstrated: (1) the hearing defect due to hydrops of the labyrinth can be accurately differentiated from other types of hearing defects; (2) defective hearing is frequently observed before vertigo occurs; (3) the early diagnosis is of particular importanct to aviation medicine.

2,963

Kraus, R. N., L. L. Elliott, & E. W. Moore 1961 STAPES MOBILIZATION: EXPERIENCE IN THE UNITED STATES AIR FORCE. (School of Aerospace Medicine, Brooks AFB, Texas) Rept. 61-88; ASTIA AD-264 461; July 1961

ABSTRACT: This paper reviews results of 151 stapes mobilization operations on 94 patients. For patients on whom followup data were available, improvement in

hearing seemed to be well maintained for a 6-month period. Although it was noted that operations performed on both ears of a patient tended to have similar results, the tendency was not statistically significant. Finally, there was considerable evidence that successful operations were proportionately higher in patients requiring surgery on only one ear. A further study is being conducted to obtain additional followup information for the entire sample. (AUTHOR)

2,964

Kraus, R. N., E. W. Moore, P. J. Dowd, & R. L. Cramer 1961 PARTICIPATION OF THE VERTICAL SEMICIRCULAR CANALS IN ADAPTATION TO STIMULATION OF THE HORIZONTAL SEMICIRCULAR CANALS. (Paper, 32nd Annual Meeting, Aerospace Medical Assoc., 24-27 April 1961, Chicago, Ill.)

ABSTRACT: It is hypothesized from data on the rapid adaptation to Coriolis stimulations that adaptation to a simple acceleratory stimulation of one set of canals is facilitated by simultaneous stimulation of another set. The data to be presented will compare adaptation to simple acceleratory stimulation of the lateral semicircular canals when only these canals are stimulated and when they are stimulated simultaneously with the vertical canals. These data will contribute to the specifications of training regimens against aerial disorientation. (Aerospace Medicine 32(3):238, March 1961)

2,965

Krieger, F.J. 1956 A CASEBOOK ON SOVIET ASTRONAUTICS (The Rand Corporation, Santa Monica, Calif.) RM-1760, 21 June 1956. ASTIA AD-108 750.

ABSTRACT: This casebook is a preliminary attempt at uncovering evidence of Soviet interest in the subject and presenting it in a suitable, readable form for the edification of readers interested in what the Russians are writing about the challenging problems of space flight.

This casebook consists of two principal sections. The first is a four-part bibliography dealing with the historical, scientific, and technical aspects of rocketry and astronautics. The second is a series of complete translations from the Russian (except in three cases) of articles and papers by various authorities selected from a variety of periodicals, and arranged chronologically so that the reader can appreciate the Soviet technique in developing the subject in the open literature and become acquainted with some of the personnel entrusted with the exposition of the problems of space flight.

2,966

Krieger, F.J. 1957 BEHIND THE SPUTNIKS: A SURVEY OF SOVIET SPACE SCIENCE. (The Rand Corporation, Santa Monica, California) U.S. Air Force Project Rand R-311, 3 Nov. 1957, ASTIA AD 150 689.

ABSTRACT: This report is a survey of Soviet astronautics based entirely on the open literature. It attempts to uncover evidence of increasing Soviet concern with the challenging problems of space flight.

The Introduction to the survey delineates, briefly, the history of the development of astronautics in Russia from the turn of the century up to the launching of the first artificial earth satellite. It is intended to provide the reader with a background of the events that presaged Sputnik I and to acquaint him with some personnel entrusted with the exposition of the problems of space flight.

The articles and papers that form the main portion of the survey are, for the most part, translations from the Russian. They were written by various authorities on Soviet astronautics and have been selected from a wide variety of publications.

The Bibliography, which contains more than 339 items, has been divided into two parts in order to increase its value to the reader as well as the scholar. Part I lists books and monographs dealing with the historical, scientific, and technical aspects of rocketry and astronautics. Part II contains references drawn from various Russian newspapers, popular magazines, and serious technical journals.

Most of the articles and papers in this report appeared in Rand Research Memoranda RM-1760 and RM-1922 which formed Parts I and II of a series entitled "A Casebook on Soviet Astronautics", dated June 21, 1956, and June 21, 1957 respectively.

2,967

Krieger, F. J. 1957 A CASEBOOK ON SOVIET ASTRONAUTICS: PART II. (The RAND Corporation, Santa Monica, Calif.) RM-1922, June 21, 1957, ASTIA AD 133 018

ABSTRACT: A two-part bibliography of Russian books and periodicals dealing with various aspects of rocketry and astronautics. In addition, this study contains a series of complete translations from the Russian of articles and papers which show the singleness of purpose in the Soviet space-flight program. (Superseded by R-311.) See Behind the Sputniks

2,968

Krieger, F. J. 1958 BEHIND THE SPUTNIKS: A SURVEY OF SOVIET SPACE SCIENCE. (Washington: Public Affairs Press, 1958)

ABSTRACT: An investigation of recent Russian research and ideas on such matters as artificial satellites, flight to the moon, interplanetary communications, biological aspects of space travel, atomic airplanes, trips to the planets, worldwide television broadcasting from space stations, intercontinental rocketry, and the technical problems of cosmic flight. This report delineates the history of the development of astronautics in Russia from the turn of the century up to the launching of the first artificial earth satellite. It shows how the Soviets, in their struggle for world dominations, are applying their sledge-hammer technique not only to terrestrial affairs but also to the conquest of cosmic space.

2,969

Krieger, F. J. 1958 THE SOVIET BALLISTIC MISSILE AND SPACE FLIGHT PROGRAM
(The RAND Corporation, Santa Monica, Calif.) P-1388, June 2, 1958

ABSTRACT: An investigation of the Soviet ballistic missile and space flight program from the organization of the GIRD (Group Studying Reactive Motion) in 1929 to the present time. The paper discusses the exploitation of the German rocket power-plants and guidance and control equipment after World War II, the upper-atmosphere research-rocket program traced to 1949, the existence of an official Soviet space-flight program around 1953, the Soviet announcement of a successful test of an ICBM in 1957, and the activities of the present Soviet program in terms of the theoretical minimum-space-flight-velocity requirements and of the type of missions to be accomplished.

2,970

Krieger, F. J. 1958 SOVIET PERIODICAL LITERATURE ON ASTRONAUTICS
(The RAND Corporation, Santa Monica, Calif.) P-1562, Dec. 1, 1958.

ABSTRACT: A discourse on the many problems confronting Western readers interested in Soviet developments in astronautics. The Soviet press not only frequently misinforms its readers, but also never presents facts objectively. The Soviets prefer to publish their astronautical studies in their own rigidly controlled media. Tables presented list Soviet newspapers, journals published by the USSR Academy of Sciences and by various institutes and ministries, and Soviet abstract and reference journals that carry articles on or pertaining to astronautics.

2,971

Krieger, F. J. 1958 SOVIET ASTRONAUTICS
(The RAND Corporation, Santa Monica, Calif.) P-1437, Feb. 24, 1958.

ABSTRACT: A description of the long and active history of Soviet interest in space flight leading up to the launching of Sputniks I and II. A discussion of Soviet technical and popular literature on space flight is included.

2,972

Krimshteyn, A. Ye. 1960 ELECTROCARDIOGRAPHIC CHANGES IN FLIGHT PERSONNEL UNDER THE INFLUENCE OF FLIGHT STRAIN
Voyenno-meditsinskiy Zhurnal 5: 224-227
See also: JPRS Trans. No. 5592

2,973

Kris, C. 1957 SIMULTANEOUS MEASUREMENT OF REFLEXLY ORGANIZED PROPRIOCEPTIVE (VESTIBULAR AND NECK) AND VISUAL (OPTOKINETIC) NYSTAGMUS SHOWING DOMINANCE OF THE VISUALLY EVOKED RESPONSE.
Electroencephalography and Clinical Neurophysiol. (Montreal), 9(3): 568 August 1957

ABSTRACT: After prior rotation of the subject in a Barany chair, the head alone was rotated through an arc of 180° from left to right and vice versa. Differences between both directions of rotation in the amplitude, frequency, and rate of nystagmus were established in control sessions (a) with eyes closed, (b) with eyes open, and (c) in a stationary black and white striped drum. Then the drum was rotated at various speeds. When the drum was rotating in the same direction and speed as the head (relative angular velocity, 0) mystagmus disappeared entirely. When the head was rotated in the opposite direction to the drum, the nystagmus was accelerated by an amount proportional to the rate at which stripes were moving relative to the subject's head. It is concluded that visual field controlled stimulation dominates- in its influence on the ocular nystagmus- over the vestibular and neck oculomotor reflexes, when the rate of nystagmus produced by the head and body rotation alone is compared to the rate recorded when optokinetic response is added to visual stimulus.

2,974

Kriz, K 1959 KOTAZCE SOUCASNEHO VYSKYTU NYSTAGMU U INTRASPINALNICH EXPANZIVNICH LAZI (TO THE PROBLEM OF SIMULTANEOUS OCCURRENCE OF NYSTAGMUS IN INTRASPINAL EXPANSIVE LESIONS)
Ceckoslovenska Otolaryngologie, 8 (6):

2,975

Kroeger, W.I. 1952 THEORETICAL ASPECTS OF CATAPULTIC DEVICES (Pitman-Dunn Labs., Frankford Arsenal, Philadelphia, Pa.) 29-30 Sept. 1952, ASTIA AD-14 355.

ABSTRACT: A theoretical outline for the basic ballistic design of powder gas operated personnel catapults is presented with specific applications.

2,976

Krohn, Whitteridge, and Zuckerman 1941 EFFECT OF BLAST ON THE HEART AND HEAD. (Ministry Home Security, Comm. Civil Defense Research) RC 249, August 1941

2,977

Krohn, P. L., D. Whitteridge & S. Zuckerman 1942 PHYSIOLOGICAL EFFECTS OF BLAST.
Lancet 1:252-258, Feb. 28, 1942.

2,978

Krotkov, F. G. 1959 AVIATSIONNAYA GIGIYENA (AVIATION HYGIENE)
Voyennaya gigiyena (Military Hygiene) pp. 319-341

ABSTRACT: This is a full translation of Chapter XII "Aviatsionnaya gigiyena" (Aviation hygiene) of the monograph "Voyennaya gigiyena" (Military hygiene), by F. G. Krotkov, Major General of Medical Services, Moskva, 1959, p. 319-341. The chapter discusses in general terms certain aspects of aviation sickness, altitude sickness, etc. The successful launchings of the three artificial earth satellites and of the cosmic space rocket in the USSR which became the tenth comet of the solar system gave new urgency to the solution of the problems of space medicine. The special properties of flights beyond terrestrial atmosphere in the physiological and hygienic plan are characterized by the influence of considerable accelerations, weightlessness and cosmic radiation on the organism. The crew of a space ship will experience 6-10 Gs at the end of each period of acceleration development Experiments conducted on a centrifuge demonstrated that such accelerations are within those which can be tolerated by man. During the ascent of the rocket men must assume prone positions. After the space ship leaves at atmospheric boundaries and the flight proceeds by inertia, men will lose their weight and will experience a feeling of weightlessness foreign to them. According to the Soviet and foreign research, the state of weightlessness of short duration (2-3 minutes) will not cause serious changes in respiration and blood circulation of the experiment animals. Pulse frequency which increases at the start (from 80 to 240 per minute), drops in the state of weightlessness to almost normal. (CARI)

2,979

Kuenzli, N. G. 1950 HOW FAST? HOW HIGH?
Flying, 46(1):34-35-47-48, Jan. 1950.

ABSTRACT: At the close of World War II, Germany conducted high-speed tests on humans and animals. During an autopsy of the animals after whirling on a centrifuge, the scienctists found proof of what killed men in high-speed air craft spins and turns. The heart and all vessels near the center of rotation of the animals except those of the head were devoid of blood. Death had resulted from the total collapse of blood circulation. From this initial form of research, anti-G suits were developed to pro ect the pilot up to maximum G forces which would be encountered in aircraft. Other tests showed that the pilot should crouch with every muscle tense in order to resist centrifugal force. Humans lying on their backs could withstand centrifugal forces of 15 G without suffering visual trouble. Wind velocity of about 599 m.p.h. was the threshold of human endurance.

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Kulouiski, J. 1958 MEDICINE: A NEW CATALYST OF MEDICAL, LEGAL, AND ENGINEERING ASPECTS OF MOTORIST INJURIES AND SAFETY.
International Record of Medicine 171(9):533-537, Sept. 1958.

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Kulowski, J. 1957 ORTHOPEDIC ASPECTS OF AUTOMOBILE CRASH INJURIES AND DEATHS. The J. of the American Medical Association 163:230-233 26 January 1957.

ABSTRACT: There is a need for better ways of determining and maintaining the fitness of people to drive automobiles. The medical profession should press for application of the facts of medicine and engineering to methods of crash-proofing motor vehicles. The medical care available in emergencies must be improved. Attention should be directed not only to the prevention of fatal accidents but also to the rehabilitation of the many people who are seriously injured.

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Kulowski, Jacob 1958 MOTOR VEHICLE SAFETY IN THE AGE OF SPEED AND POWER. A BIOMECHANICAL APPROACH. Police, Pp. 33-36, May-June 1958

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Kulowski, J. 1958 AUTOMOTIVE CRASH INJURIES TO THE SPINAL AND FEMORAL LINKAGES.
Am. J. Surg. 95:908-913, June 1958.

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Kulowski, Jacob 1958 FRACTURES OF THE ELBOW JOINT. NEW CLASSIFICATION AND ROENTGENOLOGIC GUIDE TO MAJOR PITFALLS OF DIAGNOSIS AND TREATMENT.
The American J. of Roentgenology, Radium Therapy and Nuclear Medicine 79(4):692-696, April 1958

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Kulowski, J. 1959 CRASH INJURIES
(Springfield, Ill.: Charles C. Thomas, 1959)

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Kulowski, Jacob 1960 CRASH INJURIES: THE INTEGRATED MEDICAL ASPECTS OF AUTOMOBILE INJURIES AND DEATHS
(Springfield, Illinois: Charles C. Thomas, Publisher) Library of Congress Card Number: 59-8499

ABSTRACT: This book contains sections on the following subjects: biomechanics and pathomechanics; autopsy pathology; clinical pathology or pathological anatomy; medical aspects of prophylaxis or prevention; and toward a united medical concept and integrated report.

2,987

Kulowski, J. 1962 INTERCONNECTED MOTORIST INJURIES OF THE HIP, FEMORAL SHAFT AND KNEE. (In M. K. Cragun, ed., The Fifth Stapp Automotive Crash and Field Demonstration Conference, Sept. 14-16, 1961) Pp. 105-124.

2,988

Kulwicki, P. V. and G. Peoples 1962 CONTROLLED ROTATION AND STABILIZATION FOR THE ORBITAL WORKER
(Aerospace Medical Division, 6570th Aerospace Medical Research Labs. Wright-Patterson AFB, Ohio)
AMRL MEMO P-21, December 1962

ABSTRACT: A continuously acting stabilization system for a selfmaneuvering unit for an orbital worker is discussed. The stabilization is supplied by two mementum wheels rotating uniformly in the manner of gyroscopes. Since a rotating wheel tends to remain in its plane of rotation in the absence of external forces, the capability for stablization is provided. Also, since a rotating wheel tends to change its plane of rotation with the application of force ments, the capability for controlled rotation is provided.

2,989

Kumai, T. 1957 SOME MEASUREMENTS OF ACCELERATION, OF HULL VIBRATION, AND HUMAN SENSITIVITY TO VIBRATION. (Kyushu University, Japan) Reports of Research Institute for Applied Mechanics 5(17):21-26

2,990

Kunkle, E.C., P.J. Maher Jr., A.C. Lund & D.W. Lund 1946 PRELIMINARY STUDIES OF THE EFFECTS OF POSITIVE G UPON INDUCING HEADACHE, UPON THE PERCEPTION OF PAIN, AND UPON VASCULAR HEADACHE INDUCED BY INTRAVENOUS HISTAMINE. (Aero Medical Lab., Engineering Div., Wright-Patterson AFB, Ohio) Memorandum Report No. TSEAA-695-72, 15 November 1946. ASTIA ATI 123 455

ABSTRACT: A slight reduction in the intensity of pain induced by local cooling or intramuscular hypertonic saline occurs during exposure to positive G of 3.0 to 4.0 upon the human centrifuge. The basis for this decrease in pain perception is incompletely defined by these few experiments, but the time relations of the phenomenon suggest that the distraction accompanying centrifugation is an important and probably major factor.

Headache induced by intravenous histamine is readily eliminated by exposure to positive G of 3.0 to 3.6. Correlation of this observation with those of earlier studies suggests that the effect is an indirect demonstration of a decrease in intracranial arterial pressure produced by positive G.

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Kunkle, E. C., P. J. Maher and D. W. Lund 1947 HUMAN CENTRIFUGE IN STUDY OF PAIN PERCEPTION AND HEADACHE MECHANISMS.
(Aero Med. Lab., Wright-Patterson AFB, Ohio) Memo rept. TSEAA-695-72A, April 16, 1947.

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Kunkle, E. C., D. W. Lund & P. J. Maher 1948 STUDIES ON HEADACHE: ANALYSIS OF VASCULAR MECHANISMS IN HEADACHE BY USE OF THE HUMAN CENTRIFUGE, WITH OBSERVATION ON PAIN PERCEPTION UNDER INCREASED POSITIVE G. Arch. Neurol. & Psychiat. 60:253-269, Sept. 1948.

2,993

Kuntz, W.H. 1946 PILOT EJECTION SEAT TESTS AT MUROC ARMY AIR FIELD. (Engng. Div., AMC, Wright-Patterson AFB, Dayton, Ohio) July 1946. ASTIA ATI 43122

ABSTRACT: Report is given of pilot ejection seat tests conducted from an F-61B fighter. Detailed description and general remarks are given for each test. Curves showing the trajectory of seat and dummy with respect to the test airplane after ejection are included. Still prints from the motion picture records of the tests are given. It is concluded that this pilot ejection seat is satisfactory for ejecting a 200-lb dummy and parachute equipment from an airplane in flight up to velocities of approximately 290 mph IAS at 12,000 ft altitude. Automatic devices are satisfactory for releasing the lap belt and the dummy's parachute when proper inspection is applied. Recommendations are given for future tests.

2,994

Kuntz, W.H. 1948 THE DORNIER-335 PILOT EJECTION SEAT. (AMC, Wright-Patterson AFB, Dayton, Ohio) Technical Report F-TR-1191-ND, Aug. 1949. ASTIA ATI 27204

ABSTRACT: The Dornier-335 Ejection Seat was developed by the Germans, during the latter part of World War II, to provide a means of escape from high-speed aircraft. The seat is ejected from the airplane by a piston-type catapult, utilizing compressed air stored in three steel bottles of two liters capacity each, pressure of 1707 pounds per square inch. The system produced an ejection velocity of approximately 57.4 feet per second at maximum accelerations of approximately 25 "G". The seat has a total vertical adjustment of 2-7/16 inches. The seat back is parallel to the ejection angle, which is 13° from vertical.

2,995

Kuntz, W.H. 1948 THE DORNIER 335 PILOT EJECTION SEAT. (LeBoeuf Co., Dayton, Ohio) Report 2-R-001, Feb. 1948. ASTIA ATI 54820

ABSTRACT: The Dornier 335 pilot ejection seat was evaluated to determine if the system or any features thereof might be of value to the USAF in developing ejection seats as a means of emergency escape from high speed aircraft. The seat was ejected by a piston type catapult utili ng compressed air as a source of energy, and the system produced an ejection velocity of approximately 57.4 fps at maximum accelerations of approximately 25 g. The system is described in detail, including performance data and a comparison of Dornier 335 and USAF ejection systems. The complete Dornier installation was studied to determine the relationship between the various components of the system, and the measurements of significant features were recorded. It was found that there are no advantages of this system over the present USAF ejection system utilizing a powder charge catapult.

2,996

Kupalov, P. S. and M. M. Khananashvili, 1960 DIFFERENTSIROVANIYE PROSTRANSTVENNYKH USLOVNYKH RAZDRAZHITELEY (Differentiation of Conditioned Space Stimuli)
(Trans. of Zhurnal Vysshey Nervnoy Deyatel'nosti (USSR) 10(3):305-312, 1960)
(Office of Technical Services, Washington, D.C.) 60-41681

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Kuznetzov, A.G. 1958 SOME RESULTS OF BIOLOGICAL EXPERIMENTS IN ROCKETS AND SPUTNIK II. J. Aviation Med. 29:781-784

ABSTRACT: Scientific research work investigating the effect of space flight upon living organisms has been carried on in the Soviet Union since 1949. Penetration of the upper air layers by animals is achieved with the help of rockets. The first thing was to place the animals in specially equipped and hermetically-sealed cabins which were supplied with an air-conditioning system allowing to keep up the gas composition of the air, the temperature, and humidity at the required level so as to make the normal vital activity of the organism possible. The next task was to find out the possibility of separation from the rocket, with the help of a catapult, with a subsequent descent of the animals by parachute. The third stage of the experiments was started in 1958. The launching of animals into space with the help of rockets was effected at the height of 473 (294 miles). Changes noticed in the physiological functions of the animal were brought about by the sudden effect upon the latter of external irritants: acceleration, noise and vibration which appeared at the start and continued when the rocket was placed in orbit. The return to normal of the blood circulation and breathing during the zero-gravity state, when the Sputnik is in orbit, seems to prove that this factor caused no considerable changes nor any stable changes in the physiological functions of the animal.

2,998

Kydd, G. H. and A. M. Stoll 1957 G TOLERANCE IN PRIMATES. I. UNCONSCIOUSNESS END POINT.
(U. S. Naval Air Development Ctr., Johnsville, Pa.) NADC MA 5717, 11 Dec. 1957. ASTIA AD 156 855
See also J. Avia. Med. 29(6):413-421, June 1958.

ABSTRACT: In the study unanaesthetized monkeys were observed by means of both a movie and television camera during centrifuge runs of from 2.8 to 15.6 positive G (accelerative force) for periods up to three minutes. An end point was found which served to separate the initial period of activity from that which occurred later during the run. The curve resulting from the plot of end points with respect to maximum G was compared with the human tolerance curve with respect to unconsciousness. The results are discussed in terms of a beginning in the systematic correlation of animals and human experimentation.

2,999

Kydd, G.H. & R.L. Fenichel 1958 END POINT VARIATION AT CONSTANT ACCELERATION (Paper, 1958 Meeting of Aero Medical Association, Statler Hotel, Washington, March 24-26)

ABSTRACT: Unanesthetized monkeys have been observed on the 8-foot centrifuge at from 2 to 15 G, and an end point for unconsciousness has been observed. This end point has been described as the beginning of a period of inactivity on quiescence which separates periods of activity on the part of the animals. Further observations are reported at this time in which the experimental procedure has been altered to indicate some of the variation to be expected. The animals have been given multiple runs of varying duration at constant G separated by 5-minute rest periods and the occurrence of the end point has been observed. The duration of the first run was 30 seconds and succeeding runs were increased by increments of 30 seconds. The experiments indicate that the animals withstood the initial run much better than any of those that followed. The differences between the times of occurrences of the end points in the later runs were decreased indicating that there is some adaptation and the resistance of the animal is not improved under these conditions. (J. Aviation Med. 29(3):239, March 1958)

3,000

Kydd, G., R. Fenichel, & R. Crosbie 1958 RELATIONSHIP BETWEEN MEAN PRESSURE AND G-TIME PATTERN DURING POSITIVE ACCELERATION Fed. Proc., 17(1, pt. 1): 91, March 1958

ABSTRACT: Unanesthetized monkeys were subjected to increasing accelerations from 1.5 to 12 g in order to determine the relationship between the mean arterial

pressure curve and the shape of the applied g time pattern. Evaluation of mean carotid pressures and acceleration at 0.25-second intervals revealed that single time constant described the acceleration curves, while the time constants for arterial pressure became shorter as the maximum g level was increased. The deviation of the pressure curves from the simple exponential form is attributed to damping in the circulatory system.

3,001

Kydd, G.H. & A.M. Stoll 1958 G TOLERANCE IN PRIMATES. I. UNCONSCIOUSNESS END POINT.
J. Aviation Med. 29(6):413-421, June 1958.
See also (U.S. Naval Air Development Center, Johnsville, Pa.) NADC MA 5717, 11 Dec. 1957.

ABSTRACT: Unanesthetized monkeys were observed during centrifuge runs of from 2.8 to 15.6 positive G for periods up to 3 minutes. An end point was found which serves to separate the initial period of activity from that which occurred later during the run. It provides a convenient means for investigating the effect of the initial rate of application of G on the tolerance time. The curve resulting from the plot of the end points with respect to maximum G and time from the onset of G parallels the human tolerance curve with respect to unconsciousness. The establishment of a constant relationship between these curves constitutes the first step in the systematic correlation of animal and human experimentation.

3,002

Kydd, G. H., R. L. Fenichel, & R. J. Crosbie 1959 G TOLERANCE IN PRIMATES. II. OBSERVATIONS ON THE RELATIONSHIP OF CAROTID PRESSURE AND END POINT DURING ACCELERATION. (Naval Air Development Ctr., Johnsville, Pa.) NADC-MA-5903; ASTIA AD-226 557

ABSTRACT: Observations have been made simultaneously of the occurrence of an end point of unconsciousness and carotid pressure in Rhesus monkeys during centrifugation. The data indicate that the carotid pressure is influenced initially by a maneuver which gives rise to a positive wave of pressure that is well coordinated with the onset of tangential G. Following this, there is a phase of pressure drop that can be described by a single time constant which varies with G. The data indicate that the end point occurs at a constant time following this occurrence of the pressure minimum and therefore is related to the slope of the blood pressure curve. The significance of this observation with respect to the blood supply is discussed. (AUTHOR)

3,003

Kydd, G.H. ç P. Craig 1960 BIOSATELLITE, DEVELOPMENT AND STUDY WITH; LETTER REPORT CONCERNING LIFE SUPPORT SYSTEM
(U.S. Naval Air Development Center, Johnsville, Pa.) NADC-MA-L6001, Jan. 6, 1960. ASTIA AD 231 598

ABSTRACT: This report describes work in progress in the development of a facility which will allow the simulation of the ambient conditions of the life cell of the biosatellite and to provide for the metabolic requirements of the animal. Accomplishment of these objectives will permit the study of the animal under the simulated conditions, excepting zero gravity. The environmental simulation is detailed, including the simulation of the capsule conditions, the carbon dioxide absorber, circulation pump, oxygen supply and data recording.

3,004

Kydd, G.H. & K.H. Dickerson 1960 BIOPROBE, DEVELOPMENT AND STUDY WITH; LETTER REPORT CONCERNING THE LIFE SUPPORT SYSTEM
(U.S. Naval Air Development Center, Johnsville, Pa.) NADC-MA-L6007, May 20, 1960. ASTIA AD 257 369

ABSTRACT: The life support system for the bioprobe and its components is discussed including material concerning the circulating pump, the animal capsules, temperature control and feeding of the animals. Data is given for a 14-day run inside the environmental chamber.

3,005

Kydd, G. H., R. L. Fenichel, & R. J. Crosbie 1960 RELATIONSHIP OF CAROTID PRESSURE AND END POINT DURING ACCELERATION. J. Appl. Physiol. 15(5):903-906, Sept. 1960

ABSTRACT: Simultaneous observations have been made of the occurrence of an end point of unconsciousness and carotid blood pressure in rhesus monkeys during positive acceleration. The data indicate that the carotid pressure is influenced initially by a maneuver which gives rise to a positive wave of pressure that is well coordinated with the onset of tangential acceleration, while positive acceleration is at a very low level. Following this, there is a pressure drop that can be described by a time constant, that is, a function of peak g. The data indicate that the end point occurs after a constant interval following the pressure minimum and is therefore related to the slope of the blood pressure curve. The significance of this observation with respect to blood supply is discussed. (AUTHORS)

3,006

Kydd, George H., Richard L. Fenichel & Richard J. Crosbie 1960
RELATIONSHIP OF CAROTID PRESSURE AND END POINT DURING ACCELERATION
J. Appl. Physiol. 15(5):903-906. March 1960.

ABSTRACT: Simultaneous observations have been made of the occurrence of an end point of unconsciousness and carotid blood pressure in rhesus monkeys during positive acceleration. The data indicate that the carotid pressure is influenced initially by a maneuver which gives rise to a positive wave of pressure that is well coordinated with the onset of tangential acceleration, while positive acceleration is at a very low level. Following this, there is a pressure drop that can be described by a time constant, that is, a function of peak g. The data indicate that the end point occurs after a constant interval following the pressure minimum and is therefore related to the slope of the blood pressure curve. The significance of this observation with respect to blood supply is discussed.

3,007

Kydd, G. H. and K. L. Cappel 1961 LIFE SUPPORT IN THE SMALL SPACE BIOPROBE.
Aerospace Medicine 32(3):238, March 1961.

ABSTRACT: Space bioprobes of various types accommodating small animals remain an important means of investigating the effects of the space environment on biological specimens . Successful operation of life support systems for prolonged periods would lead naturally to an investigation of the physiological and behavioral problems associated with prolonged trips into space such as the biological specimens and studies of the effects of zero gravity on behavior. Over the past few years the Aviation Medical Acceleration Laboratory, together with the Franklin Institute Laboratories, have investigated many of the problems associated with the design of small animal bioprobes. Using a simulated system, animals have been subjected to the environmental conditions of a proposed bioprobe for as long as 18 days. Observations made during such tests will be discussed together with their significance in bioprobes.

3,008

Kydd, G. H., R. L. Fenichel and R. J. Crosbie 1962 OBSERVATIONS ON THE RELATIONSHIPS BETWEEN HUMAN ACCELERATION END POINTS AND THE CENTRIFUGE ACCELERATION PATTERN.
(U.S. Naval Air Development Center, Johnsville, Pa.) NADC-MA-6146; 6 Feb. 1962; ASTIA AD 273 313
(Paper, 33rd Annual Meeting Aerospace Med. Assoc., Atlantic City, N. J., 11 April 1962).

ABSTRACT: Nine human subjects were centrifuged on the 50-foot centrifuge according to a (positive) acceleration pattern similar to one used previously with

monkeys. A total of 79 runs was made which yielded 14 end points for peripheral light loss and unconsciousness. Analysis of the records showed that only one of the end points occurred later than 15 seconds and a cinematographic record made during the runs showed that the subjects strained hardest during the initial period of the run whether or not an end point wes reached. Accordingly, the hypothesis is advanced that the occurrence of an end point is dependent upon the time derivative of the onset acceleration for g forces that rise to a maximum in approximately 6 seconds and less. Since the time course of the fall in blood pressure can also be measured, a more rigorous treatment of the effects of positive acceleration is thus made possible. (Aerospace Medicine 33(3):342, March. 1962)

3,009

Kylstra, J. 1954 REGISTRATIE VAN VERSNELLINGEN MET BEHULP VAN HET ZGN. U. EFFECT (REGISTRATION OF ACCELERATIONS BY MEANS OF THE SO-CALLED U. EFFECT
Aeromedica Acta, (Soesterberg, Netherlands) 3: 271-275. 1954. In Dutch with English summary (p. 275)

ABSTRACT: A description is given of a simple method of registering small linear and rotatory accelerations. Its use in ballistographic tests and its technical applications are discussed. Analogies with the mechanism of the vestibular apparatus are shown.

3,010

Kylstra, J. 1956 REGISTRATION OF ACCELERATION BY MEANS OF U-EFFECT
Nederl. tijdschr. geneesk. 100: 911-914, March 31, 1956

3,011

Kylstra, J. 1957 THE USE OF U-EFFECT IN PHYSIOLOGICAL RESEARCH: MEASUREMENT OF ACCELERATIONS
Aeromedica Acta (Soesterberg) Spec. Ed. 1956 (1957). Pp. 159-170.

ABSTRACT: A description is presented of the design for a simple, highly sensitive accelerometer which can detect vibrations in the range of less than 1 up to

3000 c.p.s. and acceleration forces as low as .01 g. The principle employed is the so-called U-effect -- the appearance of electropotentials in a non-metallic tube filled with mercury in diluted sulfuric acid, whenever small accelerations are directed along the longitudinal axis of the system. Applications of such apparatus to study of the heart action, blood pressure, circulation, and motion are illustrated. Phenomena similar to the U-effect may exist in nature in the semicircular canals of the vestibular system.

3,012

Kylstra, J. 1957 THE USE OF U-EFFECT IN PHYSIOLOGICAL RESEARCH: MEASUREMENT OF ACCELERATION. Actas Dermo. Sefelograf. (Madrid) 48(3):159-170, Mar. 1957

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3,013

Labosky, A. 1948 INSTRUCTIONS FOR UPKEEP AND OPERATION OF THE H.G. MARK I CATAPULT AND ARRESTING GEAR (Naval Aircraft Factory, Philadelphia, Pa.) Rept. no. M-4640; 22 April 1948; ASTIA AD-103 436

3,014

Lachmann, J., F. Bergmann & M. Monnier 1958 CENTRAL NYSTAGMUS ELICITED BY STIMULATION OF THE MESO-DIENCEPHALON IN THE RABBIT. Am. J. Physiol. 193(2):328-334.

ABSTRACT: Unilateral stimulation at high frequencies (20-50cps) of a circumscribed, meso-diencephalic area, including the reticular formation medial to the nucleus reticularis thalami and geniculate bodies in rabbit's brain, produces a 'central nystagmus' with its fast component usually directed towards the contralateral side. The reaction is tentatively explained as the result of a primary inhibition of the tonic innervation of the ipsilateral musculus rectus internus and of the contralateral rectus externus of the eyes. The relationship between this higher nystagmogenic area in the meso-diencephalon and the elementary three-neuron reflex arc of the nystagmus is discussed.

3,015

Lachmann, J., F. Bergmann, J. Weinman & A. Welner 1958 CENTRAL NYSTAGMUS. II RELATIONSHIP BETWEEN CENTRAL AND LABYRINTHINE NYSTAGMUS. Am. J. Physiol. 195(2):267-270.

ABSTRACT: Rotation of a rabbit influences the 'central' nystagmus, provoked by electrical stimulation of a nystagmogenic area in the mesodiencephalon, in opposite sense during the acceleratory and deceleratory period, respectively. Nystagmic movements, produced by simultaneous central and labyrinthine stimulation, show enhancement, when they possess identical direction, and suppression, when their directions are opposite. The same rule applies to superposition of central and caloric n stagmus, the latter resulting from temperature changes near the tympanic membrane. When electrical stimulation is stopped, central nystagmus often increases its frequency for a short period.

3,016

Lafferty, R. E., & R. Graetzer 1957 A STRAIN GAUGE METHOD OF MEASURING WIND-BLAST ON FLIGHT HEADGEAR.
(Wright Air Development Division, Wright-Patterson AFB, Ohio). WADD TR 57-204; ASTIA AD 118 169.

ABSTRACT: The headgear, such as helmets, oxygen masks, etc., worn by pilots must be able to withstand the windblast conditions encountered during emergency ejection from a moving aircraft. During the course of the tests herein described, strain gauges were used to measure the forces exerted by the windblast. When plotted, the data obtained gave qualitatively consistent graphs, and when correlated with high speed motion pictures of the test runs, indicated this method of instrumentation to be a feasible means for windblast force measurements.

3,017

Laidlaw, W. R. 1961 THE SIMULATION OF LOW ALTITUDE FLIGHT UTILIZING A LINEAR HUMAN ACCELERATOR. (Paper, Panel on Acceleration Stress of the Armed Forces NRC Committee on Bio-Astronautics, 6-11 March 1961, NASA Ames Research Ctr., Moffett Field, Calif.)

3,018

Lalli, G. 1961 INFLUENCE OF SIGNIFICANT POSITIVE ACCELERATIONS ON THE ACTIVITY OF SOME ENZYMES IN RAT SERUM.
Rev. Med. Aero (Paris) 2:30-33, Dec. 1961 (France)

3,019

Lalli, G. 1962 SULL'INFLUENZA ESERCITATA DA NOTEVOLI ACCELERAZIONI POSITIVE SU ALCUNE ATTIVITA ENZIMATICHE SIERICHE NEL RATTO (ON THE EFFECT OF HIGH POSITIVE ACCELERATIONS ON SOME SERUM ENZYME ACTIVITIES IN THE RAT)
Rivista di medicina aeronautica e spaziale (Roma), 25 (2): 234-242. April-June 1962. In Italian, with English summary (p. 240)

ABSTRACT: The following serum enzymes were determined in rats surviving twenty-four hours of exposure to positive accelerations of high intensity, long duration, and capable of producing instantaneous death (Mortality rate as high as 30%): glutamic oxalacetic and glutamic pyruvic transaminase; aldolase; lactic, malic, sorbitol, and isocitric dehydrogenase; acid and alkaline phosphotase; and ceruloplasmin. The most significant increases, as compared with control animals, were found in transaminases, especially glutamic oxalacetic transaminase, and in aldolase. These changes were inconsistent.

3,020

Lalli, G. & G. Paolucci 1963 BEHAVIOR OF VARIOUS SERUM ENZYMES IN THE RAT IN RELATION TO THE ANATOMOPATHOLOGICAL LESIONS PRODUCED BY TRANSVERSE ACCELERATIONS OF GREAT INTENSITY AND VERY SHORT DURATION. Riv. Med. Aero 26:26-57, Jan.-Mar. 1963 (Italy)

3,021

Lamb, L.E. 1959 FIRST INTERNATIONAL SYMPOSIUM ON CARDIOLOGY IN AVIATION CONDUCTED AT THE SCHOOL OF AVIATION MEDICINE, 12-13 NOVEMBER 1959 (School of Aviation Medicine, Brooks AFB, Texas) ASTIA AD-244 389

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3,022

Lamb, L.E. 1959 MEDICAL ASPECTS OF INTERDYNAMIC ADAPTATION IN SPACE FLIGHT. J. Aviation Med., 30(3):158-160

ABSTRACT: The astronaut's journey into space will require a series of adaptations to multiple sequential changes in environmental circumstances. These adaptations will involve an inter-relationship of more than one biological stress and more than one organ system. The ability to make sequential adaptations to a variety of different biological stresses is greatly influenced by individual characteristics.

3,023

Lamb, L. E., H. C. Green, J. J. Combs, S. A. Cheeseman, & J. Hammond 1960 INCIDENCE OF LOSS OF CONSCIOUSNESS IN 1,980 AIR FORCE PERSONNEL (School of Aerospace Medicine, Brooks AFB, Texas) Rept. 61-6, Oct. 1960

3,024

Lamb, L. E. 1960 INFLUENCE OF AEROSPACE FLIGHT ON THE NORMAL CARDIOVASCULAR SYSTEM: STRESSES AND EFFECTS
Am. J. Cardiol. 6(1):8-18, July 1960

ABSTRACT: The mechanics of the adjustments and alterations of cardiovascular functions in response to flight stresses such as hypoxia, explosive decompression or acute anoxia, positive pressure breathing, relative immobility, acceleration, decreased barometric pressure, and weightlessness are discussed. Consideration is also given to measures of counteracting the effects of these stresses, such as the administration of 100 per cent oxygen, the use of pressure suits and helmets, assumption of the transverse position by the pilot, the creation of an artificial g force during the weightless period, and constant stimulation of the circulatory system with forces comparable to 1 g as normally encountered at ground level. (Aerospace Medicine 31(10):874, October 1960)

3,025

Lamb, L. E. and J. Roman 1961 THE HEAD-DOWN TILT AND ADAPTABILITY FOR AEROSPACE FLIGHT
Aerospace Medicine 32(6):473-486, June 1961.

SUMMARY: 1. A study of 224 subjects with feet down (+1 g), horizontal (tranverse g), and 45-degree head-down tilt (—0.7 g) in the laboratory on a standard tilt table was carried out.

2. Marked changes in heart rate were noted by using this simple laboratory tool. The changes in heart rate were frequently associated with striking cardiac arrhythmias. Despite arrhythmias of the magnitude of sinus arrest with idioventricular rhythm, no examples of significant circulatory disturbance were encountered during a one-minute period of head-down tilting.

3. The subjects studied ranged from 20 to 45 years of age. Age did not appear to be a significant factor influencing the changes in heart rate or rhythm.

4. Analysis was carried out in reference to the influence of physical fitness as judged by relatively standard treadmill exercise tests, and it was apparent that physical fitness or exercise tolerance was not a significant factor in influencing the level of sympathetic acceleration or vagotonic

rebound indicated by changes in pulse rate for this group.

5. As a group, there were no significant differences between individuals who had had previous history of loss of consciousness, individuals who presented for a variety of complaints to the Consultation Service other than loss of consciousness, and individuals undergoing special testing from the Test Pilot School.

6. The most significant factor influencing the degree of cardioinhibitory response noted in the head-down tilt was the level of sympathetic activity in an individual as indicated by his baseline heart rate and his post-stress sympathetic acceleration level.

7. The tilt table provides a convenient tool for studying an individual's circulatory reflex response in reference to adaptation to stresses imposed during +1 g and to responses incurred following termination of stresses and exposure to —0.7 g.

3,026

Lamb, Lawrence E. 1962 SELECTION & STRESS TESTING OF ASTRONAUTS
In: (School of Aerospace Medicine) Lectures in Aerospace Medicine, 1962 pp. 45-64

ABSTRACT: Early in the history of aviation it was recognized that flight causes major stresses upon the circulatory system. Increased g forces and hypoxia both cause major alterations in cardiovascular dynamics. Much of the research which has been carried out by investigators throughout the world concerning the influences of g forces and hypoxia may be applied directly to problems of space flight. This presentation by Dr. Lamb designates the circulatory responses that may be encountered and will indicate ways by which the circulatory system may be studied in the laboratory to gain some knowledge of its adaptability to multiple sequential stresses.

3,027

Lambert, E. H. 1944 ACCELERATION CONFERENCE OF THE COMMITTEE ON AVIATION MEDICINE (Mayo Clinic, Rochester, Minnesota) 23 Feb. 1944

ABSTRACT: (a) In 215 centrifuge trials in which peripheral light loss occurred, it took place an average of 6.4 seconds after the maximal "g" was reached. Recovery averaged 12.7 seconds after the attainment of maximum "g". Where blackout also occurred, peripheral light loss developed after 5.8 seconds, recovery after 15.5 seconds. Blackout occurred at 7.9 seconds, recovery after 15 seconds. If subject became unconscious, peripheral light loss occurred at 6.8 seconds. If symptoms are going to appear on a given centrifuge run, they happen before the tenth second. In only one out of 181 cases did peripheral light loss occur after this time. The time for peripheral light loss remains constant in a given individual over a period of a year and a half.

(b) "Variations of intraoccular pressure". 200 observations on one subject whose resting blood pressure averaged 110/80 show that extraocular pressures of 50 mm Hg cause peripheral dimming beginning nasally, of 55 mm Hg result in peripheral light loss, and of 65 mm Hg cause blackout. First areas of the retina to become insensitive to light are those most remote from the origins of the retinal blood vessels. Application of 30 mm Hg negative pressure to the eyes will clear vision of a subject riding the centrifuge at blackout level. Naturally this is a very hazardous procedure.

3,028

Lambert, E. H., E. H. Wood, E. J. Baldes & C. F. Code 1944 COMPARISON OF PROTECTION AGAINST THE EFFECTS OF POSITIVE ACCELERATION AFFORDED BY THE STANDARD GRADIENT PRESSURE SUIT (GPS) AND A SIMPLIFIED SINGLE PRESSURE SUIT.
(National Research Council, Committee on Aviation Medicine, Washington,D.C.) CAM Rept. No. 308; 27 May 1944.

ABSTRACT: (a) The GPS inflated to the standard three pressure gradient afforded an average protection of 1.5 "g" in 21 subjects.
(b) The simplified single pressure suit inflated with 1.25 psi offered 1.4 "g" protection in 13 subjects. A comparison of the SPS and GPS on 8 subjects revealed no significant difference between the two suits.
(c) The GPS modified for a single pressure of 3 psi plus 1 psi/"g" afforded an average protection of 1.8 "g" in 6 subjects.
(d) The SPS inflated with a two pressure gradient afforded an average protection of 1.8 "g" in 6 subjects.

Conclusion: There is no significant difference between the GPS and SPS when either is inflated by either single or gradient pressure.

3,029

Lambert, E. H., C. F. Code, E. J. Baldes, & E. H. Wood 1944 THE F.F.S. WITH PNEUMATIC PRESSURIZATION AS AN ANTI-G DEVICE.
(National Research Council, Committee on Aviation Medicine, Washington, D.C.) CAM Rept. No. 248; 19 Jan. 1944.

ABSTRACT: The FFS, designed to contain water, was inflated with air at 1 psi/"g" and tested on 8 subjects on the centrifuge. Average protection provided was:

Visual symptoms	2.2 "g"
Blood content of ear	2.2 "g"
Amplitude of ear pulse	2.5 "g"

When the FFS was inflated with 4.7 liters of water, less than 1 "g" protection was obtained by all criteria; when fully inflated with water, 1.5 "g" protection was provided.

3,030

Lambert, E. H., E. H. Wood & E. J. Baldes 1944 PROTECTION AGAINST THE EFFECTS OF ACCELERATION AFFORDED BY PULLING AGAINST A WEIGHTED CONTROL STICK AND THE INFLUENCE OF THIS ON THE EFFECTIVENESS OF PNEUMATIC ANTI-BLACKOUT SUITS. (National Research Council, Committee on Aviation Medicine, Washington, D.C.) CAM Rept. No. 265, 12 Feb. 1944.

ABSTRACT: (a) Pulling against a force of 19 pounds per "g" applied to a mock airplane control stick increased the average "g" tolerance of 12 subjects 0.7 "g". (b) In 8 subjects (4 wearing GPS, 3 wearing AOS, and 1 wearing a modified GPS) the protection of the stick was added to the protection offered by anti-"g" suits as follows:

		PROTECTION OFFERED BY		
	THRESHOLD	STICK	SUIT	STICK + SUIT
Ear Opacity		+0.5	+1.4	+1.9
Ear Pulse		+0.6	+2.0	+2.6
Clear Vision	2.9 "g"			
Dim Vision	3.4 "g"			
Peripheral light loss	3.9 "g"	+0.7	+1.2	+1.8
Blackout	4.7 "g"			

(c) Pulling on a weighted stick speeds the time of recovery of vision and is twice as effective during recovery period as during maximum acceleration. Cardiac acceleration is greater when pulling on the stick, reaches a maximum later, and last longer.

3,031

Lambert, E.H. 1945 COMPARISON OF THE PHYSIOLOGIC EFFECTS OF POSITIVE ACCELERATION ON SUBJECTS IN THE MAYO CENTRIFUGE AND IN AN A-24 AIRPLANE (Army Air Forces Materiel Center) Contract No. w(33-038) ac-9166; August 1945; ASTIA ATI 13248

ABSTRACT: An RA-24A Douglas Dauntless dive bomber has been equipped for study of the physiologic effects of positive acceleration on the human subject in flight. The physiologic changes studied in the airplane were the visual symptoms, the changes in the ear pulse, the blood content of the ear and the pulse rate. Motion pictures of the subjects were taken in many instances. G tolerance as measured by the occurrence of visual symptoms was on the average 0.7 g higher in the airplane than on the Mayo centrifuge. The level of acceleration at which loss of the ear pulse occurred was on the average 0.5 g higher in the airplane. The observations included in this study establish the essential similarity of the effects of positive acceleration on subjects in the airplane and on the centrifuge. They support the validity of applying the results of centrifuge studies to conditions of actual flight.

3,032

Lambert, E. H. 1945 COMPARISON OF THE PHYSIOLOGIC EFFECTS OF POSITIVE ACCELERATION ON SUBJECTS IN THE MAYO CENTRIFUGE AND IN AN A-24 AIRPLANE. (Submitted to Nat'l. Research Council, Sept. 1945, and as memo. rept. to Aero Medical Lab., Wright Field, Oct. 1945) CAM Rept. No. 467.

ABSTRACT: This study was undertaken to determine whether or not there are differences between the subjective and objective physiologic changes which occur in human subjects as a result of exposures to positive acceleration on a centrifuge as compared with those which occur in an airplane. The pulse rates of the subjects both prior to and during exposure to acceleration were higher in the airplane than they were on the centrifuge. On the other hand, the actual cardiac acceleration resulting from exposure to a given magnitude of acceleration was less in the airplane than on the centrifuge, while the increase in pulse rate on exposure to accelerations which produced an equal degree of impairment of vision was almost the same in the two instances. The general pattern of the change in pulse rate during exposure to acceleration was the same in the airplane and centrifuge, although like other events the maximum cardiac acceleration was attained slightly earlier in the airplane.

3,033

Lambert, E.H. 1945 COMPARISON OF THE PROTECTIVE VALUE OF AN ANTIBLACKOUT SUIT ON SUBJECTS IN AN A-24 AIRPLANE AND ON THE MAYO CENTRIFUGE
(Mayo Aero Med. Unit Memo Rept. to AAF Material Center. Contract No. W(33-038) ac-9166. Serial Rept.: Series B, No. 2)
See also: J. Avia. Med. 21(1): 28-37, Feb. 1950

3,034

Lambert, E.H. 1945 COMPARISON OF THE PROTECTIVE VALUE OF AN ANTIBLACKOUT SUIT ON SUBJECTS IN AN A-24 AIRPLANE AND ON THE MAYO CENTRIFUGE
(National Research Council, Committee on Aviation Medicine, Washington, D.C.) CAM Rept. No. 487; October 1945

ABSTRACT: With the anti-blackout suit uninflated the g tolerance of the subjects as measured by the occurrence of visual symptoms was on the average 0.7 g higher in the airplane than it was on the centrifuge. The pulse rates of the subjects were on the average 15 beats per minute faster in the airplane than they were on the centrifuge.

The average protection afforded against the development of visual symptoms by inflation of the anti-blackout suit during exposure to acceleration in the airplane and centrifuge was 1.1 g and 1.0 g, respectively.

The average protection afforded the blood content of the ear in the airplane and centrifuge was 1.2 g and 1.1 g, respectively.

The average protection afforded the amplitude of the ear pulse in the airplane and centrifuge was 1.6plus g and 1.5plus g, respectively.

The average protection afforded the heart rate was 1.4 g in both the airplane and centrifuge.

Thus, despite the higher g tolerance of the subjects when in the airplane, the amount of protection afforded by the anti-blackout suit was the same in the airplane as it was on the centrifuge.

3,035

Lambert, E. H. & C. Sheerd 1945 INVESTIGATIONS OF THE SITE OF ORGIN OF "BLACK OUT" IN MEN.
(Paper: 13 th Annual Meeting of the Optical Society of America.)

ABSTRACT: Blackout is a temporary loss of vision without loss of consciousness which aviatiors experience when they are subjected to high positive acceleration. In these investigations, temporary loss of vision was produced at 1 G (gravity) by the application of air pressure to the eyeball. When the effective systolic arterial pressure to the eye (the systolic pressure at head level minus the pressure to the eye) was 49 to 30 mm. of mercury, vision was dimmed; peripheral vision was lost at 32 to 20 and vision was completely lost at 21 to zero. These visual changes were the same in the latent period, progress of development and level of effective blood pressure as in the case of the visual changes produced by positive acceleration of the human centrifuge. Application of 20 to 30 mm. of mercury applied to the eyeball prevents the occurrence of blackout when man is subjected to high acceleration. These experiments indicate that the loss of vision which occurs without loss of consciousness during high positive acceleration is of retinal origin. (J. Optic. Soc. Am. 35:804.)

3,036

Lambert, E.H. E.H. Wood & E.J. Baldes 1945 MAN'S ABILITY TO WITHSTAND TRANSVERSE ACCELERATION WHEN IN THE SITTING POSITION.
(National Research Council, Division of Medical Sciences)
Report No. 418, March 7, 1945, ASTIA ATI 198 404

ABSTRACT: Five subjects in the sitting position have been exposed to transverse acceleration in the dorsal-ventral direction of up to and including 10 g for 3 to 10 seconds. No residual harmful effects were observed in any of the subjects. During the period of exposure 1) The pulse rate decreased and the blood content of the ear increased in all subjects in whom the head was not supported at a level appreciably above that of the trunk. 2) Premature systoles occurred during part of the exposures in 2 subjects. 3) All subjects noted some feeling of dyspnea at acceleration above 8 g. 4) Distracting epigastric pain occurred in 2 subjects. This pain was decreased by supporting the hips and shoulders above the level of the cockpit floor. Recommendations are listed which should be considered if it is proposed to expose pilots in the sitting position to high transverse accelerations.

3,037

Lambert, E. H. 1945 THE PHYSIOLOGIC BASIS OF "BLACKOUT" AS IT OCCURS IN AVIATORS.
Fed. Proc. 4:43.

ABSTRACT: "Blackout" in aviators is a temporary loss of vision without disturbance of consciousness occurring during exposures to high positive acceleration. Experiments were designed to determine the role of the retina in the origin of this phenomenon.

1. At 1 g (Gravity) temporarly loss of vision was produced by application of air pressure to the eyeball, using special masks. The effective systolic arterial pressure to the eye (systolic pressure at head level minus the applied eye pressure) at which symptoms occurred was in millimeters of mercury: vision dim, 49 to 30; peripheral vision lost, 32 to 20; vision completely lost, 21 to 0. These visual changes were the same in latent period and progress of development and occurred at the same level of effective blood pressure as the visual changes that occur at high positive accelerations on the human centrifuge.

2. On the centrifuge, application of 20 to 30 mm. of mercury pressure to the eyeball lowered by 1 g the threshold acceleration at which visual changes occurred. This pressure corresponds to the fall in systolic arterial pressure per g found to occur at head level during exposure to acceleration.

3. The application of 30 to 40 mm. of mercury suction to the eyeball prevented the occurrence of blackout during exposure to high accelerations. When suction is applied to only one, that eye maintains clear vision while the other "blacks out."

These experiments allow the conclusion that the loss of vision (blackout) that occurs without loss of consciousness during exposure to high acceleration is of retinal origin.

3,038

Lambert, E. H. 1945 SITE OF ORIGIN OF BLACKOUT.
Proc. Am. Federation Clin. Research 2:64-65.

3,039

MOTION PICTURE

Lambert, E. H., G. A. Hallenbeck, et al. 1945 THE SYMPTOMS WHICH OCCUR IN MAN DURING EXPOSURE TO POSITIVE ACCELERATION
Federation Proceedings 4(1):43.

ABSTRACT: This motion picture illustrates the sequence of the symptoms which develop in normal men when exposed to positive acceleration while sitting in a comfortable physical and mental state, free frm undue excitement or muscle tension. Under these conditions there is a definite sequence or pattern in the symptoms. As accelerations of greater magnitude are experienced, symptoms of increasing consequence are encountered. These symptoms are ushered in by dimming or graying of vision which is most noticeable in the peripheral fields and occurs on the average at about 3 g. Between 3 to 4 g this dimming usually progresses so that lights placed in the peripheral fields of vision cannot be seen

(peripheral lights lost). In the neighborhood of 4 to 5 g vision is quite regularly lost completely, the subject being rendered temporarily completely blind (true blackout, amaurosis fugax-temporary loss of vision during positive acceleration without loss of vision during positive acceleration without loss of consciousness). At still higher accelerations (on the average 5 to 6 g) consciousness is lost. The color changes in the faces of the subjects seen in the motion picture indicate: a period of progressive failure during which blood is progressively lost from the face, and a period of compensation during which blood is returned to the face. The motion picture illustrates that if visual symptoms are encountered, they occur during the period of progressive failure and that recovery from visual symptoms often takes place during the period of compensation while the accelerative force is still at maximum.

3,040

Lambert, E. H. & E. H. Wood 1946 DIRECT DETERMINATION OF MAN'S BLOOD PRESSURE ON THE HUMAN CENTRIFUGE DURING POSITIVE ACCELERATION.
(Acceleration Lab., Mayo Aero Medical Unit, Rochester, Minn.)

ABSTRACT: Determination of the changes in arterial pressure during exposure to positive acceleration on the Mayo centrifuge was made in 20 men by puncture of the radial artery. Pressures were recorded routinely by means of a resistance wire strain gauge manometer which activated a sensitive galvanometer and occasionally by a Hamilton manometer. Pressures in the seated subject were measured with the wrist supported at head level or at heart level. The various hydrostatic levels were determined from photographs of the subject taken prior to and during exposure to acceleration.

For correlation with changes in arterial pressure simultaneous records were obtained of the subject's ear pulse, blood content of ear, heart rate, electrocardiogram, respiration, rectal pressure and reaction time to light signals in peripheral and central fields of vision.

At the level of the eyes, the decrease in blood pressure per g increase in positive acceleration averaged 32 mm. Hg systolic and 20 mm Hg diastolic. During maintained acceleration the lowest pressure occurred in about 7 seconds and was followed by some recovery. In general, with unimpaired vision the systolic pressure at eye level remained above 50 mm. Hg and with complete loss of vision it was less than 20 mm. Hg. At the level of the heart (third interspace) the average decrease in pressure per g increase in acceleration was 4 mm. Hg systolic and 0 mm. Hg diastolic. During recovery in g the pressure at heart level rose 20 to 70 mm. Hg above the control value. (Federation Proceedings 5(1):59, 1946)

3,041

MOTION PICTURE

Lambert, E. H. 1946 PHYSIOLOGIC STUDIES OF MAN'S G TOLERANCE IN AIRCRAFT. (Acceleration Lab., Mayo Aero Medical Unit, Rochester, Minn.)

ABSTRACT: This motion picture shows the procedures used in studies of g tolerance carried out on 42 men in a specially instrumented airplane and illustrates the sequence of symptoms which develop in airplane pilots and passengers exposed to positive acceleration.

Pulling a g pattern similar to that used on the centrifuge, maintaining given acceleration for 10-15 seconds, pilots on the average experienced dimming of vision at 5.1 g and blackout at 5.4 g. This was 0.7 g units higher than their tolerance as passengers in the airplane and 1.4 g units higher than their tolerance on the Mayo centrifuge. Factors causing the higher tolerance of pilots in the airplane included: colder environmental temperature, more exciting circumstances of flying, crouching and the effort of pulling the control stick to execute the high g maneuver.

Anti-blackout suits afforded the same increase in g tolerance to pilots and passengers in the airplane as to subjects on the centrifuge.

The pattern of changes in the ear pulse, blood content of the ear, and pulse rate was the same for pilots and passengers in the airplane as for subjects on the centrifuge. However, compensatory changes tended to occur one to two seconds earlier during exposure to g in the airplane.

Conclusion: The modern human centrifuge is a valid means for studying the physiologic effects of acceleration as encountered in aircraft and for developing methods of protection against these effects for pilots. (Federation Proceedings 5(1):59, 1946)

3,042

Lambert, E. H. and E. H. Wood 1946 THE PROBLEM OF BLACKOUT AND UNCONSCIOUSNESS IN AVIATORS. Med. Clin. N. Amer. 30:833-844.

3,043

Lambert, E.H., C.F. Code, E.H. Wood & E.J. Baldes 1947 THE EFFECTIVENESS OF MAN'S CARDIOVASCULAR ADJUSTMENTS TO CENTRIFUGAL FORCE.
(Paper, 17th International Physiological Congress, Oxford)
In Proceedings of the Seventeenth International Physiological Congress (Oxford, 1947)

3,044

Lambert, E.H., & O.L. Slaughter 1947 VENOUS PRESSURE IN THE EXTREMITIES OF MAN DURING POSITIVE ACCELERATION ON A CENTRIFUGE. (Acceleration Lab and Section on Physiology, Mayo Foundation) Fed. Proc. 6(1):146

3,045

Lambert, E. H. & E. H. Wood 1948 EL PROBLEMA DEL "BLACKOUT" Y LA PÉRDIDA DEL CONOCIMIENTO EN LOS AVIADORES. (The Problem of Blackout and Loss of Consciousness in Aviators.) Med. depor. y trab. 12:1315-1322, 1328-1331, Jan. 1948.

3,046

Lambert, E. H. 1949 COMPARISON OF THE PHYSIOLOGICAL EFFECTS OF POSITIVE ACCELERATION ON A HUMAN CENTRIFUGE AND IN AN AIRPLANE. J. Avia. Med. 20(5):308-335

SUMMARY: A comparison was made of the responses of 24 men to positive acceleration on the Mayo centrifuge and in flight as passengers in a specially instrumented dive bomber. In both instances acceleration was developed at a rate of approximately 1.5 g per second after 1.5 g was exceeded, and was maintained on the average for 15 seconds.

Tolerance to positive acceleration as determined by the occurrence of visual symptoms was 0.7 g higher in the airplane than it was on the centrifuge. The difference in tolerance to positive acceleration was confirmed by objective measurements using loss of the ear pulse as an end point.

Important factors contributing to the higher tolerance to positive acceleration in the airplane included (1) the colder temperatures in the airplane cockpit and (2) the more stimulating psychological environment in the airplane. That greater excitement was associated with exposure to acceleration in flight is suggested by the fact that control heart rates were on the average 20 beats per minute more rapid in the airplane than they were on the centrifuge.
The nature of the subjects' symptoms and the basic pattern of their cardiovascular responses to the positive acceleration were the same in the airplane and centrifuge. However, certain events tended to occur slightly earlier in the airplane. This was evident particularly for the recovery phase of the response to acceleration. Recovery of vision, the ear pulse, content of blood in the ear, and heart rate while acceleration was maintained began 1 to 2 seconds earlier in the airplane than they did on the centrifuge.

Emphasis must be placed on the essential similarity of the effects of positive acceleration in the airplane and centrifuge. The results of this study support the validity of applying the results of studies of subjects on the centrifuge to conditions of flight. (DACO)

3,047

Lambert, E. H. 1950 COMPARISON OF THE PROTECTIVE VALUE OF AN ANTI-BLACKOUT SUIT ON SUBJECTS IN AN AIRPLANE AND ON THE MAYO CENTRIFUGE. J. Aviation Medicine 21(1):28-37.

SUMMARY: Assays of the protective value of the G-4 (Z-1) antiblackout suit were preformed on thirteen subjects in an airplane and on the Mayo centrifuge. In both instances the tests were conducted according to procedures commonly used to determine the effectiveness of antiblackout suits on subjects on the centrifuge.

With the antiblackout suit uninflated, the g tolerance of the subjects as measured by the occurrence of visual symptoms was on the average 0.7 g higher in the airplane than it was on the centrifuge. Control pulse rates were on the average about 15 beats per minute faster in the airplane than they were on the centrifuge.

The average increase in tolerance to positive acceleration afforded by the G-4 suit as appraised by the occurrence of visual symptoms, the decrease in blood content of the ear, the decrease in amplitude of the ear pulse and the increase in pulse rate was 1.1 g, 1.2 g. 1.6+ g, and 1.4 g, respectively, in the airplane and 1.0 g, 1.1 g, 1.5+ g and 1.4 g, respectively, on the centrifuge. Thus, despite the higher g tolerance of the subjects in the airplane, the increase in g tolerance afforded by the antiblackout suit was essentially the same in the airplane as it was on the centrifuge.

3,048

Lambert, E. H. 1950 EFFECTS OF POSITIVE ACCELERATION ON PILOTS IN FLIGHT, WITH A COMPARISON OF THE RESPONSES OF PILOTS AND PASSENGERS IN AN AIRPLANE AND SUBJECTS ON A HUMAN CENTRIFUGE. J. Aviation Med. 21(3):195-220.

SUMMARY: The responses to positive acceleration of sixteen men piloting a specially instrumented dive-bomber have been compared with their own responses as passengers in the airplane and with those of other men on the Mayo centrifuge.

When piloting, the men experienced accelerations which were reached in 2 to 6 seconds and maintained for 8 to 20 seconds in a diving spiral maneuver at altitudes between 5,000 and 11,000 feet with cockpit temperatures of 8° to 22° C. Average accelerations at which vision was dimmed, lost peripherally and lost completely were 4.6 g, 5.0 g and 5.4 g, respectively. Loss of the ear pulse occurred at 5.3 g. These values were 0.7 g higher than the g tolerance of passengers in the airplane and 1.4 g higher than the g tolerance of subjects on the centrifuge. Factors causing the higher g tolerance of pilots included the slightly crouched posture and effort of controlling the plane when piloting, and the cooler temperatures and more exciting circumstances of exposure to acceleration in the airplane.

Certain changes in arterial pressure were determined from records of the ear

pulse. Exposure to acceleration caused an initial progressive fall of arterial pressure at head level which was terminated by a compensatory reaction that produced some recovery of arterial pressure even though acceleration was continued. In pilots, the lowest systolic arterial pressure (minimal ear pulse) occurred at an average of 5.2 seconds after 2.5 g was exceeded during the onset of acceleration.

The lowest systolic arterial pressure at head level was less than 50 mm. of mercury in all maneuvers in which loss of peripheral vision occurred and zero or very near zero in 71 per cent of maneuvers in which blackout occurred.

Pulse rates increased progressively from an average of 95 beats per minute just prior to acceleration to a maximum of 104 to 160 beats per minute at an average of eleven seconds after 2.5 g was exceeded.

Recovery of arterial pressure was in progress at an average of 7 seconds after 2.5 g was exceeded. Some recovery of the blood content of the ear, compensatory slowing of the heart rate and recovery of vision followed even though exposure to acceleration was continued.

The cardiovascualr responses of pilots, with a single minor exception, were remarkable similar to those of passengers in the airplane. The responses of both pilots and passengers differed from those of centrifuge subjects in that pulse rates prior to and during acceleration were faster in the airplane and events associated with compensatory recovery of circulation began one to two seconds earlier during acceleration in the airplane than they did on the centrifuge.

Most striking, however, was the general similarity of the visual symptoms and basic pattern of physiologic changes whether acceleration was experienced as a pilot or passenger in the airplane or as a subject on the centrifuge. It may be concluded that the results of centrifuge studies can be applied to the pilot in flight provided the conditions of exposure to acceleration are considered in each case.

3,049

Lamont, J. N. 1960 ANNOTATED BIBLIOGRAPHY ON FLIGHT SIMULATORS. (Defence Research Board, Dept. of National Defence, Canada) HR Rept. No. 68; ASTIA AD-247 044; Aug. 1960

ABSTRACT: This bibliography is a list of unclassified reports, articles, and other material referring to flight simulators. It is likely to be of use to Service personnel who have some responsibility in connection with the acquisition, evaluation and use of these devices for the training of aircraft pilots and crews. Simulators used for other purposes, such as research into problems of aircraft design or the training of individual crew members other than the pilot, are not referred to here.

In collecting items for the bibliography the compiler searched the literature of psychology, education, and training, but not of engineering. Hence the emphasis is on the simulator as a training device and the references deal only with the utility of the simulator in contributing to effective training, not with its maintainability nor its cost, nor any other aspect of its effectiveness purely as a piece of electromechanical equipment. (AUTHOR)

3,050

Lamport, H., E. C. Hoff, E. J. Baldes, A. R. Sweeney, C. F. Code, & E. H. Wood
1943 TESTS OF PROTECTION AGAINST THE EFFECTS OF ACCELERATION AFFORDED THE HUMAN BY THE USE OF THE LATEST MODEL OF THE GRADIENT PRESSURE SUIT (GPS) WHEN INFLATED BY THREE DIFFERENT PRESSURE ARRANGEMENTS.
(National Research Council, Committee on Aviation Medicine, Washington, D.C.) CAM Rept. No. 187; 25 Aug. 1943.

ABSTRACT: No significant differences were found between the protection offered by gradient pressure and single pressure anti-"g" suits when tested on the centrifuge.

Type of Inflation of Suit	No. Subjects	Protection in "g" units offered to Vision	Ear Opacity	Ear Pulse
3 gradient pressures	3	1.3	1.6	1.6
Gradient pressure in legs, single pressure over abdomen	7	1.2	1.3	1.4
Single pressure	6	1.2	1.4	1.2

3,051

Lamport, H. & L.P. Herrington 1944 CENTRIFUGE TESTS OF THE PNEUMATIC LEVER ANTI-"G" SUIT
(National Research Council, Committee on Aviation Medicine, Washington, D.C.) CAM Rept. No. 368; 14 June 1944

ABSTRACT: Nine male subjects tested the PLS inflated to 1.14 to 1.85 psi on the Wright Field Centrifuge. Overall protection against all visual symptoms was 1.38 "g". Roughly equal protection was obtained against all visual symptoms. The PLS suit offers promise of cooler anti-"g" device than those suits where pressurized bladders cover large areas of the body.

3,052

Lamport, H. E. C. Hoff & L. P. Herrington 1944 REVIEW OF METHODS OF APPLYING AIR PRESSURE TO THE EXTREMITIES FOR PROTECTION AGAINST ACCELERATION WITH MEASUREMENTS OF THE EFFECTIVE PRESSURES ON THE SKIN.
(National Research Council, Committee on Aviation Medicine, Washington, D.C.) CAM Rept. No. 228; 24 November 1944.

ABSTRACT: When pressure is exerted on a curved body surface by cloth, the tension of the cloth over the curved surface equals the pressure exerted on the surface times the radius of curvature of the surfaces. The same relation applies to a curved bladder surface.

The pressures exerted by the GPS, Berger Bros. long tube suit, and the pneumatic lever suit have been measured on the subjects under 1 "g" and the results tabulated in a series of graphs. The pressures vary greatly and depend to a large extent on the location where they are measured (i.e., under bladder or under cloth of suit. etc.)

3,053

Lamport, H., E. C. Hoff, & L. P. Herrington 1944 STATISTICALLY VALID TESTS OF DRUGS AND OTHER FACTORS AFFECTING THE RESISTANCE OF MICE TO ACCELERATION.
(National Research Council, Committee on Aviation Medicine, Washington, D.C.) CAM Rept. No. 298, 15 March 1944.
See also American J. Physiology 143(1):262-271.

ABSTRACT: (a) Mice were studied in the laboratory centrifuge and resistance to acceleration measured objectively in terms of the fatal spin number (FSN), the number of spins of equal duration but progressively higher top speed required to cause death.

(b) Ergonovine, throughout its dosage range, reduces the resistance of mice to acceleration.

(c) Pitressin increases resistance of mice with low initial resistance, but is without effect on mice of average or high initial resistance.

(d) Pitressin plus atropine give greater protection than pitressin alone.

(e) Dilantin is without effect on "g" tolerance.

(f) Preliminary tilting of mice in which they are not maintained in a head up position has no effect on "g" tolerance. Head up tilting protects mice if continued for 4 days prior to testing. It has no significant effect if continued for only 2 days.

(g) Experiments with humans to determine on the centrifuge the effect of sleeping in beds tilted head up are suggested.

3,054

Lamport, H., W.C. Clark & L.P. Harrington 1945 THE COMFORT AND ACCELERATION PROTECTION ON THE CENTRIFUGE OF THE L-12 PNEUMATIC LEVER ANTI-BLACKOUT SUIT
(National Research Council, Committee on Aviation Medicine, Washington, D.C.) CAM Rept. No. 483; 1 May 1945

ABSTRACT: Comparison between Pneumatic lever suit and the G-4 suit. Subjects preferred lever suit assuming each gave equal protection.

3,055

Lamport, H., E. C. Hoff & L. P. Herrington 1945 STATISTICALLY VALID TESTS OF DRUGS AND OTHER FACTORS AFFECTING RESISTANCE OF MICE TO ACCELERATION. Am. J. Physiol. 143:262-271, Feb. 1945.
NOTE: Reel 7, Flash 6, Item 4.

3,056

Lamport, H. & L. P. Harrington 1945 TEST OF THE GENERAL ELECTRIC ACCELERATION ACTIVATED AIR PRESSURE REGULATOR (P-321-14) AND VALVE (P-321-13). (National Research Council, Committee on Aviation Medicine, Washington, D.C.) CAM Rept. No. 484, 1 May 1945.

3,057

Landis, E. M., J. L. Patterson, Jr., & G. C. Ham 1943 STUDIES ON THE CIRCULATORY CHANGES INDUCED BY TILTING AND NITROGLYCERIN ADMINISTRATION IN A SERIES OF YOUNG MALE SUBJECTS.
(National Research Council, Committee on Aviation Medicine, Washington, D.C.) CAM No. 190; 13 July 1943.

ABSTRACT: Fifty-eight subjects were tilted and 20 given nitroglycerin. Twenty subjects fainted (35%). A combination of the fall in ear temperature and the lowest pulse pressure recorded in the first 3 minutes after tilting to an upright position has statistically significant value in predicting fainting. A simplified tilt test is described and its possible value as a test for "g" tolerance is discussed.

3,058

Landis, E. M. 1948 THE EFFECTS OF ACCELERATION AND THEIR AMELIORATION. In Advances In Military Medicine. (Boston: Little, Brown & Company, 1948), Vol. I, Chap. 21.

3,059

Lane, M.H., P.M. Fitzpatrick and J.J. Murphy 1962 ON THE REPRESENTATION OF AIR DENSITY IN SATELLITE DECELERATION EQUATIONS BY POWER FUNCTIONS WITH INTEGRAL EXPONENTS. (Air Force Proving Ground Command, Eglin Air Force Base) Rept. no. APGC TDR 62-15; ASTIA AD 273 680.

ABSTRACT: The scale height in height-bands between 150 and 400 km is assumed to vary linearly with height. Integration of the hydrostatic equation for an ideal gas above a spherical earth then leads to a power function representation of the air density over the band. With integral exponents such power laws give better fits to several proposed model atmospheres over altitude ranges of several hundred kilometers than those provided by the usual exponential representation of air density. The representation of air density in satellite deceleration equations by power functions with integral exponents reduces them to elementary forms. It was possible with such density distributions to obtain simplified formulas which may be useful for (a) computing atmospheric densities from satellite accelerations, (b) comparing proposed model atmospheres with observations, and (c) developing the theory of satellite orbits in the presence of air drag. As is possible with the exponential form, these power functions may be modified to take account of the effect of an oblate, rotating atmosphere. Their use may, therefore, permit the development of a simplified, accurate orbit theory for satellites with perigee heights below 300 km. Certain preliminary results are discussed and compared with previous theory and observations. (Author)

3,060

Langberg, M.P. 1960 A PRIMER OF SPACE MEDICINE (Amsterdam: Elsevier Publishing Co., 1960)

ABSTRACT: Specific physical, physiological, and psychological problems of manned space flight are presented. Also included is a description of the dynamic conditions of life in a space cabin and man's acceleration tolerance during passage to and from the space station.

3,061

Langdon, D. E. & G. E. Reynolds 1961 POSTFLIGHT RESPIRATORY SYMPTOMS ASSOCIATED WITH 100 PERCENT OXYGEN AND G-FORCES.
Aerospace Medicine 32(8):713-718.

ABSTRACT: To explore the problem of postflight respiratory symptoms after 100 percent oxygen and high g-force missions, a study was made of a group of student and instructor pilots whose flying mission entailed the above conditions. Questionnaires with flight surgeon follow-up revealed some frequency statistics and the flight conditions that preceded the symptoms. A series of tests followed on 35 randomly selected pilots and two of the invariably symptomatic pilots in which an effort was made to delineate the various factors involved and to pinpoint the differences between those who regularly developed symptoms and those who did not. (Tufts)

3,062

Langeron, A. 1937 LE MEDECINE, L'INGENIEUR, LE CHEF (The Doctor, the Engineer and the Pilot)
Ailes (Paris) 17(833): 13

3,063

Langslow, M.C. 1941 LETTER FROM ROYAL AUSTRALIAN AIR FORCE F.P.R.C., OCTOBER 3, 1941: ACCELERATION. (Royal Austrailian Air Force, Flying Personnel Research Committee) F.P.R.C. Report 358 B.

3,064

Lansberg, M.P. 1955 THE FUNCTION OF THE VESTIBULAR SENSE ORGAN AND THE CONSTRUCTION OF A SATELLITE, Aeromedica Acta 4:172

3,065

Lansberg, M. P. 1955 ON THE ORIGIN OF THE UNPLEASANT SENSATIONS ELICITED BY HEAD MOVEMENTS DURING AFTER-SENSATIONS. Aeromedica Acta 4:67-72

3,066

Lansberg, M. P. 1957 THE FUNCTION OF THE VESTIBULAR SENSE ORGAN AND THE CONSTRUCTION OF A SATELLITE. In Aeromedica Acta; Special Edition, containing the Scientific Communications of the First European Congress of Aviation Medicine, Scheveningen (the Hague) 30 Oct. - 1 Nov. 1956 (Soesterberg: National Aeromedical Centre, 1957) pp. 69-77

3,067

Lansberg, M. P. 1961 THE PHYSIOLOGIC ACCELEROMETERS. Aeromed. Acta. 8:37-43, 1961-2.

3,068

Lansberg, M.P. 1962 THE PHYSIOLOGIC ACCELEROMETERS In Impact Acceleration Stress: Proceedings of a Symposium With a Comprehensive Chronological Bibliography (National Academy of Sciences, National Research Council) Publication No. 977, Pp. 27-34

ABSTRACT: Physiological accelerometers under conditions of weightlessness were investigated. Three inherent contradictions existing are that (a) the head is held in an inclined position relative to the vertical, (b) the head is rotating around a horizontal axis, and (c) the head is moved along a horizontal path. During weightlessness, it will be man's visual framework that will induce his spatial orientation. Against this background, the three contradictions arise. In the situation where the head is held in an inclined position relative to the vertical, the otoliths signal a symmetric status, albeit a symmetry of zero gravity, and for the higher centers a symmetry means perpendicularity, which is denied by the visual reference. Probably the voice of the otoliths will not be very strong in this instance, and the visual clue will dominate. The reason is that the otoliths respond to change in acceleration rather than to acceleration. In the situation where the head is rotating around a horizontal axis, matters become worse. There is not only a conflict between otolithic information and visual framework but, worse still, the semicircular canals report a change in attitude which should be corroborated by the message from the otoliths which, however, may default. A disagreement now develops between the two parts of the labyrinth. This disagreement would not arise if the head movement had occurred around a vertical axis, vertical in the man's subjective framework of orientation. The situation where the head is moved along a horizontal path will probably be of less importance because such linear movements do not seem likely to occur.

3,069

Lansberg, M. P. 1963 CANAL-SICKNESS: FACT OR FICTION? Industr. Med. Surg. 32:21-24, Jan. 1963.

3,070

Lanz, R.C. 1948 KINETIC MEASUREMENTS ON A PILOT-DUMMY EJECTED FROM A P-82 AIRPLANE
(Air Materiel Command, Wright-Patterson AFB, Ohio) Rept. MCREXAS-45341-3-4; 11 March 1948; ASTIA ATI 22 026

ABSTRACT: Tests were made to obtain data relative to the forces experienced by a pilot-dummy when ejected upward from high-performance aircraft by means of a catapult. Tests were made with a P-28 airplane. The measuring instrumentation consisted of a multi-channel recording oscillograph in conjunction with resistance type acceleration, air pressure, and position transmitters. It was concluded that rearward accelerations become more critical at airspeeds above 430 knots and that armor plate should be attached to the ejection seat rather than the fuselage to reduce this acceleration. (ASTIA)

3,071

Lappin, A.N. 1949 DESIGN OF ROTATABLE SEAT FOR ACCELERATION ALLEVIATION
(Cornell Aeronautical Laboratory, Inc., Buffalo, New York) December 1949; Report BC-531-S-16; ASTIA ATI 125 505

ABSTRACT: The rotatable seat, described in this report, is an acceleration sensitive device which automatically causes the pilot's or passenger's body to be oriented into a position which greatly increases his tolerance to high acceleration.

3,072

Larkins, R. L., J. H. Roberts, & F. J. Calkum 1962 SURVEY AND ALIGNMENT OF THE HOLLOMAN TRACK FROM 1956 TO 1961 (Air Force Missile Development Ctr., Holloman AFB, N. Mex.) MDC TDR 62-1; ASTIA AD-273 058; Feb. 1962

ABSTRACT: A survey was made of the Holloman Track, Holloman AFB, New Mexico. In 1956 and 1957 the track was extended from a length of 5,000 to 35,000 ft. The reliability of a construction of this type, consisting of a continuous concrete foundation with a total length of almost 7 miles was not known. The instruments used and the results of the many repeated surveys of the Holloman Track from 1956 until 1961 are described. Some settlement of the track took place during the first year after construction; however, the greater part of the track remained

essentially stable. The reported surveys show that the Holloman Track is built on stable soil. Based on a five-year span of observations and experience it can be stated that the Holloman Track can be maintained to the precision with which it was built. (AUTHOR)

3,073

Larue, M. A. 1961 ENVIRONMENT AND ITS EFFECT ON MAN-MACHINE DESIGN
In 1961 Proceedings of the Institute of Environmental Sciences National Meeting, April 5, 6, 7, 1961, Washington, D. C. (Mt. Prospect, Ill.: Institute of Environmental Sciences, P. O. Box 191) pp. 305-310

3,074

Lasky, I. I., & J. H. Davis 1961 CARDIAC INJURY IN BODILY TRAUMA; A CLINICAL STUDY. California Medicine 94(2):79-82, Feb. 1961

3,075

Latham, F. 1951 MEDICAL ASPECTS OF SUPERSONIC FLIGHT (MANCHESTER UNIVERSITY MEDICAL SCHOOL GAZETTE, JULY 1951)
(Flying Personnel Research Committee, Air Ministry) F.P.R.C. Memo. 28, July 1951

3,076

Latham, F. 1955 MAN-CARRYING CENTRIFUGE
Nature (London) 175:1057-1059, 18 June 1955.

3,077

Latham, F. 1957 ACCELERATING THE HUMAN FRAME.
Aeroplane 92(2373):273, Feb. 22, 1957.

ABSTRACT: Summary of a lecture by Wg. Cdr. F. Latham to the British Interplanetary Society on "The effects of acceleration on the human frame", on February 2. There are, according to the lecturer, six factors to be taken into account: magnitude, duration, site, area, and rate of application.

3,078

Latham, F. 1957 LINEAR DECELERATION STUDIES AND HUMAN TOLERANCE (Flying Personnel Research Committee, Gt. Brit.) FPRC Rept. No. 1012; June 1957; ASTIA AD 141 044

ABSTRACT: The limits of physiological tolerance to linear deceleration lasting 0.2 to 0.4 secs. have been assessed for subjects wearing four types of Service torso-restraining harnesses without limb restraint. A combined harness alone, which is proposed for use in Service aircraft, should give protection up to 17 g, but above this figure serious injury is likely. If additional leg-restraint is employed, it is considered that the safe limit may be raised to at least 20 g. Above this figure arm, leg and head restraint, and a jerk in harness should give protection up to 25 g. Attention is drawn to the possible mechanism of injury to the larynx, face and chest. Peak intra-abdominal pressures of 450 mm. Hg, at 12 g have been recorded in a test subject. When the test subjects were relaxed prior to impact a protective extensor response in the lower limbs tending to brace the subject against the rudder pedals was not detected less than 100 milliseconds after impact. (Author)

3,079

Latham, F. 1957 A STUDY IN BODY BALLISTICS. SEAT EJECTION. Proc. Roy. Soc. B. 197: 121-139, Aug. 1957
See also: (RAF, Institute of Aviation Medicine, Farnborough) FPRC Rept. No. 1016, Jan. 1957. A reprint.

ABSTRACT: To define the upper limits of tolerance for short-duration accelerations acting through the vertical axis of the body, subjective reactions from tests in vertical ejection rigs were assessed. Accelerometers on the head and waist recorded up to 30 g lasting 0.01 to 1.0 sec. Frequency and damping characteristics of the man-seat system were determined by vibrating the system over the frequency range of 1 to 20 c/sec., and by use of sledge-hammer and seat-drop experiments. Tolerance was found to be conditioned by the force-time function of the ejection gun, the alignment of the body and seat, and the dynamic characteristics of the seat pack. For minimum overshoot of acceleration in the body the opt mum duration of force was 0.23 sec. Low-frequency response of the man was the important variable. Previously defined limits of thrust should be adhered to as anatomical limits. Maximum overshoot in the body would result with a rate of acceleration change increased to 400 g/sec.
might be increased to 20 g with additional leg restraint, and to 25 g with a jerkin harness and arm, leg, and head restraints.

3,080

Latham, F. 1958 LINEAR DECELERATION STUDIES AND HUMAN TOLERANCE.
Clin. Sci. 17(1):121-135, Feb. 1958.

ABSTRACT: The physiological effects of decelerations up to 16 g, with a maximal rate of change of 300 g/second, were studied in human subjects on a rocket-propelled trolley apparatus. Four types of restraining harness were compared, including a conventional Royal Force "Z" harness comprised of shoulder and lap straps, a four-point harness incorporating leg (crutch), lap, and shoulder straps, and two three-point variations of the latter harness. Decelerations up to 12 g were found to produce no undue discomfort or bruising with any harness tested, provided that the head was flexed to an angle of 45° prior to impact. Above 12 g, bruising in the region of the lap blet and shoulder straps occurred, particularly in the absence of crutch straps. Location of the feet in aircraft rudder pedals resulted in a noticeable reduction in lap belt load, although no reflex leg muscle action could be distinguished until 100 milliseconds after the start of deceleration. Peak intra-abdominal pressures of 200-450 mm. Hg were recorded during deceleration. Electrocardiograms were normal immediately following impact, and pulse rates returned to normal resting fates (from 100-140 beats/minute during runs) within several minutes. It is concluded that the leg, lap, and shoulder harness gives protection up to 17 g but that serious injury is likely above this level. It is suggested that the safe limit of deceleration

3,081

Latham, R. & P. Howard 1958 MECHANISM OF INJURY DURING WHOLE BODY LINEAR DECELERATION.
(RAF Institute of Aviation Medicine, Farnborough) FPRC Rept. No. 100, Sept. 1958. ASTIA AD 217 225.

ABSTRACT: Experiments were carried out on the changes in venous pressure at head level resulting from violent blows to the torso.

The results suggest a possible mechanism for the conjunctival and soft tissue hemorrhages observed during whole body linear decelerations.

3,082

Latner, A. L. 1942 LOW PRESSURE PHASE OF BLAST
Lancet 2:303-304, September 12, 1942.

3,083

Lauda , E. 1959 VERTIGO.
Wien Klin Wschr. 71:928-32, 4 December 1959

3,084

Laughlin, C. P. 1962 IN-FLIGHT MEASUREMENT, TRANSMISSION, AND ASSESSMENT OF ASTRONAUT PHYSIOLOGIC RESPONSES
Aerospace Engineering 21(1):40-43, 1962

SUMMARY: The manned space flight programs have stimulated considerable interest in human physiologic response-monitoring techniques. The responses sensed (pulse, respiratory rate, blood pressure, etc.) remain unchanged from routine clinical "vital signs." These responses have sharp limitations in adequately reflecting basic physiologic processes. A critical function in adequately conveying physiologic status is the voice transmissions of subjective sensations. In medical-safety monitoring, the physician must integrate these data to arrive at a decision and appropriate action.

The complexity of the in-flight investigation program contemplated for the earth-orbiting missions requires information exceeding that available from biosensor devices. It will be more reliable and productive for a scientific crew member to make first-hand observations using standard clinical techniques.

Bio-instrumentation utilization is dependent on flight-mission objectives, and application will be varied in each mission phase.

3,085

Laughlin, C. P., E. P. McCutcheon, R. M. Rapp, D. P. Morris, Jr. and W. A. Augerson 1962 PHYSIOLOGICAL RESPONSES OF THE ASTRONAUT. (In Results of the First U. S. Manned Orbital Space Flight, February 20, 1962) (NASA Manned Spacecraft Ctr.) Pp. 93-103.

3,086

Lavrent'ev, M. A. 1960 THE PROBLEM OF PIERCING AT COSMIC VELOCITIES. In L. V. Kurnosova, ed., Artificial Earth Satellites, (New York: Plenum Press, Inc., 1960), III, 85-91.

ABSTRACT: It is known from the theory of cumulative charges that the mechanism of puncturing of metallic plates by cylinders or by balls differs greatly at 3-10 km/sec from the mechanism at velocities up to 1000 m/sec. Two stages take place at high velocities: (a) the ball or cylinder, penetrating into the obstacle, flows over the surface of the punched out crator; (b) inertia expansion

of the cavity takes place after the "bullet has been annihilated"1 The first part can be calculated with accuracy by using an ideal incompressible liquid as a model, but the second part is more difficult. Much less investigated is the puncturing problem at 50-100 km/sec; the experimental difficulties at such velocities require particular caution as regards the main hypothesis made in the theory of each phenomenon.

3,087

Lawton, A. H. 1952 HUMAN FACTORS IN THE OPERATIONS AND DESIGN OF AIRCRAFT. J. Aviation Med. 23(3):254-258, 306. June 1952.

ABSTRACT: Human factors in aviation embrace three broad divisions: (1) aviation medicine, which familiarizes pilots with their equipment, safety measures, and preventive medical aspects; (2) human engineering, which analyses limitations of human response to the aircraft and its equipment; and (3) human resources which relate to selection, classification, aptitude measurement, training, and human relations, taking into the account the diversified nature of human beings. Psychophysiological aspects of noise, vibration, use of pressurized cabins, use of ejection seats and all kinds of protective equipment, and the impact of speed are discussed. Animal experiments have a great value in furthering research but ultimately each device, method, and principle has to be tested by "human guinea pigs".
Surgeon is perhaps the best known to flyers. The Flight Surgeon's aim is to prevent disease or disaster and to cure that which cannot be avoided.

3,088

Lawton, A.H. 1953 THERE'LL ALWAYS BE A MAN.
J. Aviation Med. 24(6):532-535

ABSTRACT: For a long time to come, the human engineer must strive to keep the cockpit and the crew positions optimally habitable and humanly functional; the psychological scientists must constantly improve the selection, classification, and training procedures of men to fly or to support the aircrews; and the biological scientists must constantly seek to protect those who fly against increasing environmental stresses and to keep them mentally and physically sound.

For various administrative reasons the Human Factors of flying are divided for research and development purposes into three areas: (1) Human Engineering, (2) Human Resources, and (3) Aero Medical Sciences. Human Engineering consists of relating man to his machine or, in the Air Force, of fitting the man, the airframe, the power plant, the electronic devices, and the armament into an operational unit designated as the weapon system.

Human Resources research has revealed the sources of flying personnel and analyzed the jobs that each man may be called upon to perform in the Air Force. From these studies selection and classification methods are now becoming available to fit the man and job advantageously. Of the Human Factors team the Flight

3,089

Lawton, R. W. 1951 HEAD TOLERANCE TO IMPACT BLOWS
In Whiting, A. A., et al., Head Impact & Helmet Investigation (Cornell Aeronautical Lab., Inc., Buffalo, N. Y.) Contract No. N6-ori-11917, Rept. No. OG-675-D-5, 30 April 1951

3,090

Lawton, R. W., R. Crosbie, & C. Clark 1954 THE VISCOELASTIC BEHAVIOR OF ISOLATED AORTIC STRIPS STUDIED BY MEANS OF A PARALLEL SPRING AND DASHPOT ANALOGUE (Naval Air Development Ctr., Johnsville, Pa.) NADC-MA-5412; 12 Oct. 1954

3,091

Lawton, R. W., R. Crosbie, & C. Clark 1955 ELASTIC PROPERTIES OF MAMMALIAN TISSUE. PHASE I - INSTRUMENTATION. (Naval Air Development Ctr., Johnsville, Pa.) Project NM 001 100 315; 31 Dec. 1955

ABSTRACT: Automatic cam-controlled G programs which will produce short acceleration stresses of various amplitudes and forms have been designed. Because of the shortness of the periods of acceleration required, phase lag and distortion in the human centrifuge were revealed in preliminary tests of these cams. Animal experimentation using these programs was suspended pending further study of the centrifuge characteristics under Phase II, NM 001 100 303.

An automatic programming mechanism for the 8 foot animal centrifuge has been constructed and is at present undergoing preliminary tests. Animal experimentation is proceeding on the small animal centrifuge utilizing a turntable which converts lateral to positive G in 0.6 second.

3,092

Lawton, R. W., R. Crosbie, C. Clark, L. Greene, & Kydd 1955 ELASTIC PROPERTIES OF MAMMALIAN TISSUE. PHASE II. ARTERIAL BLOOD PRESSURE RESPONSES TO POSITIVE G IN THE MONKEY. (Naval Air Development Ctr., Johnsville, Pa.) Project NM 001 100 315; 31 Dec. 1955

ABSTRACT: Positive G experiments using an automatic cam-controlled G program (5 second sine wave) have been suspended. The results to date have been analyzed and a report is in preparation. Experiments on the small animal centrifuge are continuing. For a nearly "square wave" acceleration, the response time of the blood pressure fall which occurs in the aorta is under study. Data obtained in this way will augment the results obtained on the human centrifuge.

3,093

Lawton, R. W., R. Crosbie, & C. Clark 1955 ELASTIC PROPERTIES OF MAMMALIAN TISSUE. PHASE III. DYNAMIC MECHANICAL BEHAVIOR OF ISOLATED TISSUES. (Naval Air Development Ctr., Johnsville, Pa.) Project NM 001 100 315; 31 Dec. 1955

ABSTRACT: Studies of isolated tissue specimens, principally those of the vascular system, have continued. Theoretical computations have been carried out with the help of the Aeronautical Computer Laboratory of NADC to test the hypothesis that the elastic behavior of these tissues parallels that of a rubber-like material.

3,094

Lawton, R. W., R. Crosbie, C. Clark, & L. Greene 1955 ELASTIC PROPERTIES OF MAMMALIAN TISSUE. PHASE IV. A STUDY OF THE MECHANICS OF THE INTACT AORTA IN DOGS BY MEANS OF SLOW MOTION PICTURES. (Naval Air Development Ctr., Johnsville, Pa.) Project NM 001 100 315; 31 Dec. 1955

ABSTRACT: The mechanical properties of the intact aorta have been studied by means of a frame-by-frame analysis of slow motion pictures. Measurements of diameter and length of a short aortic segment are made and plotted with respect to pressure. The results will be analyzed in terms of simple mechanical models.

3,095

Lawton, R. W., R. Crosbie, & C. Clark 1955 MEASUREMENTS ON THE ELASTICITY AND DAMPING OF ISOLATED AORTIC STRIPS OF THE DOG. Cir. Res. 3:403-408

3,096

Lawton, R. W., R. Crosbie, C. Clark, & L. Greene 1955 SOME ASPECTS OF RESEARCH IN BIOLOGICAL ELASTICITY (Introductory Remarks, Conference on "Tissue Elasticity", Dartmouth College, September 1955)

3,097

Lawton, R. W. 1956 ARTERIAL BLOOD PRESSURE RESPONSES TO G FORCES IN THE MONKEY.
(U.S. Naval Air Development Center, Johnsville, Pa.) NADC-MA-5611, 24 September 1956. ASTIA AD 115 268.
See also; J. Aviation Med. 29:97-105, 1958.

ABSTRACT: This study describes arterial blood pressure responses in monkeys subjected to psotive acceleration. The three principal factors affecting the blood pressure are shown to be (a) the height of the fluid column in the G

axis, (b) the volume within, and (c) the distensibility of the arterial vascular tree. In addition to pressure changes due to the physical effect of acceleration on the fluid column, a decrease in arterial volume, and thus a pressure fall, occurs because of a change in the dymanic equilibrium of inflow and outflow in the system.

3,098

Lawton, R. W. 1957 ARTERIAL BLOOD PRESSURE RESPONSES TO ABRUPT POSITIVE ACCELERATION.
(U.S. Naval Air Development Center, Johnsville, Pa.) NADC-MA-5704, Rept. No. 4, 1 March 1957. ASTIA AD 127 901.

ABSTRACT: This study describes arterial blood pressure responses in 12 anesthetized monkeys exposed to abrupt, positive acceleration produced by the 90° rotation of an animal board mounted on a small 8-foot centrifuge. The time constant for the exponential fall in carotid blood pressure was determined. Its average value was 0.34 sec^{-1} Extrapolated log pressure-time curves yielded an average intercept of -0.2 second, suggesting the absence of a finite lag period in the carotid pressure response. Changes in arterial distensibility were suggested by measurement of pulse wave velocity. The data were discussed in terms of a simple hydraulic analogue.

3,099

Lawton, R.W., G.H. Kydd, R. Fenichel, R.E. DeForest, & C.C. Collins 1958 ACCELERATION TOLERANCE STUDIES OF ORBITAL AND SPACE FLIGHT
(U.S. Naval Air Development Center, Johnsville, Pa.) NADC-MA-LR58, July 1, 1958

ABSTRACT: This report concerns a preliminary study of the effects of spinning on rat mortality. The study was undertaken to ascertain whether rats would survive spin rates associated with the launching of certain satellite vehicles. Fifteen unanesthetized rats were used at spin rates which were varied from 100 to 750 rpm. In general, runs lasted for 15 minutes. Animals which were removed from the spin table alive showed characteristic behavior. Those which had been spun in the central container showed no abnormalities of gait. Those spun in the peripheral chamber, in general, moved in circles in the direction in which they had been rotated. Performances studies on animals after spinning suggest that, although rats will survive spinning on the central axis up to nearly 700 rpm and to 250 rpm at a 1 foot radius, such stress may be associated with a marked decrement in performance.

3,100

Lawton, R. W. et al 1958 ARTERIAL BLOOD PRESSURE RESPONSES TO G FORCES IN THE MONKEY. I. SINUSOIDAL POSITIVE G
J. of Aviation Medicine 29(2):97-105, February 1958

ABSTRACT: This study describes arterial blood pressure responses in monkeys subjected to positive acceleration. The three principal factors affecting the blood pressure are shown to be (1) the height of the fluid column in the G-axis, (2) the volume within, and (3) the distensibility of the arterial vascular tree. In addition to pressure changes due to the physical effect of acceleration on the fluid column, a decrease in arterial volume, and thus a pressure fall, occurs because of a change in the dynamic equilibrium of inflow and outflow in the system. These two factors tend to balance each other in the region of the diaphragm so that blood pressure changes are minimal in this area.

3,101

Lawton, R.W. & H.G. Shepler 1958 CIRCULATORY AND RESPIRATORY EFFECTS OF ACCELERATION
(U.S. Naval Air Development Center, Johnsville, Pa.) NADC-MA-LR44 April 11, 1958

ABSTRACT: This is a review of the recent "open" literature on the cardiovascular and respiratory effects of radial acceleration in man and animals. The material has been arranged and presented in tabular form and a selective bibliography is included. The older literature has been reviewed elsewhere and is not included in the tables.

3,102

Lawton, R. W., et al. 1960 BIOENGINEERING PROBLEMS IN EARLY MANNED SPACE FLIGHT.
Annals of the New York Academy of Sciences 84:29-74, 26 Feb. 1960.

ABSTRACT: This article describes problems to be encountered during early manned spaceflight and offers solutions to those problems.

3,103

Lawton, R. W. 1961 ARTERIAL BLOOD PRESSURE RESPONSES TO POSITIVE ACCELERATION IN ANIMALS.
In Gauer, O. H. & G. D. Zuidema, eds., Gravitational Stress in Aerospace Medicine. (Boston: Little, Brown, and Co., 1961). Pp. 29-38.

3,104

Lawton, R. W. 1961 THE HYDROSTATIC PRESSURE IN THE ARTERIAL TREE. In Gauer, O. H. & G. D. Zuidema, eds., Gravitational Stress in Aerospace Medicine. (Boston: Little, Brown, and Co., 1961). Pp. 260-261.

3,105

Lawton, W. H. 1957 PHYSIOLOGICAL INVESTIGATIONS IN THE FLYING SAFETY PROGRAMS OF THE FLYING TRAINING AIR FORCE. U. S. Armed Forces Med. J. 8:937-944

3,106

Lease, G. O. & F. G. Evans 1959 STRENGTH OF HUMAN METATARSAL BONES UNDER REPETITIVE LOADING.
J. Appl. Physiol. 14:49-51.

3,107

Leavitt, W. 1958 MAN IN SPACE
Air Force 41(3):109-117, 120-123. April 1958.

ABSTRACT: A description of tests of men under space-flight conditions.

3,108

Lecca, Gmo. Garrido 1963 EL ACCIDENTE DE JORGE CHAVEZ (THE ACCIDENT OF JORGE CHAVEZ)
(Lima: Instituto Peruano de Fomento Educativo, 1963)

3,109

LeCount, E. R., et al. 19 PATHOLOGIC ANATOMY OF TRAUMATIC FRACTURES OF CRANIAL BONES AND CONCOMITANT BRAIN INJURIES.
Journal of American Medical Association 74(8):501-511. Feb. 21, 1920.

ABSTRACT: This attempt to consider the injuries of the brain and cranial bones when the latter are broken by external violence is based on conditions encountered in 504 postmortem examinations made by one of us during the years 1911 to 1918. It does not include all the postmortem examinations during that period of the bodies of persons with such traumatic fractures, for in about sixty instances the measurements and other steps necessary in the interests of precision were not so detailed as in the 504 here

reviewed. The patients were cared for in the Cook County Hospital or the Hospital of the House of Correction, and some post mortem examinations were of bodies of persons who were found dead or who died in route to a hospital.

3,110

Lederer, J. & R.M. Woodham 1955 SAFETY THROUGH STEEP GRADIENT AIRCRAFT. (The Daniel and Florence Guggenheim Aviation Safety Center, Cornell University)

3,111

Lederer, Jerome 1962 PERSPECTIVES IN AIR SAFETY
(Presented at the 1962 ASME Aviation & Space Division Conference, Shoreham Hotel, Washington, D. C. 27 June 1962)
The Daniel & Florence Gugganheim Aviation Safety Center at Cornell University.

3,112

Lederer, L.G. 1956 THE AEROMEDICAL ASPECTS OF TURBO-PROP COMMERCIAL AIRCRAFT. A STUDY OF VISCOUNT PASSENGER OPERATIONS IN THE UNITED STATES. J. Aviation Med. 27(4):287-300

SUMMARY: The aeromedical characteristics of the VISCOUNT turbo-prop airliner have been discussed as related to operation in commercial aviation in the United States. The differences between turbo-prop and conventional piston powered aircraft have been demonstrated particularly in the field of noise and vibration. The level of cabin pressurization has been discussed and shown to be more physiologically acceptable than other commercial aircraft operating in the United States.

Pilot transition training has been discussed and a new type of flying in commercial operation, have been cited, such as "hull life," and "metal fatigue." It is hoped that as new better commercial aircraft are developed, the aeromedical aspects such as have been covered in the presentation will also be reported.

3,113

Lederman, M. 1962 REPORT ON TEST ON C16 2406 001 TRANSMITTER-ACCELEROMETER (Kearfott Div., General Precision, Inc., Little Falls, N. J.) Jan. 1962 Rept. no. K-265; IDEP Rept. no. 851.20.01.40-R8-01, ASTIA AD-275 237

ABSTRACT: Accelerometer S/N 281 satisfactorily met the requirements of the Inspection Tests and Qualification Tests. Accelerometer S/N 350 satisfactorily met the Inspection Tests and Qualification Tests. Accelerometer S/N 350 satisfactorily met the Inspection, Vibration High Temperature Tests. The unit satisfactorily met the Low Temperature requirements after cleaning and recalibration. With the exception of the damping ratio, which remained constant throughout all the tests, the S/N 95 unit satisfactorily met the Inspection and Qualification Test requirements. (AUTHOR)

3,114

Ledley, R. S. 1957 FUNCTIONAL CRITERIA FOR BIO-MEDICAL DIGITAL ELECTRONIC COMPUTER DESIGN
(National Bureau of Standards, Washington, D. C.) NBS Report No. 5667, 6 December 1957.

3,115

Ledley, R.S. 1960 COMPUTING FACILITY
(George Washington U., Washington, D.C.) Project 9777(805), Contract AF 49(638)-715; AFOSR, DLS.

ABSTRACT: A flac II computer, surplus to Air Force operational needs, has been loaned to George Washington University for use in developing a program of research in medical and biological problems. Some of the research will result from collaboration with scientists in other laboratories. The facility will represent one of the few having its potential capability devoted entirely to biomedical research.

3,116

Lee, R. H., F. I. Whitten, and F. W. Brown, III 1959 THE EXPLOSIVE DECOMPRESSION COMPONENT OF AIR BLAST. (Navy Mine Defense Lab., Panama City, Fla.) Medical research rept. no. 4; ASTIA AD 219-712.

ABSTRACT: The equations $P_i = Po(1 + T_c/t_m)$ and $\theta_i = \theta_o(1 + t_c/t_m)$ derived from the study of a biophysical analog presumed to simulate the mechanical action of explosive decompression on living animals, are applied to the data from a series of experiments in which mice were exposed to rapid decompression under a wide range of pressures and decompression times. Estimates of the

average values of the time constants, tm, of the mice at constant mortality are compared with estimates based on physical measurements of lung volumes and tracheal diameters. The primary objective was to demonstrate that engineering formulae can be applied to the biophysical aspects of explosive decompression in exactly the same manner that such formulae were applied to the physical aspects. Biophysical parameters are estimated which correspond in every way to their physical counterparts. Emphasis is to be placed on the existence of these parameters, and on the methods for their estimation, rather than on accuracy of the numerical values given. (Author)

3,117

Lees, L., F. W. Hartwig & C. B. Cohen 1958 THE USE OF AERODYNAMIC LIFT DURING ENTRY INTO THE EARTH'S ATMOSPHERE.
(Space Technology Laboratories, Ramo-Wooldridge Corp., Los Angeles, Calif.) GM-TR-0165-00519, November 20, 1958.

ABSTRACT: By employing aerodynamic lift during entry into the earth's atmosphere at either orbital or escape velocity, the range of allowable entry angles for a prescribed peak deceleration is greatly increased, while the total heat energy transferred to the vehicle can be held to about the same value as that for a nonlifting vehicle. Only modest lift-drag ratios are required beyond peak g to prevent the deceleration from exceeding the peak value or to prevent the vehicle from skipping out of the earth's atmosphere. Thus the difficult guidance and control problem is greatly alleviated; in particular, for return from the moon or from other planets the necessity for multiple-pass dragbraking is eliminated.

3,118

LeGalley, D. P. 1963 SPACE SCIENCE (John Wiley, Publ.)

ABSTRACT: Based on a series of 16 lectures presented at the Univ. of California in the Fall semester of 1961, this latest entry in the Wiley Space Technology Series provides a full-scale review of the theoretical and experimental scientific data obtained during the first five years of the space age. After an introductory chapter by the Editor on space exploration, 15 nationally recognized authorities offer straightforward and lucid accounts of progress made in their own areas of research.

Included is a chapter on bioastronautics by General Don Flickinger, with references to acceleration problesm.

3,119

Lehmkohl, J. C. 1947 SPINAL ACCELERATION MEASUREMENTS ON A PILOT-DUMMY EJECTED FROM A P-61 AIRPLANE IN FLIGHT. (Army Air Forces, Materiel Command, Engineering Division) Serial No. TSEAC12A-45341-2-5, 1 July 1947; ATI-10 794

CONCLUSIONS & RECOMMENDATIONS: It is concluded that the existence of a vibrating system; consisting of the ejection seat, the cushioning media, and the dummy; which induces the high peak accelerations is further substantiated by the results of these tests. The peak values of spinal acceleration, as recorded, exceed the present known physiological tolerances of a human subject. The weight of the ejection charge has a very small effect on the peak value of spinal acceleration. The primary factor effecting the magnitude of the spinal acceleration peak is the angle of ejection. Within 0.15 seconds after the catapult separation the spinal acceleration of the dummy stabilizes at approximately -2g for the duration of the record. It is recommended that ground tests be conducted to obtain additional data concerning the effect of ejection angle. Corrective action be taken towards the modification of the means of cushioning in order to eliminate or reduce the excessive peak accelerations. (AUTHOR)

3,120

Leman, J., W. Demeshak, A. Myerson & D. Goldman 1936 EFFECT OF ALTERATIONS IN POSTURE ON THE INTRA-ARTERIAL BLOOD PRESSURE IN MAN. I. PRESSURE IN THE CAROTID, BRACHIAL, AND FEMORAL ARTERIES IN NORMAL SUBJECTS. Arch. Neurol. Psychiat. (Chicago) 35:1216-1224.

3,121

Lemon, H. H. 1947 FROM GALILEO TO THE NUCLEAR AGE. (Chicago: The University of Chicago Press, 1947)

3,122

Lenggenhager, K. 1936 DIE GENESE DER LUFTSEE UND EISENBAHN-KRANKHEIT IN NEUENR LICHT. (The Origin of Air, Sea, and Car Sickness from a New Point of View) Schweiz Med. Wchnschr., 66: 354-357

ABSTRACT: According to the present writer, air, sea, and car sickness are not due to labyrinthine disorder, but to variations in pressure and traction on the great sympathetic nerve plexuses of the upper abdomen. Therapeutically he recommends horizontal posture, tight binding of the abdomen and administration of Bayer's sedative, "Seasick Cure," which contains atropin, scopolamin, luminal and papaverin. ABSTRACT: Journal of Aviation Medicine 7(4): 212, December 1936

3,123

Lennox-Buchthal M., F. Buchthal and P. Rosenfalck 1960 CORRELATION OF ELECTROENCEPHALOGRAPHIC FINDINGS WITH CRASH RATE OF MILITARY JET PILOTS. Epilepsia (Amster.) 1:366-72, June 1960

3,124

Lentz, E.C., and A.F. Zeller. 1962 AIRCRAFT ACCIDENT POTENTIAL RELATED TO PILOT AGE AT TIME OF GRADUATION. (Directorate of Flight Safety Research, Norton AFB, Calif.) ASTIA AD-286 479; 2 July 1962

ABSTRACT: The overall findings offer support for the hypothesis that younger pilot graduates have a better subsequent accident record than the older. The fact that younger pilots experienced a higher accident rate during their early hours of rated flying than did the pilots who received their wings when 25 years of age or older, is apparently the result of the previous experience of some of the pilot graduates. When those pilots who had had previous rated, though non-pilot, experience were eliminated from consideration the anticipated results appear. The reversal of trend with the previously rated individuals included results from the fact that on the whole those who had received prior training were older and had been exposed to a period of screening which resulted in a superior group. This demonstration of the fact that dual training with the dual screening leads to a better end product is of theoretical interest, but because of the expense and time involved would not appear to be practically feasible as a standard procedure.

3,125

Lestard, R. F. 1946 [ACCELERATION AND CENTRIFUGATION] Rev. de Informaciones Aeronaut. 15:249-278. April 1946.

3,126

Levedahl, B. H. 1961 SOME NOTES ON THE PHYSIOLOGICAL TOLERANCE TO ACCELERATION (Douglas Aircraft Co., El Segundo, Calif.) ES 40253; ASTIA AD-257 737; 20 Feb. 1961

ABSTRACT: The report contains eleven tables and graphs dealing with the duration and time-tolerance of negative acceleration and transverse acceleration.

3,127

Levedahl, B. 1962 NOTES ON THE EFFECTS OF HUMAN ACCELERATION TOLERANCES ON DESIGN FOR THE TERRAIN FOLLOWING AIRCRAFT. (Douglas Aircraft Co., Inc., El Segundo, Calif.) Rept. No. ES 40621; Contract Nonr-107600; ASTIA AD-278 653 Jan. 1962

ABSTRACT: Accelerative forces acting on the pilot serve as a severe limitation on low level, high speed terrain following operations. The physiological restrictions imposed by acceleration forces essentially define the flight path permitted and hence restrict the altitudes that can be maintained over any defined terrain. While some benefit can be derived by the use of anti-g suits for positive g forces, the physiological limitations are not apparent when an attempt is made to control over-shoot after passing over a barrier. At this time negative g forces are applied to the pilot. Some evidence is available to show that repeated application of g-forces may effect physiological parameters other than tolerance and may thus be of importance in defining performance characteristics or limits. More work must be done on the effects of g-loading on these parameters before a reasonable assessment can be made. (AUTHOR)

3,128

Leverett, S. D. MEASUREMENT OF THE CONTRACTION FORCE OF THE HEART. (Wright Air Development Ctr., Wright-Patterson AFB, Ohio) Proj. 7220; RPO - 805

ABSTRACT: This work involves the measurement of the contraction force of an experimental animals heart when the subject is exposed to prolonged positive acceleration. The objective is the determination of the causes of the variation in human tolerance to accelerative forces.

3,129

Leverett, S.D., and G.D. Zuidema 1957 STANDARDIZATION OF HUMAN CENTRIFUGE TECHNIQUES. Meddelanden fran flyg - och naval-medicinska namnden (Stockholm), 6(2): 33-39

ABSTRACT: Standardization of experiments conducted in different centers on human centrifuges is proposed along the following criteria: (1) rate of onset 1.5 g/sec (2) Maximum time at peak g in a rapid onset run, 15 sec.; (3) lights in room, darkened or dimmed; (4) distance from subject's eyes to light panel, 30 inches; (5) distance between right and left peripheral lights, 28 inches; (6) type lights for subject, to be determined (however, some standard white light would be most desirable): (7) central observer, this is definitely desirable, (8) television monitor, optional, but desirable; and (9) end-point criteria, blackout (peripheral light loss, central light loss) at any point in the run. Certain other recommendations are made.

3,130

Leverett, S.D., & G.D. Zuidema 1957 STANDARDIZATION OF HUMAN CENTRIFUGE TECHNIQUES. (Paper, Meeting of Aero Medical Association, Denver, Colo., May 6-8, 1957)

ABSTRACT: There are eight centers in the world actively reporting studies on the human centrifuge and several others are either under construction or being planned. With increased speed and altitude of aircraft, the problem of human tolerance and reaction to acceleration becomes more complex. Although many centrifuges have been in operation as long as fifteen years, there has been no standardization of operation. This tends to make results reported by one group invalid for another group using a different set of operating criteria. These criteria include the type of lights used for subject response, central observer, closed-circuit TV monitor, end-point criteria, maximum time at peak G during a rapid-onset run, rate of acceleration to peak G, type of lights in room, and distance between subject's eyes and signal lights. A standard run based on the above criteria is suggested. (J. Aviation Med. 28(2):208, April 1957.)

3,131

Leverett, S. D., S. Bondurant, & M.B. Riley 1957 VENOUS CONSTRICTION IN MAN DURING EXPOSURE TO POSITIVE G FORCE. Federation Proceedings, 16(1,part I):80. March 1957

ABSTRACT: Five subjects were studied during 15 second exposure to 3 g (positive) on the human centrifuge. Pressure in the venous segment isolated between two occlusive pneumatic tourniquets increased in every instance beginning 1-10 seconds after the onset of acceleration. It reached a peak after 10-30 seconds and slowly returned to the original level during the subsequent 20-45 seconds. The group mean maximum pressure increase was 12.5 ± 4.8 mm. Hg. Reflex venous constriction occurred during positive acceleration, presumably contributing to circulatory compensation. The functional significance of this reflex remains to be determined.

3,132

Leverett, S.D., & N.P. Clarke 1958 CHANGES IN FORCE OF CONTRACTION OF THE HEART DURING POSITIVE ACCELERATION.
(Paper, 1958 Meeting of Aero Medical Association, Statler Hotel, Washington, D.C., March 24-26)

ABSTRACT: Using the strain gage arch technique, qualitative changes in the force of contraction of the left ventricle of dogs were observed simultaneously with the arterial pressure at head level and the EKG when the animal was exposed to varying positive force fields on the centrifuge. The arterial pressure overshoot following a 20 mm. Hg. The Valsalva maneuver was used as one of the prerun indexes of the responsiveness of the autonomic nervous system in affecting the cardiovascular reflexes. Drugs known to affect the contractility and rate of the heart were selectively administered to qualitatively test the responsive-

ness of the strain gage pick-up unit sutured to the myocardium. Preliminary experiments indicate: (1) a reflex increase in force of contraction of the heart during steady, short-duration (15 seconds) positive G runs: (2) positive G runs of either a prolonged low level G or high level G (above 5 G) but of shorter duration resulted in a degradation of the initial cardiovascular collapse; and (3) a complete loss of all of the above reflex compensatory mechanisms following the administration of a post-ganglionic sympathetic blocking agent. (J. Aviation Med. 29(3):240, March 1958)

3,133

Leverett, S. D., and N. P. Clarke Nov. 1959 A TECHNIQUE FOR DETERMINING CHANGES IN FORCE OF CARDIAC CONTRACTION DURING ACCELERATION. Aerospace Medicine 30(11):832-839. Nov. 1959
See also (Wright Air Development Ctr., Wright-Patterson AFB, Ohio) WADD TN 60-116; ASTIA AD-238 275; April 1960

ABSTRACT: A technique is described for measuring changes in force contraction of the heart during positive acceleration in intact, anesthetized dogs. It employs a modification of the Walton-Brodie strain gage arch. The post-Valsalva arterial overshoot was used as a pre-run test of cardiovascular responsiveness. Three g rapid onset accelerations of 15 sec duration caused an initial decrease in both arterial pressure and force contraction. Six to 10 sec later, reflex increase in force contraction to 25% above control level apparently contributed to a concomitant rise in arterial pressure. Dibenzyline reduced by one-half the acceleration required to reduce systolic blood pressure at head level to zero in gradual onset experiments. The post-Valsalva arterial overshoot was absent following administration of this drug. In prolonged exposures to accelerations of 3 g, a decrease in arterial pressure and force contraction appeared between 3 and 7 min, accompanied by significant electrocardiographic changes. The depression of arterial pressure and force contraction lasted longer than a 10-min post-run observation, but force contraction returned to normal within 24 hr. (AUTHOR)

3,134

Leverett, S. D., & N. P. Clarke 1960 A TECHNIQUE FOR DETERMINING CHANGES IN FORCE OF CARDIAC CONTRACTION DURING ACCELERATION. (Wright Air Development Ctr., Wright-Patterson AFB, Ohio) WADD TN 60-116; ASTIA AD-238 275; April 1960
See also Aerospace Medicine 30(11):832-839, Nov. 1959

ABSTRACT: A technique is described for measuring changes in force contraction of the heart during positive acceleration in intact, anesthetized dogs. It employs a modification of the Walton-Brodie strain gage arch. The post-Valsalva arterial overshoot was used as a pre-run test of cardiovascular responsiveness. Three g rapid onset accelerations of 15 sec duration caused an initial decrease in both arterial pressure and force contraction. Six to 10 sec later, reflex increase in force contraction to 25% above control level apparently contributed to

a concomitant rise in arterial pressure. Dibenzyline reduced by one-half the acceleration required to reduce systolic blood pressure at head level to zero in gradual onset experiments. The post-Valsalva arterial overshoot was absent following administration of this drug. In prolonged exposures to accelerations of 3 g, a decrease in arterial pressure and force contraction appeared between 3 and 7 min, accompanied by significant electrocardiographic changes. The depression of arterial pressure and force contraction lasted longer than a 10-min post-run observation, but force contraction returned to normal within 24 hr. (AUTHOR)

3,135

Leverett, S.D., Jr., R.U. Whitney, & G.D. Zuidema 1961 PROTECTIVE DEVICES AGAINST ACCELERATION
In Gauer, O.H. & G.D. Zuidema, Gravitational Stress in Aerospace Medicine (Boston: Little, Brown, and Co., 1961) Pp. 211-220

3,136

Leverett, S. D., Jr. & G. D. Zuidema 1961 STANDARDIZATION OF HUMAN CENTRIFUGE TECHNIQUES.
In Gauer, O. H., and G. D. Zuidema, eds. Gravitational Stress in Aerospace Medicine. (Boston: Little, Brown, and Co., 1961). Pp. 263-270.

3,137

Levi, L. 1961 A NEW STRESS TOLERANCE TEST WITH SIMULTANEOUS STUDY OF PHYSIOLOGICAL AND PSYCHOLOGICAL VARIABLES: A PRELIMINARY STUDY. Acta Endocrinologica. (Copenhagen) 37(1):38-44. May 1961. (In English).

3,138

Levine, D. 1961 ACCELERATION-COMPENSATING PRESSURE TRANSDUCERS FOR SURFACE-PRESSURE MEASUREMENTS.
(Naval Ordnance Lab., White Oak, Md.) Ballistics Research Rept. 27, NAVORD Rept. 6834, August 1961. ASTIA AD 265 415.

ABSTRACT: An acceleration-compensating pressure transducer was developed for use in the U. S. Naval Ordnance Laboratory high-performance shocktube wind tunnels to operate at pitot pressures as high as 1,000 psi. The transducer consists of two polarized barium titanate elements whose outputs are closely matched. The elements are connected electrically to cancel mechanical forces simultaneously detected by both elements. Only one element is exposed to the flow. Tests in the 6-in. Shocktube, and in the Shocktube Wind Tunnels have shown that the transducer gives accurate pressure information for the aerodynamic conditions generated in these facilities. (Author)

3,139

Levings, N.T. Jr., 1961 LAUNCHING AND ALIGHTMENT SYSTEMS FOR AERO-SPACE VEHICLES. (Cleveland Pneumatic Industries , Inc., Grand Rapids, Mich.) WADD TR 60-857, ASTIA AD-263 472, May 1961

ABSTRACT: The purpose of this study was to investigate and derive concepts for alightment, attachment, and departure of advanced, extremely high-altitude flight vehicles. The following report describes the investigatory work, problems encountered, methods by which concepts were selected, and results of preliminary design integrity testing as applicable to specifically selected concept models. Results indicate that valuable data have been derived on the relative efficiency of the various types of shock mitigation systems as originally conceived through the efforts of this project. The basic framework for an evaluation technique b which the shock mitigation systems can be rated as to energy-absorbing capability and efficiency with regard to percentage of total mass of the system, has been provided. Additionally, through precision application of the laws of similitude in developing models of the most promising concepts, evidence has been provided as to the value of utilizing dynamic scaling as an important adjunct to the analytical techniques for preliminary design. (Author)

3,140

LeVora, N. W. & E. C. Wortz 1962 PULMONARY EFFECTS OF ACCELERATION AFTER BREATHING 100 PERCENT OXYGEN.
(Garrett Corp. AiResearch Manufacturing Div., Los Angeles, Calif.) Rept. No. 4381, May 25, 1962.

ABSTRACT: Studies have been made of pilots who have developed atelectasis and pulmonary edema after undergoing high "G" maneuvers preceded by breathing 100 per cent oxygen.

3,141

Levy, E. Z., G. E. Johnson, J. Serrano, Fr., V. H. Thaler, et al. 1961 THE USE OF SKIN RESISTANCE TO MONITOR STATES OF CONSCIOUSNESS
Aerospace Medicine 32(1):60-66, Jan. 1961.

ABSTRACT: The technique of recording the absolute level of skin resistance continuously on a highly compressed record is described as a tool for studying consciousness. Recent experimental work at the USAF Aero Medical Laboratory in isolation research and crew compartment studies in which the technique was used are described. The usefulness of the tool as a monitoring device for alertness is discussed along with its limitations in its present form.

3,142

Levy, L. L. Jr. 1961 THE USE OF DRAG MODULATION TO LIMIT THE RATE AT WHICH DECELERATION INCREASES DURING NONLIFTING ENTRY.
(National Aeronautics and Space Administration, Washington, D.C.) NASA TN No. D-1307, Sept. 1961. ASTIA AD 263 198.

ABSTRACT: The method developed in NASA TN D-319 for studying the atmosphere entry of vehicles with varying aerodynamic forces has applied to obtain a closed form solution for the motion, heating, range, and variation of the vehicle parameter for nonlifting entries during which the rate of increase of deceleration is limited. The solution is applicable to vehicles of arbitrary weight, size, and shape, and to arbitrary atmospheres. Results have been obtained for entries into the earth's atmosphere at escape velocity during which the maximum deceleration and rate at which deceleration increases were limited. A comparison of these results with those of NASA TN D-319, in which only the maximum deceleration limited, indicates that for a given corridor depth, limiting the rate of increase of deceleration and the maximum deceleration requires an increase in the magnitude of the change in vehicle parameter and results in increases in maximum heating rate, total heat absorbed at the stagnation point, and range. (Author)

3,143

Levy, P. M., D. J. Sekinger & R. S.Stone 1961 A DISCUSSION OF THE NATURE AND SOURCE OF INJURY EXPERIENCED BY AVIATORS EJECTING FROM F9F-8T COUGAR UTILIZING MK-45 SEAT.
(Paper, Symposium on Biomechanics of Body Restraint and Head Protection, Naval Air Material Center, Philadelphia, Pa. 14-15 June 1961)

ABSTRACT: An analysis of nine aviators ejecting in the MK-45 seat revealed that the more serious injuries were related to the ejection per se and were back injuries. Analysis of the MK-45 seat revealed inadequacies relating to improper positioning of the aviators and application of increased ejection forces to the ejecting aviator.

3,144

Levy, P. M., E. A. Jaeger, R. S. Stone, & C. T. Doudna 1962 CLINICAL PROBLEMS IN AVIATION MEDICINE: AEROATELECTASIS: A RESPIRATORY SYNDROME IN AVIATORS. Aerospace Medicine 33(8):988-994, Aug. 1962

SUMMARY: Ten cases of basilar subsegmental atelectasis occurring in aviators flying high performance jet aircraft are presented. The lesions usually but not invariably are unaccompanied by any clinical signs or symptoms. Thus, cough, pleuritic-like pains, chest constriction sensation and basilar rhonchi may be noted. The condition is self-limited with symptoms and x-ray clearing within 48 hours, more often sooner.
Multiple etiologic factors which may be implicated in the development of this atelestasis are discussed. These include the effects of high oxygen concentration, "g" forces, active respiratory disease, oxygen toxicity, and chest constriction during flight.
Treatment and prevention are also discussed.
The term aeroatelectasis appears to appropriately describe this entity. (AUTHOR)

3,145

Levy, S., A. E. McPherson & E. V. Hobbs 1948 CALIBRATION OF ACCELEROMETERS. J. Research of the National Bureau of Standards 41:359-369.

ABSTRACT: This paper describes three accelerometer calibrators developed to provide a convenient means for calibrating lightweight accelerometers of the types used for measuring accelerations on airplanes in flight. The first calibrator is a shaking table having a sinusoidal motion with frequencies of 20 to 110 cycles per second and accelerations up to 80 gravity; the second is a portable calibrator producing a known pulse of acceleration with a peak value between 1 and 20 gravity; and the third is a centrifuge, which develops a maximum steady acceleration of about 1,000 gravity.

3,146

Levy, S., & W.D. Kroll 1950 RESPONSE OF ACCELEROMETERS TO TRANSIENT ACCELERATIONS. J. Res. of the National Bureau of Standards. 45(4): October, 1950.

3,147

Levy, T. 1943 OBSERVATIONS ON AIR SICKNESS. Mil. Surgeon, 93:147-51

3,148

Lew, J. 1949 REVIEW OF PROBLEMS OF EMERGENCY ESCAPE BY PARACHUTE JUMP AND EJECTION SEAT (Cornell Aeronautical Laboratory, Inc., Buffalo, N.Y.) Report No. BC-531-5-12, Dec. 1949. ASTIA ATI 125 336.

ABSTRACT: To obtain an understanding of the status of the problems of escape from an airplane at high speeds and altitudes, a search was made of pertinent literature. The existing literature covered only the normal parachute jump and the catapult seat ejection, methods of egress which are satisfactory at maximum speeds of 350 and 550 mph, respectively, and at a maximum altitude of 50,000 feet.

Information is presented on:

the conditions imposed upon the human by the two methods during egress and the descent to earth, and

the reactions of the human body to these conditions.

3,149

Lewis, B. M., & J. W. Taylor 1952 EFFECTS OF ACCELERATION UPON THE CEREBRAL METABOLISM AND CEREBRAL BLOOD FLOW. DEVELOPMENT OF A NEW METHOD FOR CONTINUOUS MEASUREMENT OF CEREBRAL BLOOD FLOW IN HUMANS UNDER ACCELERATION. (Naval Air Development Ctr., Johnsville, Pa.) NADC-MA-5202; 15 Aug. 1952

3,150

Lewis, B. M., & J. W. Taylor 1955 THE EFFECTS OF ACCELERATION UPON CEREBRAL METABOLISM AND CEREBRAL BLOOD FLOW. (Naval Air Development Ctr., Johnsville, Pa.) Project NM 001 100 301; 31 Dec. 1955

ABSTRACT: Cerebral blood flow has been measured in 14 studies in 10 normal males by the use of Kr^{79}. The radiations of Kr^{79} can be detected through the intact skull, hence the Fick principle can be applied to intervals of one minute or less. The average value obtained was 1246 cc/min with a standard deviation of 258 cc. Minute-to-minute stability was good. The sensitivity to changes in cerebral blood flow was as great as with the N_2O method. When corrected for endocranial volume, the Kr^{79} method gave systematically higher values than simultaneously performed N_2O studies. This difference may be due to (1) scattered radiation from the chest and change in background during the study (2) inclusion of extracerebral tissues, including air spaces in the counter path. The first factor has been evaluated and has been shown to be small.

3,151

Lewis, D.H., 1955 AN ANALYSIS OF SOME CURRENT METHODS OF G-PROTECTION. J. Aviation Med. 26(6):479-485

SUMMARY: In 415 centrifuge runs on four experienced subjects the time to peripheral light loss was recorded for g levels from 2.5 to 7.0 g. Using the runs in which the subject was relaxed and unprotected as a baseline, comparison was made of the effect of straining, the standard Navy Z-2 suit, and two types of experimental full pressure half suits. The protection afforded by these various measures was as follows:

Straining	1.1 g
Z-2 suit	1.2 g
A-2 suit plus straining	2.2 g
Full pressure half suit	2.4 g

For the Z-2 suit, the pressure required to protect is of the order of 3 psi per g above the subject's minimum tolerance level unprotected. For the full pressure half suit the maximum limit of protection was defined by the discomfort of the suit.
The maximum protection obtained by our subjects with the full pressure half suit was about the same as that obtained by the combination of the Z-2 suit plus straining.

3,152

Lewis, D. H., H. N. Hunter, & P. R. Edwards 1955 THE EFFECT OF ACCELERATION ON THE ELECTRICAL ACTIVITY OF THE RETINA. (Naval Air Development Ctr., Johnsville Pa.) Project NM 001 100 317; 31 Dec. 1955

ABSTRACT: Electroretinogram records were obtained on human subjects under G. The electroretinogram persisted during blackout with only a slight decrement. In addition, the consensual light reflex was noted at the blackout level in the opposite shielded eye. The findings have been reported.

3,153

Lewis, D. H., & T. D. Duane 1955 THE ELECTRORETINOGRAM IN MAN DURING BLACKOUT. (Naval Air Development Ctr., Johnsville, Pa.) NADC-MA-5514; ASTIA AD-83 491; 1 Dec. 1955 NOTE: CARI P&S 2.11
See also J. Appl. Physiol. 9:105-110 , 1956

ABSTRACT: "Electroretinograms from 5 subjects were recorded on the human centrifuge under varying degrees of accelerative stress up to and including blackout and unconsciousness. These findings were correlated with changes in the retinal circulation and with the consensual light reflex. It was found that the electroretinogram could not be employed as an objective measurement of blackout since it persisted throughout all the experiments, as did the consensual light reflex. These findings indicate a likely origin of blackout in or near the ganglion cell layer of the retina." (AMAL)

3,154

Lewis, D.H. 1955 THE G-PROTECTION PROVIDED BY THE FULL PRESSURE HALF SUIT (Naval Air Development Ctr., Johnsville, Pa.) NADC-MA-5511, 23 Sept. 1955. ASTIA AD 79 881

ABSTRACT: An evaluation was made of the g protection provided by the full-pressure half suit, and a comparison was made with the protection provided by straining, by the Z-2 suit, and by a combination of the Z-2 suit and a straining. The mean protection which was obtained by 4 experienced subjects in 415 centrifuge runs was 2.4 g with the full-pressure half suit, 1.1 g with straining, 1.2 g with the Z-2, and 2.2 g with the Z-2 plus straining. Maximum suit pressures of 7 and 9 psi were obtained for the full-pressure and Z-2 suits, respectively. No cardiac arrhythmias or circulatory embarrassment was observed at 7 psi with the full-pressure half suit. For the Z-2 suit, straining, and the combination of the two, the g level at which peripheral light loss occurred was selected as the limiting g level. For the full-pressure half suit, abdominal pain due to suit pressurization limited the g level; voluntary straining was not possible, apparently because of respiratory difficulty. For the full-pressure half suit, the pressure required for protection against peripheral light loss was 2 psi/g above the g level at which light loss occurs without the suit; for the Z-2 suit, the value is 3 psi/g. Acceptability of the full-pressure half suit is limited by excessive cumbersomeness, difficulty in donning,the presence of abdominal pain at maximum suit pressures, and lack of improvement over the combination of the Z-2 suit plus straining.

3,155

Lewis, D. H., & T. D. Duane 1956 ELECTRORETINOGRAM IN MAN DURING BLACKOUT.
J. Appl. Physiol. 9:105-110
See also (Naval Air Development Ctr., Johnsville, Pa.) NADC-MA-5514; ASTIA AD-83 491; 1 Dec. 1955

ABSTRACT: "Electroretinograms from 5 subjects were recorded on the human centrifuge under varying degrees of accelerative stress up to and including blackout and unconsciousness. These findings were correlated with changes in the retinal circulation and with the consensual light reflex. It was found that the electroretinogram could not be employed as an objective measurement of blackout since it persisted throughout all the experiments, as did the consensual light reflex. These findings indicate a likely origin of blackout in or near the ganglion cell layer of the retina." (AMAL)

3,156

Lewis, D. H. 1957 THE EFFECTS OF EXTERNAL PRESSURIZATION UPON THE CARDIO-VASCULAR SYSTEM IN DOGS. I. PHYSIOLOGICAL ASPECTS.
(U.S. Naval Air Development Center, Johnsville, Pa.) TED ADC AE 1401, Project NM 11 01 12.1, Rept. No. 3; July 1957. NADC-MA-5709.

ABSTRACT: Studies of the effects of external pressurization on the cardio-vascular system were carried out in 16 anesthetized dogs. Observations were made of applied pressure at the surface of the abdomen, of rectal pressure, and of various vascular pressures during inflation of a bag type of "suit" which encased the entire lower half of the animals body up to the sternum.

3,157

Lewis, E. R. & H. Horn 1919 MEDICAL STUDIES ON THE "FEEL OF THE AIRSHIP." DEAF-MUTES AND NORMALS.
Laryngoscope 29(2):65-81, Feb. 1919.

ABSTRACT: A physiologic function of the inner ear, which is peculiarly important to aviation, is that of motion-sensing in equilibration. Nothing could better illustrate this peculiar importance of the inner ear than a comparative study of individuals with normal inner ears as contrasted with those of destroyed inner ear—deaf-mutes. A series of experiments was conducted in actual flights. Those with normal inner ears, when blindfolded, were able to detect motion changes during the flight, whereas blindfolded deaf-mutes with destroyed labyrinths were not.

3,158

Lewis, E. R. 1919 STUDIES OF THE EAR AS A MOTION SENSING ORGAN.
Ann. Otol. Rhin. & Laryng. 38:10-28

3,159

Lewis Flight Propulsion Laboratory, Cleveland, Ohio 1956 AIRPLANE CRASH-IMPACT LOADS, CRASH INJURIES, AND PRINCIPLES OF SEAT DESIGN FOR CRASH WORTHINESS
(Paper, NACA Conference, April 17, 1956)

3,160

Lewis Flight Propulsion 1957 ACCELERATIONS IN FIGHTER AIRPLANE CRASHES. (Lewis Flight Propulsion Lab., Cleveland Ohio) NACA RM E57G11, Nov 4, 1957

3,161

Lewis, H.O. 1961 SHOCK TESTING WITH ELECTRODYNAMIC SHAKERS
In 1961 Proceedings of the Institute of Environmental Sciences National Meeting, April 5, 6, 7, 1961, Washington, D.C. (Mt. Prospect, Ill.: Institute of Environmental Sciences) Pp. 267-276

SUMMARY: This report should be considered solely as a preliminary description of shock tests conducted with electrodynamic shakers. Because of the marked limitations in time, this technique has been developed only to the point of making testing possible.

In the Polaris Missile System Test Services Laboratory, shakers are employed extensively to shock-test articles weighing from 200 to 1000 pounds within the pulse durations described above. Plans are currently underway to extend the use of this technique to all items requiring pulse durations up to 14 milliseconds. There are several areas which need further development before the technique can be considered "of age". First, an effective and repeatable method of producing the desired pulses must be developed. Then, if this technique receives sufficient acceptance, the shaker manufacturers should market the exciters with longer stroke capabilities. This would permit the particular method of conducting a shock test to be extended over a wider range of pulse duration. Finally, effective control of all shaker system gain settings is mandatory if repeatable data is to be obtained. It is hoped that other testing agencies will participate in the development of this technique, so that it may become an accepted part of environmental testing. (Author)

3,162

Lewis, S.T. & J.P. Stapp EXPERIMENTS CONDUCTED ON A SWING DEVICE FOR DETERMINING HUMAN TOLERANCE TO LAP BELT TYPE DECELERATIONS. ARMDC TN 57-1, ASTIA AD 135 005

3,163

Lewis, S.T. and J.P. Stapp 1957 EXPERIMENTS CONDUCTED ON A SWING DEVICE FOR DETERMINING HUMAN TOLERANCE TO LAP BELT TYPE DECELERATIONS. (Air Force Missile Development Ctr., Air Research and Development Command, Holloman AFB, New Mexico) AFMDC TN 57-1, Dec. 1957. ASTIA AD 135 005

ABSTRACT: Anthropomorphic dummies and human volunteer subjects were decelerated while seated in a swing-seat device, facing forward, and being restrained by lap belts three inches wide. The swing consisted of an aircraft seat, suspended by cables forming a swing-pendulum, which could be raised and dropped through a measured vertical component and arrested by a steel cable. Rate of onset, magnitude, and duration are tabulated for 21 dummy tests and 19 human tests.

3,164

Lewis, S.T. & J. Stapp 1958 HUMAN TOLERANCE OF AIRCRAFT SEAT BELT RESTRAINT. J. Aviation Med. 29:187-196

ABSTRACT: Human volunteer subjects were decelerated while restrained by a lap belt three inches in width while seated forward-facing in three experimental devices:

1. An aircraft seat hanging by 20-foot cables forming a swing-pendulum, which could be raised and dropped through a measured vertical component and arrested by a steel cable;
2. A sled, on a 120-foot track, propelled by an ejection seat M1-A1 catapult and decelerated by water inertia brakes; and
3. A catapult accelerating a seat by means of rubber shock cords in an 18-foot distance and decelerating it with mechanical friction brakes in thirty inches or less.

Rate of onset, magnitude and duration of force are tabulated for 30 human experiments. Air transport crash protection is discussed as well as tolerance limits to the application of crash-type mechanical forces of the magnitude investigated by these experiments.

3,165

Ley, Willy 1928 DIE MÖGLICHKEIT DER WELTRAUMFAHRT: ALLGEMEINVERSTANDLICHE BEITRAGE ZUM RAUMSCHIFFAHRTS-PROBLEM (The Possibility of Space Flight: General Agreement of Contributions to the Space Travel Problem) (Leipzig: Hachmeister und Tahl, 1928)

3,166

Ley, Willy 1957 ROCKETS, MISSILES AND SPACE TRAVEL
(Viking, New York, 1957)

ABSTRACT: Said, by the author, to be complete as far as publications in book or pamphlet form are concerned. No periodical articles are included.

Arrangement is by language - English, French, German, Italian, Russian, Dutch and Danish.

Separate listings are devoted to historical works; books on related themes; and imaginative literature on space travel.

3,167

Ley, Willy 1958 THE LONG HISTORY OF SPACE TRAVEL.
In Ten Steps Into Space, The Franklin Institute, Philadelphia, Pa., Monograph No. 6, pp. 1-11, Dec. 1958.

3,168

Ley, W. 1961 G FORCES
Space World 1:44-45, Aug. 1961

3,169

Libber, L. M. 1957 SOME THRESHOLDS OF INJURY FROM APPLICATION OF HIGH LINEAR ACCELERATIVE FORCE TO RATS.
J. Aviation Med. 28(2):166-170, April 1957.

CONCLUSIONS: In spite of the difficulties involved, some generalized conclusions can be drawn from this study on rats:

1. Increasing the duration of applied linear acceleration lowers the threshold peak G necessary to produce bone fracture.
2. Increasing the duration of applied linear acceleration has little effect on the threshold peak G necessary to produce either intraventricular or subdural hemorrhages.
3. Increasing the duration of applied linear acceleration lowers the peak G necessary to produce corneal reflex loss considerably.
4. The threshold peak G necessary to produce corneal reflex loss is considerably higher than those necessary for intraventricular and subdural hemorrhages.
5. The thresholds for intraventricular and subdural hemorrhage are very similar and are probably somewhat lower than those reported.
6. It is possible that the sequence of injury which would occur with increasing level of G is: intracranial hemorrhage, fracture and loss of corneal reflex.

3,170

Libbey, B. W. 1958 EVALUATION MEASUREMENTS OF ENERGY ABSORBING BUMPERS ON TEST VEHICLES. (Master's Thesis for MS in ME, University of Minnesota) Aug. 1958

3,171

Lichtenstein, J. H. & T. M. Carney 1961 ANALYTICAL INVESTIGATION OF AN ACCELERATION AUTOPILOT FOR CONTROL OF THE IMPACT POINT OF A BALLISTIC MISSILE DURING REENTRY.
(National Aeronautics and Space Administration, Washington, D. C.)
NASA TN D-416, September 1960.

3,172

Lidvall, H. F. 1961 VERTIGO AND NYSTAGMUS RESPONSES TO CALORIC STIMULI REPEATED AT SHORT INTERVALS.
Acta Oto-laryngol. 53:33-44.

ABSTRACT: Repeated monoaural caloric stimulations with water of constant temperature at intervals of 10 minutes brought about a progressive decline of the vertigo and nystagmus responses as measured by the mean values of the latency, duration and maximum intensity of the vertigo, the duration of the nystagmus and the total number of nystagmic beats.

The calorization series were paired so that they differed in regard to (1) only the labyrinth (left or right), (2) only the temperature of the water (warm or cold), or (3) both the labyrinth and the temperature of the water. The maximum intensity of the vertigo in the second of a paired series appeared to be independent of that in the first series, regardless of the type of pairing. The decline in the vertigo response thus appeared to show a directional specificity linked to the direction of the cupular deflexion in the individual lateral semicircular canal.

3,173

Lidvall, H. F. 1961 VERTIGO AND NYSTAGMUS RESPONSES TO CALORIC STIMULI REPEATED AT SHORT AND LONG INTERVALS.
Acta Oto-laryngol. 53:507-518.

ABSTRACT: Experiments on 50 young, and, from an otoneurological point of view, "normal" subjects, showed a decline of the average vertigo and nystagmus responses to repeated monoaural caloric stimulations with water at 30° C.

This response decline (R.D.) occurred both at short (8 min) and long (24 hours or more) interstimuli intervals, which indicates that a central mechanism was responsible for this phenomenon. Statistical analysis disclosed some traits in the response pattern characteristic of habituation.

Of practical interest is the observation that, even when an interval of two weeks elapsed between the first and second irrigations the nystagmus response to the second irrigation was significantly weaker. This R.D. was more marked in latency, total number of beats and dysrhythmia than in the duration of the nystagmus response.

3,174

Lieber, P. & R. Duffy 1954 A STUDY OF THE ACCELERATION DAMPER BASED UPON AN EXACT THEORY AND THE ELECTRIC ANALOG.
(Rensselaer Polytechnic Institute, Troy, N.Y.)
Rept. No. TR AE-5410, 30 Dec. 1954. ASTIA AD 55 831.

ABSTRACT: An analysis was made by means of an analog computer of a single unit acceleration damper attached to a non-uniform cantilevered beam. The accuracy of these calculations was limited by the approximate representation used for the nonuniform beam and also thru the process by which the mechanism of impact is described. The choice of 4 elastically coupled stations for representing the beam resulted in a close approximation to the true mode. The effects of the following parameters were evaluated: coefficient of restitution, mass ratio, and the ratio of amplitude of oscillation to the free path of the impacting mass. These results proved helpful in guiding the application of an acceleration damper to controlling the vibration of specific systems.

3,175

Lieberman, J., I. I. Lasky, S. I. Dulkin & O. E. Lobstein 1957 SERUM GLUTAMIC-OXALACETIC TRANSAMINASE ACTIVITY IN CONDITIONS ASSOCIATED WITH MYOCARDIAL INFARCTION. I. BODILY TRAUMA.
Annals of Internal Medicine 46(3):485-596, March 1957.

3,176

Lilienthal, J. L. 1944 THE EFFECT OF HYOSCINE ON MOTION SICKNESS IN AIRCRAFT.
(Naval School of Aviation Medicine, Pensacola, Fla.) Research Rept. X-252.
1., 1 May 1944

3,177

Lilienthal, J. L. 1945 THE EFFECT OF HYOSCINE ON MOTION SICKNESS IN AIRCRAFT: INDIVIDUAL THERAPY OF MOTION SUSCEPTIBLE SUBJECTS. (Naval School of Aviation Medicine, Pensacola, Fla.) Research Rept. X-252.2., 2 March 1945 ATI-70 114

SUMMARY: 1) Forty-five individuals who had experienced a disabling degree of airsickness were studied with reference to the efficacy of hyoscine hydrobromide (0.6 mgm. perorally) as a preventive of airsickness. 2) The previous flight experience of members of the test group ranged from totally inexperienced aerial photography students to veteran personnel with more than 2000 hours of flight time. 3) The experienced members were well protected from airsickness by 0.6 mgm. of hyoscine whether exposed to turbulence or acrobatics. Among the inexperienced group there were several complete or partial failures, but in the majority hyoscine proved to be a potent preventive. 4) There was no evidence that hyoscine delayed or prevented adaptation to motion in flight.
CONCLUSIONS: 1) Hyoscine is a safe and effective preventive of airsickness in susceptible individuals. 2) The efficacy of hyoscine suggests a wider usefulness in effecting a rapid adaptation to motion in aircraft in certain phases of aviation training. (AUTHOR)

3,178

Lilienthal, J. L. 1945 MOTION SICKNESS.
(Naval School of Aviation Medicine, Pensacola, Fla.) Research Rept. X-72, 22 Jan. 1945

3,179

Lincoln Laboratory 1956 BIBLIOGRAPHY OF SCIENTIFIC AND ENGINEERING PAPERS 1954-1956
(Lincoln Laboratory, Massachusetts Institute of Technology)Contract No. AF 19(122)-458. ASTIA AD 24972

ABSTRACT: This bibliography is composed of journal articles, meeting papers, and theses concerning science and engineering.

3,180

Lincoln Laboratory 1960 ABSTRACTS, SCIENTIFIC AND ENGINEERING PAPERS, JUNE 1960
Lincoln Laboratory, Massachusetts Institute of Technology Contract No. AF 19(604)-5200

ABSTRACT: This publication lists, by Lincoln Laboratory author, abstracts of articles published in the technical journals and papers presented at meetings of the scientific societies.

Included also are abstracts of work performed under Lincoln sponsorship or by consultants to the Laboratory, and, in Section A, of theses submitted for advanced degrees.

The period covered by this report is July 1, 1956 - April 15, 1960. An earlier edition, published in 1956 and now out of print, includes abstracts from the period July 1, 1954 - June 30, 1956.

3,181

Lincoln Laboratory 1961 UNCLASSIFIED PUBLICATIONS OF LINCOLN LABORATORY Lincoln Laboratory, Massachusetts Institute of Technology Contract No. AF 19(604)-7400 ASTIA AD 264 714

ABSTRACT: This reports lists all technical reports, G-reports, journal articles, meeting speeches, technical memorandums, Lincoln Manuals, special reports, and translations published by Lincoln Laboratories.

3,182

Lindberg, E. F., W. F. Sutterer, H. W. Marshall, R. N. Headley, & E. H. Wood 1960 THE EFFECT OF HEADWARD ACCELERATION ON CARDIAC OUTPUT. Abstract.

ABSTRACT: Measurements of cardiac output by dye dilution and of heart rate, stroke volume, mean arterial pressure at heart level, and systemic vascular resistance were made in six subjects in the seated position during a total of 51 1-minute exposures to 2, 3, and 4 g levels of headward acceleration produced by a human centrifuge. Comparison of the average values obtained 20 to 40 seconds after the onset of acceleration with data from 31 interspersed control determinations when the centrifuge was stationary revealed decreases of 7, 18, and 22 per cent in cardiac output and of 24, 37, and 49 per cent in stroke volume; systemic vascular resistance increased 17, 41, and 59 per cent during accelerations of 2, 3, and 4 g, respectively. Inflation of an anti-g suit to a pressure of 200 mm. of mercury during accelerations had no systematic effect except for an average increase in mean arterial pressure of 15 mm. of mercury above the values obtained without inflation. In five of the same subjects acceleration was lengthened to 10 minutes and measurements were made at 2-minute intervals 25, 24, and 17 times at the levels of 2, 3, and 3½ g, respectively. After the initial effects of these exposures, systematic alterations from the values obtained during the first minute were not observed. (The Physiologist 3(3):105, Aug. 1960)

3,183

Lindberg, E. F., W. F. Sutterer, H. W. Marshall, R. N. Headley & E. H. Wood 1960
MEASUREMENT OF CARDIAC OUTPUT DURING HEADWARD ACCELERATION USING THE DYE-DILUTION TECHNIQUE.
Aerospace Medicine 31(10):817-834.

SUMMARY: Measurement of Cardiac output, heart rate, stroke volume, mean arterial pressure and systemic vascular resistance were made in six subjects in the seated position during a total of fifty-one exposures for one minute to 2, 3 and 4 G levels of headward acceleration produced by a human centrifuge. The determinations of cardiac output by the indicator-dilution technique as well as measurement of the other variables mentioned were made during the period twenty to forty seconds after the onset of acceleration. Although there was a wide variability in the results, comparison of the average values during acceleration with data from thirty-one interspersed control determinations when the centrifuge was stationary revealed decreases of 7, 18 and 22 per cent in cardiac output and decreases of 24, 37 and 49 per cent in stroke volume during accelerations of 2, 3 and 4 G, respecitvely. Increases in heart rate of 14, 35 and 56 per cent, in mean aortic pressure of 9, 21 and 27 per cent in systemic vascular resistance of 17, 41 and 59 per cent were demonstrated during the 2, 3 and 4 G accelerations, respectively. It should be emphasized that these results are pertinent only to the period twenty to forty seconds after the onset of acceleration. They cannot be used as an indication of changes taking place during other periods of an exposure, particularly not during the initial fifteen seconds of acceleration when blood pressure at head level is severly reduced and dramatic cardiovascular alterations are taking place.

Inflation of the g-3A anti-g suit to 200 mm. Hg pressure during acceleration did not produce a significant systematic difference in the parameters measured except for the mean aortic pressure which was elevated to an average of 15 mm. Hg above the values obtained during exposures without inflation of the suit. The levels of acceleration associated with equivalent degrees of visual impairment in these six subjects were elevated approximately 1 G by inflation of the g-3A suit during the exposure. The results support the concept that this protection against development of visual symptoms is related to the degree of bypertension at heart level produced by inflation of the suit chiefly as a result of an increase in systemic vascular resistance and that an increase in cardiac output is not a major factor in this regard. (Author)

3,184

Lindberg, E. F., W. F. Sutterer, H. W. Marshall, R. N. Headley & E. H. Wood 1960
THE MEASUREMENT OF CARDIAC OUTPUT DURING HEADWARD ACCELERATION USING THE DYE-DILUTION TECHNIQUE.
(Paper: 31st Annual Meeting of the Aerospace Medical Association, Americana Hotel, Bal Harbour, Miami Beach, Fla., May 9-11, 1960)

ABSTRACT: The cardiac outputs of six trained centrifuge subjects in the seated position were determined twenty-seven times at 1 G and at interspersed intervals during seventeen, twenty-two and twelve one-minute exposures to 2, 3 and 4 G headward accelerations, respectively, by means of the Mayo Clinic centrifuge. After accelerating to 1.5 G, a 2 G per second rate of onset was achieved. Twenty

seconds after reaching the desired level of acceleration, a "slug" injection of cardio-green dye was made into the right atrium via a No. 5 Lehman catheter which was advanced into the heart from the left arm after percutaneous puncture of an antecubital vein. Both radial and atrial pressures were recorded continuously except during injection of dye or sampling. The electrocardiogram, respiratory rate, ear opacity, ear opacity pulse, esophagela pressure and reaction times to central and peripheral light signals also were recorded. Results indicate wide variations and inconsistent changes in cardiac outputs. Inflation of a G-4A anti-G suit to 200 mm. of mercury increased the range of alterations in cardiac output.

3,185

Lindberg, E.F., H.W. Marshall, W.F. Sutterer, T.F. McGuire & E.H. Wood 1961
STUDIES OF CARDIAC OUTPUT AND CIRCULATORY PRESSURES IN HUMAN BEINGS DURING FORWARD ACCELERATION.
(Paper, 32nd Annual Meeting of the Aerospace Medical Assoc., Palmer House, Chicago, Illinois, April 24-27, 1961)

ABSTRACT: Six healthy physicians were exposed to varying periods of forward acceleration of up to 10 minutes' duration at plateau levels of 3, 3.5 and 5 g produced by a human centrifuge. The subjects were supported in the supine seated position by a nylon net stretched tightly over a contoured metal frame, with the back elevated 21 degrees in the direction of acceleration. Measurements of cardiac output on the basis of dye-dilution curves recorded at the radial artery with injections of dye into the right atrium were made a total of 29, 30, and control (1g) determinations of cardiac output were done prior to and after the 80 determinations carried out during rotation in the centrifuge. In addition, five of the six subjects' output were done prior to and after the 80 determinations carried out during rotation in the centrifuge. In addition, five of the six subjects' outputs were determined five separate times in rapid succession during a 10-minute period in which the centrifuge was stationary. Continuous recordings of right atrial and aortic pressures as well as respirations, heart rate, ear opacity, ear opacity pulse and oxygen saturation of arterial blood were made in the control situation and during exposures to acceleration. Results indicate relatively little change or slight increases in cardiac output up to levels of 5 g forward acceleration when compared with control determinations performed at 1 g. When these accelerations were prolonged up to 10 minutes' duration, the cardiac output remained stable and there were no overt signs of decompensation. Forward acceleration produced significant increases in right atrial pressure from the average of 8 mm. mercury during control conditions (1g) up to an average of 22 mm. mercury at the onset of exposure to 5 g. Consistent increases in intraesophageal pressure of similar magnitude were noted in the three subjects in whom this variable was recorded; likewise, a consistent increase in mean aortic pressure was recorded in all subjects during exposure to acceleration. (Aerospace Med. 32(3):239, Mar. 1961)

3,186

Lindhard, J. 1913 EFFECT OF POSTURE ON THE OUTPUT OF THE HEART.
Skand. Arch. Physiol. 30:395-408

3,187

Lindsley, D. B., & G. R. Wendt 1944 STUDIES IN MOTION SICKNESS: II. AN INVESTIGATION INTO THE RELATIONSHIP OF THE ELECTROENCEPHALOGRAM TO MOTION SICKNESS SUSCEPTIBILITY. (Civil Aeronautics Administration, Washington, D. C.) Dec. 1944; Rept. No. 40.

SUMMARY: In the following study an analysis was made of the occipital, pre-central and frontal EEG's of 10 motion-sickness susceptible male college students and 10 non-susceptibles selected by means of a motion-sickness history questionnaire. Susceptibles were those who were subject to one or more forms of motion sickness at the time of taking the questionnaire; all were in the most susceptible 5 per cent of the total group. Non-susceptibles were those who had experience on all vehicles and devices listed on the questionnaire and who had never been motion sick; 7 per cent of the total population of students fell in this category. The expectation was that if susceptibility is the result of a deviant condition of higher nervous activity, then those two groups, selected from the extremes of the population, might be clearly differentiated by their EEG's. The results, however, did not confirm this expectation. The EEG's of the two groups did not differ significantly with respect to normal characteristics of the EEG (alpha frequency, amplitude, and per cent time) or in abnormal tendencies (5-7 sec. activity from pre-central loads and abnormal response to hyperventilation). From the findings it may be concluded that susceptibility to sickness from motion is not accompanied characteristically by a deviant condition of high nervous activity as represented by the electroencephalogram. (CAA)

3,188

Linnell, R. D. 1958 VERTICAL RE-ENTRY INTO THE EARTH'S ATMOSPHERE FOR BOTH LIGHT AND HEAVY BODIES
Jet Propul. 28:329-330, May 1958

ABSTRACT: A solution for the velocity of a body during vertical re-entry into the earth's atmosphere is presented.

3,189

Lipkin, M., & H. L. Ratcliffe 1954 SOME EFFECTS OF CYCLIC ACCELERATION IN RHESUS MONKEYS. (Naval Air Development Ctr., Johnsville, Pa.) NADC-MA-5404; 4 May 1954 ASTIA AD-36 626
See also Aviation Med. 25(6):594-599.

ABSTRACT: The effects of cyclic accleration on rhesus monkeys were compared with the effects of positive and negative acceleration. Animals exposed to cyclic acceleration exhibited no change in external appearance, but tissue damage to internal organs was present. This damage could be grouped into 3 categories: (1) vascular congestion, edema, and hemorrhage; (2) formation of hyaline thrombi, and (3) separation of parenchymal liver cells. Details are included concerning the procedure, the final results, and the significance of the experiments. Postmortem examinations are presented in a report of each monkey. Each report outlines the gross and microscopic findings of each organ. (ASTIA)

3,190

Lipkin, M. and Ratcliffe, H. L. 1954 SOME EFFECTS OF CYCLIC ACCELERATION IN RHESUS MONKEYS. J Aviation Med. 25(6):594-599.

SUMMARY: In this study, eighteen rhesus monkeys (Macaca mulatta) were subjected to acceleration forces of either 25 G or 35 G, which were combined with from 30 to 150 rotations per minute. Two monkeys were accelerated to 25 and 35 G, then allowed to decelerate while being rotated at 110 turns per minute. All animals were sacrificed with intravenous Membutal within one to six hours after exposure.

Post-mortem examination revealed tissue damage in internal organs of all animals exposed to this type of acceleration. The damage could be grouped in three categories: (1) vascular congestion, edema, and hemorrhage; (2) formation of hyaline thrombi, and (3)separation of parenchymal liver cells.

A comparison is made with rhesus monkeys unexposed to acceleration, and with others exposed to positive and negative acceleration of 40 G. It is suggested that the above-mentioned effects of cyclic acceleration are the result of more profound changes than can be accounted for on the basis of intravascular pressure rise due to the acceleration forces. It is recommended that the possible implications of these studies to the man in high performance aircraft be given further study.

3,191

Lippisch, A.M., R. Noble 1948 TRAJECTORIES OF UPWARD SEAT EJECTION (Naval Air Material Center, Aeronautical Medical Equipment Lab., Philadelphia, Pa.) TED NAM 256005, Report No. 6, Nov. 1948. ASTIA ATI 57 511

ABSTRACT: A method for determining the trajectory of a man and seat ejected upward from a moving aircraft when the initial conditions of flight and ejection are known has been derived. The mathematical derivation is highly complex, but the solution of the differential equations of motion yields a set of equations from which the position of the ejected body with respect to ground or to a point in space can be easily determined when the seven parameters which comprise

the initial conditions necessary for accurate calculation are airplane speed, direction and angle of inclination of flight, flight altitude, ejection velocity, angle of the seat guide rails with respect to the vertical, weight of the ejected mass, and air resistance of the mass. A particular form of the method presented can be used to determine the initial conditions of flight and ejection which are necessary for specified clearance of aircraft for particular dimensions. A preliminary investigation of the effect of the variation of four of the seven parameters is presented. The method for calculating the space and time trajectories of the ejected mass is given, and a comparison of available flight test trajectory data with theoretical calculations is shown. This analysis of trajectories and of the effects of the variable on the path of the ejected body is able to serve as a check and assurance of the validity and completeness of the aero-medical and engineering studies.

3,192

Lissner, H. R., E. S. Gurdjian & J. E. Webster 1947 MECHANICS OF SKULL FRACTURE Proc. Soc. Exp. Stress Analysis 7(1):61-70.
See also: Paper presented at the annual meeting of the Society for Experimental Stress Analysis, New York, Dec. 4, 1948.

3,193

Lissner, H. R., E. S. Gurdjian and J. E. Webster 1948 MECHANICS OF SKULL FRACTURE
(Paper, annual meeting of the Society for Experimental Stress Analysis, New York, 1948)
See also: Proc. Soc. Exp. Stress Analysis, 7 (1):61-70.

3,194

Lissner, H. R. 1952 EXPERIMENTAL AND CLINICAL SKULL FRACTURES. Instructional Course Lectures, Amer. Acad. Orth. Surg. 9:277-281

3,195

Lissner, H. R. and F. G. Evans 1956 ENGINEERING ASPECTS OF FRACTURES. Clinical Orthopaedics. 8:310-322.

3,196

Lissner, H. R., M. Lebow & F. G. Evans 1960 EXPERIMENTAL STUDIES ON THE RELATION BETWEEN ACCELERATION AND INTRACRANIAL PRESSURE CHANGES IN MAN. Surg., Gynec., & Obstet. 111(3):329-338, Sept. 1960.

ABSTRACT: The problems primarily investigated in the present studies are: (a) whether or not the body weight augmented the impact of the head against an automobile instrument panel, i.e., whether the fact that the body was attached to the head produced a more severe impact to the head than if the head alone were dropped on the instrument panel as in previous investigations; (b) the relationship between acceleration and intracranial pressure produced when the head struck a thin steel plate, an automobile instrument panel, and a large steel block; (c) the time duration of the pressures and accelerations occurring during impact of the head; and (d) the probable intracranial pressure and its time duration accompanying concussion.

Twenty-three drops, divided into 5 series of tests, were made with the embalmed bodies of 4 adult white male cadavers. The apparatus and instrumentation, as well as the method of making the drops, are described and illustrated.

3,197

Lissner, H. R. Mar. 1961 BIOMECHANICS RESEARCH. Journal of Engineering Education 51(7):594-598.

ABSTRACT: The author describes the tests conducted by the Biomechanics research center at Wayne State University on the strength characteristics of human bone during impact and acceleration.

3,198

Lissner, H. R. 1961 EFFECTS OF ACCELERATION ON THE HUMAN SKELETON (Wayne State University, Detroit, Michigan) June 1961

3,199

Lissner, H. R., & E. S. Gurdjian 1961 EXPERIMENTAL CEREBRAL CONCUSSION. American Society of Mechanical Engineers, New York, New York) Report No. 60-WA-273.

3,200

Lissner, H.R. 1961 IMPACT STUDIES IN UNITED STATES UNIVERSITIES (Paper, Symposium On Impact Acceleration Stress, Brooks Air Force Base, San Antonio, Texas, November 27-29, 1961)

3,201

Lissner, H.R. 1961 AN OUTLINE OF CURRENT RESEARCH AND OBJECTIVES OF FUTURE CONTRIBUTIONS TO INVESTIGATIONS OF IMPACT INJURIES BY UNITED STATES UNIVERSITIES
(Paper, Wayne State University, November 22, 1961)

ABSTRACT: It is futile to attempt to obtain a generalized approach to impact injury. The mechanism of injury due to impact in all regions of the body, and the mechanism of injury of all bodily organs and their attachments must be studied individually; and impact can be provided by objects of various sizes and shapes which will have a significant effect on the injury produced. In order to determine the type of injury, it will be necessary to devise instrumentation of a particular and special sort for making measurements within the body of living animals. All data obtained in impact investigations must be evaluated statistically. Another problem which should be investigated concurrently with injury production is how best to provide protection against injury under various impact conditions. Since research of this type must be undertaken by teams from various disciplines involved in the problem, I believe that universities are particularly well suited to conduct such investigations. One problem is to get people to work together in a team effort.

3,202

Lissner, H. R. 1962 BIOMECHANICS - WHAT IS IT?
(Paper, Winter Annual Meeting, New York, N. Y., Nov. 25-30, 1962, of the American Society of Mechanical Engineers) ASME Paper No. 62-WA-232

3,203

Lissner, H. R. 1962 DEFORMATION STUDIES OF THE BONES OF THE FACE
(Wayne State University, Detroit, Michigan) May 1962

3,204

Lissner, H.R. 1962 HUMAN AND ANIMAL IMPACT STUDIES IN U.S. UNIVERSITIES
Impact Acceleration Stress: Proceedings of a Symposium With a Comprehensive Chronological Bibliography, National Academy of Sciences, National Research Council, Publication No. 977, pp. 61-68)

ABSTRACT: Questionnaires were sent to the Deans of 158 engineering colleges and 83 medical schools in the United States to determine to what extent their institutions were engaged in studies involving impacts to animals and humans. The results of this survey will be presented.

The research being conducted can be classified into three separate categories. In the first category are the investigations covering planned automobile collisions. In the second category are the surveys being conducted to determine the actual injuries resulting in highway automobile collisions. In the third category we find investigations being conducted with impacts applied directly to animals and humans.

3,205

Livingston, P. C. 1939 THE PROBLEM OF BLACKOUT IN AVIATION. (Amaurosis Fugax), Brit. J. Surg. 26:749-756.

ABSTRACT: The first impression derived from the terrific impact of the aircraft against the resistance of the air at the point of turn is one of intense bodily strain producing what might be described as a "concertina sensation".

Loops out of a dive may produce only discomfort with a suspicion of visual uncertainty at 200 m.p.h. There may be dimness of perception of the ground and a sensation may be caused as though the accomodation had been overtaxed by bringing print too near the eyes.

A favored view of causation of "black-out" is one based on the compressing influence of intra=ocular pressure upon the central retinal artery and its branches. The vessels are believed to colapse because the systolic drive in the ophthalmic artery is seriously impaired, and the intra-ocular tension of 20 mm. of mercury provides an impassable resistance. Thus, retinal nutrition is brought to a standstill. (The author does not agree fully with this view)

The retina is peculiar in so much as it is more dependent upon oxygen for the maintenance of its vitaility and function than any other tissue within the body. It was found that the oxygen demmand represents a four-fold value over that of other structures. Were the retina deprived completely of its blood supply and were the vessels actually compressed to extinction, there would be a definite risk of permanent damage to the visual receptor mechanism. This has never been recorded. The process may not be one of complete vascular denudation, but rather retardation of the existing flow.

Free use of oxygen has little effect on the onset of black-out, while CO_2 seems to be beneficial.

3,206

Livingston, P.C. 1942 FLYING PERSONNEL RESEARCH COMMITTEE APPARATUS FOR INVESTIGATING VISUAL REACTIONS IN RELATION TO AIRSICKNESS (RAF, Institute of Aviation Medicine, Farnborough) F.P.R.C. 463; May 1942, ASTIA AD-206 852

ABSTRACT: Fifteen personnel from A.C.R.C. selected at the National Hospital from among those examined for sickness on swings were sent to the Northampton Polytechnic to undergo the visual test. No records accompanied them, so that the experiment was uninfluenced by previous knowledge of their reactions to swinging, in which they might or might not have been affected.

The results of the vision test were graded according to their performances when putting the loop over the pin; that is to say during the second half of the full test. Notes were made with regard to the onset of swaying and any indication of pallor, or sweating. Where such signs appeared to be sufficiently marked to merit mention those added weight to any shown assessment as indicated from the use of the loop and pin test. The results at the Northampton Polytechnic (Visual Tests) are compared with those obtained at the National Hospital (Swinging Tests) in this report.

3,207

Livshits, G. SH. 1956 O VOZMOSHNOSTI MEZHPLANETNYKH POLETOV. (ON THE FEASIBILITY OF INTERPLANETARY FLIGHT) (Alma-Ata: Kazakhskoe gosudarstvennoe izdatel' stvo, 1956)

ABSTRACT: Space travel and problems connected with its realization are depicted in popular language to acquaint the layman with the tremendous difficulties of achieving space flight. A chapter entitled "Preparation for the Realization of Interplanetary Flight" reviews historical progress of astronautics from the first rocket flights to modern animal rocket experiments and sputniks. It also summarizes the findings related to overcoming effects of acceleration and deceleration forces, weightlessness, creation of cabin atmosphere, solar and cosmic radiation, etc.

3,208

Llano, G. A. July 1956 THE ART OF SURVIVAL. Flying Safety, 1: 6-10.

ABSTRACT: This article discusses abandoning of aircraft by parachute, especially over the sea. The mental and physical aspects are considered, especially in survival from great heights, when required survival equipment includes special maintenence of temperature and pressure. The "flotation gear" is discussed.

3,209

Lockheed Aircraft Corp. 1962 HUMAN CAPABILITIES IN THE PRONE AND SUPINE POSITIONS: AN ANNOTATED BIBLIOGRAPHY. (Lockheed Aircraft Corp., Sunnyvale, Calif.) Report no. 3-80-62-8; ASTIA AD-278 653; May 1962

3,210

Lockheed Missiles & Space Company 1961 SPECIAL BIBLIOGRAPHIES (Lockheed Missiles & Space Company, Sunnyvale, California) ASTIA AD 267868

ABSTRACT: This publication presents a compilation of special bibliographies from the Lockheed Missiles & Space Company for the years 1959-1961.

3,211

Loeb, A.A. 1955 STUDY OF THE IMPACT OF A SPHERE ON A SEMI-INFINITE SLAB FOR USE IN DROP-TOWER (Samuel Feltman Ammunition Labs., Picatinny Arsenal, Dover, N.J. Technical rept. no. 2173, proj. no. TA1-2707; July 1955; ASTIA AD-68 347.

ABSTRACT: "A mathematical analysis has been developed to describe the physical variations of deflection, load, velocity, and acceleration which take place during the impact of a sphere on a horizontal surface. The analytical expressions have been modified by experimentally determined constants to make them specifically useful in the interpretation of impact results secured with a drop tower which is utilized in the testing and evaluation of ammunition components and complete rounds. Expressions have been obtained which make possible the determination of peak acceleration, or setback, to an accuracy of 20% with variations in the height of drop, weight of the falling body, and geometrical configuration of the impacting surfaces as well as in the material used for the impacting surfaces. Experimental tests have been performed to verify the analytical equation and to evaluate the modifying constant used to correlate the theoretical and the experimental results. On the basis of this development and investigation, several extensions of this project appear desirable. A determination of coefficients of restitution, a dynamic analysis of the impact problem considering the nodes of vibration, and further refinement of the experimental equipment all appear to be desirable extensions of this work." (SFAL summary)

3,212

Logan, J. ed. 1953 THE COMPLETE BOOK OF OUTER SPACE (New York: Maco Magazine Corp., 1953)

ABSTRACT: A short collection of non-technical articles and lectures on space flight by authorities on rocket propulsion and space medicine.

3,213

Loginov, Bladislav & Leinoid Salmanov 1962 ON THE PREPARATION OF MAN FOR FLIGHTS INTO THE COSMOS
(Translation Services Branch, Foreign Technology Div., Wright-Patterson AFB, Ohio)
FTD-TT-62-1592/1+2+4 20 Nov. 1962. ASTIA AD 292 615
Original Source: Kommunist, September 8, 1962, P. 3

ABSTRACT: The immediate preparation of man for flight into the cosmos began with the creation in our country of heavy cosmic ships. Scientists of biology and medicine, together with engineers, began an intensive study of the influence of the factors of cosmic space on the organisms of human beings and animals. In cosmic flight a man encounters many effects different from those on earth. These factors of cosmic flight may be divided into three groups. In the first group are extremely low barometric pressure, the absence of molecular oxygen, cosmic radiation, severe temperature conditions, the danger of meteors, etc. In the second are included the noise, vibration, and accelerations experienced over the powered portions of the ascent and descent of the craft, and also the weightlessness during the time of orbital flight. The third group consists of the effect of the artificial atmosphere of the cabin, the work and rest schedule without the 24-hour time periods to which man is accustomed, the peculiarities in eating, restriction of movement, psychological strain, etc. This article contains details on the selection of the pilot-cosmonauts and their scientifically based preparation and training.

3,214

Loman, J., W. Dameshek, A. Myerson, & D. Goldman 1936 EFFECT OF ALTERATIONS IN POSTURE ON THE INTRA-ARTERIAL BLOOD PRESSURE IN MAN. I. PRESSURE IN THE CAROTID, BRACHIAL AND FEMORAL ARTERIES IN NORMAL SUBJECTS. Arch. Neurol. Psychiat. 35:1216-1224 (Chicago)

3,215

Lombard, C.F., and D.R. Drury 1941 THE INFLUENCE OF POSITIVE FOOT-TO-HEAD RADIAL ACCELERATION UPON THE ABILITY OF A SUBJECT (PILOT) TO MANIPULATE A CONTROL STICK. (University of Southern Calif., School of Medicine, Los Angeles) Contract N60ri77, Task 1, 31 March 1941

ABSTRACT: By the use of an airplane control stick, modified and spring loaded, subjects were tested for their ability to manipulate the control stick in tracing a six-lobed clover leaf pattern while under the influence of increased positive radial acceleration (G) directed from foot to head. The positive G was obtained by the use of a human centrifuge of 25-foot radius.

The time to trace the pattern, with stick loading constant, decreased progressively from 28 seconds at 1 G to 17 seconds at 4 G, with no further change up to 6 G.

The time to trace the pattern at a constant radial acceleration of 3 G did not vary significantly as the elevator loadings for pull, or push, or the aileron loadings were varied one at a time.

There is an apparent change in psychomotor performance of the subjects as the radial acceleration is increased up to 4 G with no further change up to 6 G.

The actual pull on the stick, by subjects applying an estimated 20-lb. pull, increased uniformly with increasing positive accelerations.

It is recommended that both the apparent change in psychomotor performance with increased radial accelerations and the effects of radial acceleration upon the masses of the extremities of the body, in regard to airplane controls, be further determined.

3,216

Lombard, C. F. and D. R. Drury 1947 THE INFLUENCE OF POSITIVE (FOOT TO HEAD) RADIAL ACCELERATION UPON THE ABILITY OF A SUBJECT (PILOT) TO MANIPULATE A CONTROL STICK.
(Office of Naval Research, Washington, D.C.)
July 1947 Contract N6ori77

SUMMARY: By the use of an airplane control sitck, modified and spring loaded, subjects were tested for their ability to manipulate the control stick in tracing a six-lobed clover leaf pattern while under the influence of increased positive radial acceleration (G) directed from foot to head. The positive G was obtained by the use of a human centrifuge of 25-foot radius.

The time to trace the pattern, with stick loading constant, decreased progressively from 38 seconds at 1 G to 17 seconds at 4 G, with no further change up to 6 G.

The time to trace the pattern at a constant radial acceleration of 3 G did not vary significantly as the elevator loadings for pull, or push, or the aileron loadings were varied one at a time.

There is an apparent change in psychomotor performance of the subjects as the radial acceleration is increased up to 4 G with no further change up to 6 G.

The actual pull on the stick, by subjects applying an estimated 20-lb. pull, increased uniformly with increasing positive accelerations. The actual pull of 23 lb. at 1 G increased to 30 lb. to 3 G, 34 lb. at 4 G, 36 lb. at 5 G and 38 lb. at 6 G. Five tests at 7 G and two tests at 8 G showed 50 lb. and 54 lb. respectively. The increase in actual pull with increased G while estimating a 20-lb. pull appears to be caused by the radial acceleration acting on the mass of the arm through its lever system to produce an "involuntary pull" which is additive to the estimated or "effort pull."

It is recommended that both the apparent change in psychomotor performance with increased radial accelerations and the effects of radial acceleration upon the masses of the extremities of the body, in regard to airplane controls, be further determined.

3,217

Lombard, C. F. et al 1948 THE EFFECTS OF NEGATIVE RADIAL ACCELERATION ON LARGE EXPERIMENTAL ANIMALS (GOATS).
(Office of Naval Research, Washington, D. C.)
January, 1948 Contract N6ori77

SUMMARY: The effects of negative radial acceleration (centrifugal force acting from tail to head) upon 11 goats were studied on the himan centrifuge at the University of Southern California, at levels of -5 G and -8 G.

In addition to routine gross examination for presence of hemorrhages, etc., observations were made on respiration and cardiac function. In selected cases, ophthalmological examinations were made, electrocardiograms recorded, chest X-rays taken and blood samples collected.

Autopsies were conducted on all animals, and specimens taken for histopathologic study.

A motion picture was prepared which records both gross and microscopic pathologic findings as well as typical experimental procedures.

These experiments indicate that repeated exposures to -5 G tend to produce considerable odema and numerous hemorrhages, both potechial and frank, in the tissues of the head and neck. In contrast, however, only one animal showed cerebral hemorrhage, this a small one on the dorsal surface of the medulla. Heart action was slowed and respiration depressed. Some subpleural hemorrhages were found in the lungs. Subenodocardial hemorrhages of dubious origin were frequently noted.

Negative G seems to offer greater danger of strangulation by edema of the glottis and surrounding tissues than of cerebral hemorrhage.

3,218

Lombard, C.F. 1948 HUMAN TOLERANCE TO FORCES PRODUCED BY ACCELERATION
(Douglas Aircraft Company, Inc., El Segundo, Calif) Report No. ES-21072
27 Feb. 1948.

ABSTRACT: Human tolerance to acceleration is reviewed and discussed in a manner relatively free from medical terminology in an effort to make the current knowledge on the subject more usable. A chart is presented which shows on a log grid the approximate human tolerances to forces produced by acceleration in relation to velocity, stopping distance and time.

3,219

Lombard, C. F., A. A. Canfield, R. C. Wilson, N. D. Warren, & D. D. Drury 1948 THE INFLUENCE OF POSITIVE (HEAD TO FOOT) CENTRIFUGAL FORCE UPON SUBJECT'S (PILOTS') ABILITY TO EXERT MAXIMUM PULL ON AN AIRCRAFT CONTROL STICK. (Research Report to the Office of Naval Research) Contract N6ori77, Task Orders I and III, Jan. 1948

3,220

Lombard, C. F., H. P. Roth and D. R. Drury 1948 THE INFLUENCE OF RADIAL ACCELERATION (CENTRIFUGAL FORCE) ON RESPIRATION IN HUMANS (Office of Naval Research, Washington, D. C.)
February 1948 Contract N6ori77
Also see J. Avia. Med., 19(5), October 1948

SUMMARY: The effects of centrifugal force applied positively (head to seat) and negatievely (seat to head) upon respiration were studied on a human centrifuge of 25-foot radius. Results were as follows:

Negative acceleration up to -3 G (without protective gear).
a. Slight increase in respiratory rate.
b. Decrease in tidal volume.
c. Decrease in lung volume at end of expiration.
d. Decrease in vital capacity.

Positive acceleration up to +5 G without protective pneumatic suits or tight belt.
a. Slight increase in respiratory rate.
b. Increase in tidal volume.
c. Increase in the lung volume at end of expiration.
d. Decrease in vital capacity.

Positive acceleration up to + 6 G with protective pneumatic suit.
a. Moderate increase in respiratory rate.
b. Decrease in tidal volume.
c. Decrease in the lung volume at end of expiration.

Positive acceleration up to + 4 G with tight abdominal belt.
a. Insignificant increase in respiratory rate.
b. Increase in tidal air volume.
c. Increase in the lung volume at end of expiration.

3,221

Lombard, C. F., H. P. Roth and D. R. Drury 1948 THE INFLUENCE OF RADIAL ACCELERATION (CENTRIFUGAL FORCE) ON RESPIRATION IN HUMANS. J. Aviation Medicine, 19(5):355-364.

ABSTRACT: The effects of centrifugal force applied postively (head to seat) and negatively (seat to head)upon respiration were studied on a human centrifuge of 25-foot radius. Results were as follows:

Negative acceleration up to -3 G (without protective gear).

a. Slight increase in respiratory rate.
b. Decrease in tidal volume.
c. Decrease in lung volume at end of expiration.
d. Decrease in vital capacity

Positive acceleration up to + 5 G without protective pneumatic suits or tight belt.

a. Slight increase in respiratory rate.
b. Increase in tidal volume.
c. Increase in the lung volume at end of expiration.
d. Decrease in vital capacity.

Positive acceleration up to + 6 G with protective pneumatic suit.

a. Moderate increase in respiratory rate.
b. Decrease in tidal volume.
c. Decrease in the lung volume at end of expiration.

Positive acceleration up to + 4 G with tight abdominal belt.

a. Insignificant increase in respiratory rate.
b. Increase in tidal air volume.
c. Increase in the lung volume at end of expiration.

3,222

Lombard, C.F., H.P. Roth and D.R. Drury 1948 THE INFLUENCE OF RADIAL ACCELERATION (CENTRIFUGAL FORCE) ON RESPIRATION IN HUMANS. (University of Southern Calif., School of Medicine, Los Angeles) Contract N60ri77, Task 1, 31 March 1951
See also J. Aviation Medicine, 19(5):355, October 1948

ABSTRACT: The effects of centrifugal force applied positively (head to seat) and negative (seat to head) upon respiration were studied on a human centrifuge of 25-foot radius. Results were as follows:

Negative acceleration up to -3 G (without protective gear)

a. Slight increase in respiratory rate.
b. Decrease in tidal volume.
c. Decrease in lung volume at end of expiration.
d. Decrease in vital capacity.

Positive acceleration up to + 5 G without protective pneumatic suits or tight belt.

a. Slight increase in respiratory rate.
b. Increase in tidal volume.
c. Increase in the lung volume at end of expiration.

d. Decrease in vital capacity.

Positive acceleration up to + 6 G with protective pneumatic suit.

a. Moderate increase in respiratory rate.
b. Decrease in tidal volume.
c. Decrease in the lung volume at end of expiration.

Positive acceleration up to + 4 G with tight abdominal belt.

a. Insignificant increase in respiratory rate.
b. Increase in tidal air volume.
c. Increase in the lung volume at end of expiration.

3,223

Lombard, Charles F. 1949 HOW MUCH FORCE CAN THE BODY WITHSTAND? Aviation Week, 50(1):20-21;23-25;27-28. 17 Jan 1949

3,224

Lombard, C.F. 1949 PHYSIOLOGICAL, BIOCHEMICAL AND ANATOMICAL EFFECTS OF ACCELERATION ON THE BODY RELATIVE TO PILOT POSITION IN HIGH-SPEED AIRCRAFT. (University of Southern Calif., School of Medicine, Los Angeles) USN Contract no. N6ori77, Task Order 1, Project no. 161-014 July 1949

3,225

Lombard, C.F., A.A. Canfield, R.C. Wilson, N.D. Warren and D.R. Drury 1951 THE INFLUENCE OF POSITIVE (HEAD TO FOOT) CENTRIFUGAL FORCE UPON A SUBJECT'S ABILITY TO EXERT MAXIMUM PULL ON AN AIRCRAFT CONTROL STICK. (University of Southern Calif., School of Medicine, Los Angeles) Contract N6ori77, Tasks 1 & 2, 31 March 1951

ABSTRACT: Two series of experiments were performed on the human centrifuge to determine the effects of various levels of positive G (Gravitational or centrifugal force acting from head to foot) upon the maximum pull which a seated subject could exert on a simulated airplane control stick, using both arms simultaneously. An "isometric" stick, having negligible deflection with applied force, was used. G protection was used to avoid grey-out or black-out.

The maximum pull which a subject can exert upon a simulated airplane control stick does not increase with increased G. The mean maximum pull was the same at 1 and 2 G, and decreased there after with increased G up to and including 5 G.

Variation in arm position, measured by the angles of the members in relation to the direction of the G force, did not significantly influence maximum pull at 4 G. This implies that the arms are acting as rigid, non-jointed members during maximum pulling effort.

The involuntary pull of the subject's arms, at 1 G, due to their own mass and leverage system, increases as the angles of the members increase in relation to the direction of G force.

Involuntary pull for two arms, at 1 G, was found to exceed 10 lbs. in more than 50% of the arm angles tested in those experiments.

3,226

Lombard, C. F., S. W. Ames et al 1951 STUDIES WITH THE EPICYCLIC CENTRIFUGE ON ANIMALS AND HUMANS
(Paper Twenty-second annual meeting of the Aero Medical Association in Denver, Colorado, May 1951.)
(Office of Naval Research, Washington, D. C.)
May 1951 Contract N6ori77

SUMMARY: In order to better understand the effects of tumbling during exposure to high accelerational forces, such as might be encountered during escape from high speed aircraft, a small centrifuge was mounted on the large University of Southern California centrifuge. Anesthetized goats and apes were repeatedly exposed to accelerations up to 5 G while being rotated either about the head, heart or hips, at speeds up to 72 RPM. One human subject was exposed on several occasions to 2 G at 40 RPM. Motion pictures were taken to study the problem of holding the body.

It was found that it is extremely difficult to strap an animal or human such that they will not work out of the straps. The ever changing direction of acceleration with respect to the body makes it a writhing, flopping aggregate of discordant masses. Rotation about the heart appeared to be the best position.

Blood pressures measured at level of base of skull and only in the animals showed, at the higher stress loads, extremely high transient pressures (900 plus mm HG) which did little or no observable damage.

More nearly normal blood pressure and more rapid return to the normal was observed while rotating the animal about the heart.

Apes, after recovery from the effects of the anesthetic, showed no apparent alteration in behavior or faculties.

The human subject reported no dizziness but some questionable gastric distress several hours after one series of exposures.

3,227

Lombard, C.F., S.W. Ames, and S. Rosenfeld 1951 VOLUNTARY TOLERANCE OF THE HUMAN TO IMPACT ACCELERATIONS OF THE HEAD. (Depart. of Aviat. Med., Univ. of Southern Calif., School of Med., Los Angeles, Calif.) Contract N6ori77, Task 1, 31 March 1951
See also J. Av. Med. 22(2):109-116

ABSTRACT: Voluntary tolerances to impact blows to the head of humans have been determined while using available protective head of humans have been determined while using available protective headgear to reduce or minimize the local bruising effects.

Voluntary limits were always found to be other than the effects of acceleration upon the head (or brain); neck pain, local bruising, etc.

Accelerations of equal pendular masses shows that the human voluntarily tolerated up to 34 G from a top blow, 38 G from a frontal blow, 25 G from a blow by the side of the head and 35 G from a back blow.

The averages of voluntary tolerances showed for the top 23 G for 6.0 ft lbs at 5.8 ft per sec at 4,800 g.p.s., for the front 22 G for 4.1 ft. lbs at 4.9 ft per cec at 5,600 g.p.s.; for the side 20G for 5.7 ft at 5.6 ft per sec at 3,500 g.p.s.; and for the back blows 18 G for 4.9 ft lbs at 5.2 ft per sec at 3,700 g.p.s.

An approach has been mada to this multifaceted problem of head injury in which an attempt to study the effect only one factor namely impact acceleration. Some data has been obtained but much more is indicated and a much greater effort by biologists in the use of engineering terms is indicated if their data is to be useful.

3,228

Lombard, C. F., S. W. Ames and S. Rosenfeld 1951 VOLUNTARY TOLERANCE OF THE HUMAN TO IMPACT ACCELERATIONS OF THE HEAD
J. of Aviation Medicine 22(2):109-116, April 1951.

SUMMARY: Voluntary tolerances to impact blows to the head of humans have been determined while using available protective headgear to reduce or minimize the local bruising effects.

Voluntary limits were always found to be other than the effects of acceleration upon the head (or brain); neck pain, local bruising, etc.

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An approach has been made to this multifaceted problem of head injury in which an attempt to study the effect only one factor namely impact acceleration. Some data has been obtained but much more is indicated and a much greater effort by biologists in the use of engineering terms is indicated if their data is to be useful.

3,229

Lombard, C. F., P. Close, & F. Larmie 1963 PATHOLOGY PRODUCED BY IMPACT ACCELERATION APPLIED TO GUINEA PIGS. (Paper, 34th Annual Meeting of the Aerospace Medical Association, Statler-Hilton Hotel, Los Angeles, Calif., April 29-May 2, 1963)

ABSTRACT: In contemporary aerospace vehicles the possibility of exposure of astronauts to impact at any angle has increased the need for experimental data relating to tolerance, pathology and the value of various protective device concepts. To obtain such information, anesthetized male guinea pigs were placed on a small impact acceleration sled in form fitting fiberglass reinforced plastic support and restraint device. The device was gimbal mounted on the carriage of the sled so that accelerations could be applied to the animals at any of a wide variety of selected angles. Animals were exposed to forces of 80 to 90 g peaks with onset rates of about 11,000 to 14,000 g/sec. Animals placed in the close fitting support-restraint tolerated the transverse impact accelerations even when repeatedly exposed. A type of sub-clinical damage was observed in some of these animals which resembled air blast. The guinea pigs oriented on the sled in a tail first direction tolerated the impact well. However, animals oriented on the sled the opposite direction, head first, showed little tolerance to the exposures and frequently indicated vertebral injury, ranging from the head tailward to the mid-thoracic vertebrae. The need for improved restraints is indicated.

3,230

LoMonaco, C. T. 1947 INFLUENZA DIALCUNI FATTORI SULLA RESISTENZA UMANO ALLE ACCELERAZIONE. (EFFECTS OF VARIOUS FACTORS ON HUMAN RESISTANCE TO ACCELERATIONS). Rivista D. medicini Aeronautica 10:609-611, Oct.-Dec. 1947.

3,231

LoMonaco, T. 1948 L'ORGANISMO UMANO RESISTERA ALLE VARIAZIONI AMBIENTALI DI UN VIAGGIO INTERPLANETARIO? (WILL THE HUMAN ORGANISM BE ABLE TO WITHSTAND THE ENVIRONMENTAL CHANGES OF AN INTERPLANETARY JOURNEY?) Riv. med. aeronaut. 11:84-87

3,232

Lomonaco, T. 1950 ALCUNE PROBABILI MANIFESTAZIONI DELL'ORGANISMO UMANO NEL FUTURO VOLO INTERSIDERALE (SOME PROBABLE REACTIONS OF THE HUMAN ORGANISM IN FUTURE INTERPLANETARY FLIGHT) In L'Uomo in volo (Rome: Abruzzini, 1950) pp. 469-476

3,233

Lo Monaco, C. T., 1950 L'UOMO IN VOLO: MANUALE DI MEDICINA AERONAUTICA PER IL PERSONALE AERONAVIGANTE. (Man in Flight: An Aeromedical Manual For Flyers) (Rome: Abruzzini Editore, 1950). ASTIA ATI 132 428.

3,234

LoMonaco, C. T. 1951 INFLUENZA DEL MODERNO VOLO VELOCE SULLE FUNZIONI PSICOFISIOLOGICHE DEL PILOTA (Effect of Modern High Speed Flight on the Psycho-physiologic Functions of the Pilot) Rivista di Medicina Aeronautica, Rome 14:209-229, April-June 1951.

3,235

LoMonaco, T. 1952 ALCUNI PROBABILI FENOMENI FISIO-PATOLOGICI DELL 'UOMO DURANTE I FUTURI VOLI SIDERALI (Some Probable Physiopathological Phenomena In Man During Future Interplanetary Flights) Riv. med. aeronaut. (Roma), 15(1):3-12

ABSTRACT: Physiopathological aspects of interplanetary flight are discussed, falling in three main categories: (1) changes in speed or direction of a moving body exert forces on the organism which are tolerated best if they are of short duration; (2) reduction of the apparent weight beyond the zone of gravitation would affect the labyrinthic rather than the cardiovascular system and would interfere with muscular coordination; and (3) problems of the environment include maintenance of air supply, temperature, and food, and avoidance of cosmic radiation. Space medicine cannot, at present, give any assurance as to the survival of humans in a space ship.

3,236

Lo Monaco (Croce), T. 1952 PRIMI STUDI SUGLI EFFECTTI FISIOPATOLOGICI CAUSATI DALLA SUB-GRAVITA IN ANIMALI LANCIATI, DENTRO MISSILI, NELL'ALTO ATMOSFERA (First Studies on the Physiopathological Effects Caused by the "Sub-Gravitation" in Animals Propelled in Rockets into the Upper Atmosphere) Rivista di Medicina Aeronautica (Rome) 16(2): 192-199.

3,237

LoMonaco, T. 1956 IL CENTRO DI STUDI E RICHERCHE DI MEDICINA AERONAUTICA DI ROMA. (CENTER OF STUDIES AND RESEARCH IN AVIATION MEDICINE OF ROME) Rivista aeronautica (Roma) 32 (8):833-866, Aug. 1956.

ABSTRACT: The mission of the Center of Studies and Research in Aviation medicine, Rome, is to (1) engage in studies and experimental research dealing with the physiology, physiopathology, psychology, and psychotechnique of man in flight; (2) develop methods for increasing man's resistance to modern flight; (3) teach aviation medicine to medical officers, flight surgeons, and other physicians; and (4) train flying personnel in aviation physiology. The center is divided into departments of physiology and physiopathology, aviation hygiene, and biochemistry, and applied psychology. Also included are a library and documentation and statistical offices. Discussion is presented on the research programs of the Center, along with multiple illustrations on the apparatus (human cenyrifuge, decompression chamber, manometric and oximetric apparatus, etc.) utilized in research.

3,238

LoMonaco, T., M. Strollo, & L. Fabris 1956 COMPORTAMENTO DELLA COORDINAZIONE MOTORIA IN SOGGETTI SOTTOPOSTI A VALORI DI ACCELERAZIONE VARIANTI DA 3 A 0 G. (Behavior of Motor Coordination in Subjects Exposed to Acceleration Values Varying from 3 to 0 G) Proc. International Astronautical Congress, VIIth, (Rome) Pp. 825-839, Sept. 12-22, 1956.

ABSTRACT: Thirty subjects with normal labyrinthine function were exposed, by means of a subgravity tower, to accelerations varying from 3 to 0 G for a total time of 8 seconds, of which 4 were spent in subgravity. Under these conditions studies were made of eye-hand coordination and body equilibrium. During the experiment the subjects showed motor incoordination. Under subgravity conditions there was evidenced an increase of muscle tonus, a sense of levitation, bewilderment and distration, and various unpleasant sensations. Twenty of the thirty subjects exposed to various consecutive tests demonstrated improvement in the coordination test and a decrease in unpleasant sensations, indicating possible adaptation to experimental conditions.

3,239

LoMonaco, T., A Scano, M. Strollo, & F. Rossanigo 1957 ALCUNI DATI SPERIMENTALI FISIOPSICHICI SUGLI EFFETTI DELLE ACCELERAZIONI E DELLA SUB-GRAVITA PREVISTI NELL 'UOMO LANCIATO NELLO SPACIO.
(Some Physiopsychic Experimental Data On the Effects of Accelerations and Gravity Predicted for Man Launched Into Space)
Riv. med. aeronaut. (Roma), 20(3):363-390. July-Sept 1957.

ABSTRACT: Thirty subjects with normal labyrinthine functions were exposed to accelerations ranging from 4-3 g (for fractions of a second) to zero g (4 seconds) in a 14-meter-high subgravity tower. The eye-hand coordination was studied by means of an aiming test. Slight but well defined motor incoordination was observed. During weightlessness the majority of subjects experienced a lifting sensation or a feeling of levitation, an increase in muscle tonus, and various unpleasant sensations. Five subjects exposed to several consecutive runs showed an improvement in coordination performance and less severe subjective sensations, indicating an adaptation to the experimental conditions. In 10 subjects, most of whom had already been exposed to the latter experiment, the CF and CF5 leads of the electrocardiogram during controlled apnea before, during, and after gravity variations showed a marked increase in heart rate which rapidly returned to normal. The coordination test was repeated on five deaf mute subjects whose labyrinthine function was completely failing, and demonstrated good eye-hand coordination during the tower experiments.

3,240

Lomonaco, T., M. Strollo, & L. Fabris, 1957 SULLA FISIOPATOLOGIA DURANTE IL VOLO NELLO SPAZIO: COMPARTOMENTO DELLA COORDINAZIONE MOTORIA IN SOGGETTI SATIOPOSTI A VALORI DI ACCELERAZIANA VARIANTE DA 8 A ZERO G
(Physiopathology During Space Flight: Behavior of Motor Coordination in Subjects Exposed to Acceleration Values Varying From 3 G to 0 G)
(Presented at Seventh International Astronautical Congress, Rome, 1956)
Rivista di Medicina Aeronautica 20(1):76-96 (Suppl. to No. 1, Jan.-Mar.)

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Lomonaco, T., A. Scano, M. Strollo & F. Rossanigo 1958 ALCUNI DATI SPERIMENTALI FISIC-PSICHICI SUGLI EFFETTI DELLE ACCELERAZIONI E DELLE SUBGRAVITA PREVISTI NELL'UOMO LANCIATO NELLO SPAZIO (Some Physio-psychic Experimental Data on the Effects of Accelerations and Sub-gravity Predictable for Man in Space)
Minerva medica (Torino) 49: 61-62, 4 Aug. 1958
See also: Riv. Med. aero. (Rome) 20(3): 363-390, July-Sept. 1957

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LoMonaco, T.C., A. Scano, and F. Rossanigo 1958 VARIATIONS OF PSYCHO-PHYSIOLOGICAL DATA IN MAN SUBJECTED TO CHANGES IN ACCELERATIONS BETWEEN 3 AND ZERO G. Rivista di Med. Aero. 21(4):691-704 (In Italian with English summary).

ABSTRACT: Studies were carried out concerning psychophysiologic effects of weightlessness on human subjects (zero G, after an initial acceleration of 3 G) States of subgravity were achieved by drops from a tower 14-m high, which is described in detail. The authors made radiograms of the thorax and electronystagmographic recordings during the zero G state. Sensations experienced during the experiment were described by the test subjects upon termination of the experiments. The results show that weightlessness is accompanied by displacement of the heart and the diaphragm. Zero gravity, however, does not induce nystagmus or modify previously induced nystagmus. Among the sensations reported, the feeling of being lifted and of falling into the void was considered unpleasant; some subjects reported loss of the sensation of being tied to the seat. Two subjects who had kept their eyes shut reported that they felt like taking successive upward jumps after the actual fall, which was not perceived as such.

3,243

Lomonaco, T., A. Scano, & F. Rossanigo 1959 COMPORTAMENTO DI ALCUNI DATI FISIO-PSICHICI NELL'UOMO SOTTOPOSTO A VARIAZIONI DI ACCELERAZIONE COMPRESE FRA 3 E ZERO G (BEHAVIOUR OF CERTAIN PHYSIO-PSYCHOLOGICAL FEATURES IN SUBJECTS SUBMITTED TO VARIATIONS OF G BETWEEN 3 AND ZERO) Minerva Medica 50(31):1134-1138
NOTE: Reel 11, Flash 6

ABSTRACT: The authors have studied some physio-psychological effects of subgravity in human subjects (zero g after an initial acceleration of 3 g). By means of a 14 m high tower, which is described in detail, chest roentgenograms and electronystagmografic recordings were taken during zero g state. An analytical study was also made of the subjective sensations of a number of subjects possessing a greater capacity of auto-observation. The results show that subgravity is associated with displacements of the heart and diaphragm but is unable to determine nystagmus or to modify it when previously provoked. The subjects examined described peculiar sensations and illusions felt during the test. These sensations differ according to whether their eyes were open or closed. (Minerva Medica 50(31):1157, 1959)

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LoMonaco, T. 1959 PREVISIONI SUL COMPORTAMENTO PSICO-FISIOLOGICO DELL'UOMO LANCIATO NELLO SPAZIO (PREDICTIONS ON THE PSYCHO-PHYSIOLOGICAL BEHAVIOUR OF MAN IN SPACE) Minerva Medica 50(31):1122-1134, April 1959
NOTE: Reel 11, Flash 6

ABSTRACT: The main physiological and psychological problems concerning man travelling through space in an especially designed vehicle are considered and discussed on the basis of the most recent discoveries. These problems concern the effects of acceleration on the body, the microclimate aboard the space-ship, the defense from noxious radiations and meteorites, the psycho-physiological effects of speed and of remotion from the Earth, the effects of isolation in a confined, sealed cabin and, finally, the effects of sub and zero-gravity conditions The results are presented of researches in this field, carried on in Italy and abroad, and in particular the results of a series of experiments, performed in the "Centro di Studi e Ricerche di Medicina Aeronautica" of Rome, by means of a specially constructed device: the so-called "subgravity tower". These experiments have shown that, in subjects submitted to sub and zero-gravity conditions, motor incoordination and displacement of thoraco-abdominal viscera occur. (Minerva Medica 50(31):1157, 1959)

3,245

LoMonaco, T., A. Scano & F. Rossanigo 1960 COMPORTAMENTO DI ALCUNE FUNZIONI PERCETTIVO-MOTORIE DURANTE IL PASSAGGIO DA CIRCA 2 A O G ED INFLUENZA DELL ALLENAMENTO: ESPERIMENTI ESEGUITI CON LA TORRE DI SUBGRAVITA. (Behavior of Some Perceptual-Motor Functions During the Transition from About Two to Zero G and the Effect of Training: Experiments Executed with the Subgravity Tower) Riv. med. aeronaut. (Rome), 23(4):439-456 Oct. - Dec. 1960. (In Italian)

ABSTRACT: Tests were conducted on a group of six subjects in order to establish the degree of performance during hyper- and zero gravity. The subjects were required to execute a repetitive task with electrical switches following a pre-established pattern while at rest and when launched on a subgravity tower to various states of gravity. Film was taken during the test for observation at a later time. After mild rectilinear acceleration, the normal subjects could tolerate several short and frequent exposures during weightlessness. Moreover, the subjects could perform simple perceptual-motor tasks. The subjects with restraint devices performed with greater ease and were more accurate than those without restraint devices. Repetition of the task during launches also led to greater accuracy in performance. Although the greater part of the test was only slightly affected provided that the relation between his body and the surrounding objects remained fixed.

3,246

LoMonaco, T. 1960 PROBLEMS OF SPACE MEDICINE
Missili (Roma) 2(1):5-20, Feb. 1960

ABSTRACT: The main psycho-physiologic problems which concern man traveling in space are considered and discussed on the basis of recent research and discoveries. Included are the effects of acceleration on the body. Particular reference is made to a series of experiments on weightlessness performed in the "Central di Studi e Ricerche di Medicina Aeronautics", Rome, by means of a specially constructed device, the so-called "subgravity tower".

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Lomonaco, T. 1961 IL FATTORE UMANO, CAUSA DI INCIDENTI DI VOLO (The Human Factor, Cause of Flight Accidents)
Rivista di Medicina Aeronautica e Spaziale (Rome) 24(1): 5-28. Jan.-March 1961

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LoMonaco, T. 1962 LINEAMENTI DI UNA SELEZIONE PSICOFISICA DEL COSMONAUTA (Psycho-Physical Criteria for Selection of an Astronaut)
In Antonio Ambrosini, Ed. RENDICONTI DEL CONGRESSO INTERNAZIONALE--L'UOMO E LA TECNICA NELL'ERA NUCLEARE E SPAZIALE, 18-21 APRILE 1962, (Proceedings of the International Congress--Man and Technology in the Nuclear and Space Age, 40th Trade Fair, Milan, April, 18-21, 1962)
(Rome, Italy: Associazione Internazionale Uomo nello Spazio)
Pp. 453-468

ABSTRACT: The physical and psychological stresses of spaceflight are reviewed and the criteria for selecting astronauts are given. (N63-18937)

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Long, F.M. 1962 BIOLOGICAL ENERGY AS A POWER SOURCE FOR A PHYSIOLOGICAL TELEMETERING SYSTEM. IRE Internat. Convention Record, 10 (9):68-73

ABSTRACT: A brief study of three biological energy sources, biological potentials and chemical gradients, blood pressure and flow, and muscular activity and motion, revealted that the first two possibilities presented difficult problems in electrode and tissue reactions and that the third possibility might have more immediate application. A theoretical study of an accelerometer system, utilizing relative motion, indicated that several milliwatts could be delivered to the damping mechanism. A test model employing a piezo-electric crystal as the mechanical to electrical converter and a tunnel diode oscillator was successfully operated at power levels of approximately one microwatt. (Author)

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Longmore, D. V. 1950 TRAVEL SICKNESS.
Guys Hosp. Gazette, 64 :237

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Lord, C. D. and J. W. Coutts 1944 A STUDY OF PARACHUTE INJURIES
Bull. Army med. Dept. (78):57-67. 1944.

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Lord, C. D. and J. W. Coutts 1944 A STUDY OF TYPICAL PARACHUTE INJURIES OCCURRING IN TWO HUNDRED AND FIFTY THOUSAND JUMPS AT THE PARACHUTE SCHOOL
J. Bone Joint Surg. 26:547-557.

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Lorente de No, R. 1932 RESEARCHES ON LABYRINTH REFLEXES Trans. Amer. Otol. Sec. 22:287-303

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Lottig, 1937 GRENZEN DER PHYSIOLOGISCHEN BELASTUNGSFAHIGKEIT IM FLUGZEUG (LIMITS OF PHYSIOLOGIC ENDURANCE IN AVIATION) Zentralbl. f. Hals. --Nasen--und Ohrenheilk. 28:105-107

ABSTRACT: Trained aviators may lfy to altitudes of 6000-7000m without additional oxygen. The most dangerous effect of these high altitudes is the psychic effect which resembles very much that of alcoholic intoxication with loss of powers of concentration and attention, euphoria and a devil-may-care attitude. In many persons circulatory collapse occurs at levels of 5000-6000 m. before the psychic symptoms develop. To overcome these ill effects by administration of oxygen, careful training constitutes an important problem. Short accelerations not exceeding 5-6 times gravity may be endured without injury. In greater centrifugal accelerations visual disturbances and confusion develop as the blood supply to the retina and brain suffer most. Von Diring - shofen has demonstrated that this effect may be prevented by stooping of the aviator. Accelerations beyond 10 times gravity cannot be tolerated in spite of all protective measures. (CARI)

3,255

Loucks, R. B., & T. G. Hermans 1947 ANNOTATED BIBLIOGRAPHY ON THE PSYCHOLOGICAL ASPECTS OF ORIENTATION AS THEY RELATE TO AVIATION. (Aero Medical Lab., Eng. Div., Wright Field, Ohio) TSEAA-694-16a, 1 Dec. 1947

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Lovelace, W.R. 1939 RESEARCH IN GERMAN, ITALIAN AND FRENCH AIR FORCES. (RAF, Institute of Aviation Medicine, Farnborough) FPRC 36, June 1939.

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Lovelace, W.R. II 1944 AVIATION MEDICAL PROBLEMS IN THE EUROPEAN AND MEDITERRANEAN THEATRES OF OPERATION. (War Dept., Air Forces) TSELA5B-697-8, 1 November 1944

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Lovelace, II, W. Randolph, Edward J. Raldes, & Verner J. Wulff 1945 THE EJECTION SEAT FOR EMERGENCY ESCAPE FROM HIGH-SPEED AIRCRAFT
Air Technical Service Command, Engineering Division, Army Air Forces Serial No. TSEAL-3-696-74C August 31, 1945 ASTIA ATI 7245

ABSTRACT: This report presents data obtained from the German, British and Swedish Air Forces on the research and development of the pilot ejection seat and evaluates this information for application to the Army Air Forces pilot ejection seat program. It was found from tests that emergency escape from fighter aircraft, such as the P-38, P-51, P-47 and P-80, while traveling at high speeds is a difficult and dangerous operation. Emergency escape from high-speed bombers such as the A-26 is equally difficult. The ejection seat, as used operationally by the German Air Force, is the most successful method known to date for emergency parachute escape from high-speed aircraft. The following design characteristics of the ejection seat assembly are believed desirable up to speeds of 550 miles per hour for AAF aircraft: (a) Maximum duration of acceleration : 0.1 second. (b) Maximum allowable average acceleration : 20 g with peaking to 25 g for 0.01 second or less, when ejecting the pilot above the aircraft. (c) Minimum allowable ejection velocity into wind stream: 57 ft./sec. in aircraft having a single vertical stabilizer of average height. (d) Minimum piston length: 30 inches, based on the above ejection velocity. In designing an ejection seat the following is required: (a) All parts of the body, especially the head, arms, and legs, must be supported. (b) A shoulder harness must be used, to prevent forward bending of the pilot with consequent fracture of the lower thoracic and lumbar vertebrae. (c) Arm rests must be used to reduce the load on the lower vertebral column.

3,259

Lovelace, W.R. and V.J. Wulff 1945 EVALUATION OF TARGETS INVESTIGATED AND SUMMARY OF INFORMATION OBTAINED PERTAINING TO RESEARCH IN AVIATION MEDICINE FOR THE GERMAN AIR FORCE. (War Dept., U.S. Strat. Air Forces in Europe, Misc.) 4 August 1945

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Lovelace, W.R. 1945 REPORTS FROM EUROPEAN AND JAPANESE TOURS (Aeromedical Lab., USAF, Wright-Patterson AFB, Ohio)

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Lovelace, W.R., II, & A.P. Gagge 1946 AVIATION MEDICINE AND PSYCHOLOGY. (Hdq. Air Materiel Command, Publications Branch, Intellignece T-2, Wright Field, Dayton, Ohio) May 1946. ASTIA ATI 9776

ABSTRACT: This report and its appendices are devoted to an outline of future problems in aviation medicine and the importance of continued research on these problems for an interim air force capable of taking off, landing, and flying any place in the world independently of the weather. Strong support is given to continued use of personnel and research facilities in order to maintain the sciences involved in human engineering on the level to which they have been rightfully raised by the exigencies of war. Much of the knowledge gained in such research will be of value in general physiology.

3,262

Lovelace, W.R., II. & V.J. Wulff 1946 SUMMARY OF GERMAN AVIATION MEDICAL RESEARCH. (U.S. Army Air Forces, Air Technical Service Command, Aero Medical Laboratory, Wright-Patterson AFB, Ohio) Memo Rept. TSEAA-660-99. Feb. 1946 TIP U 454.

ABSTRACT: Points out emphasis of German Aviation Medical Research on problems related to high speed jet and rocket aircraft. Reviews studies on accelerative forces encountered during flight with modern aircraft and their tolerance by human subjects. Briefly discusses the ram attack (ramming tactic) and the effects of the short-term high accelerative forces that would be encountered. Reviews research on g- protection afforded the pilot by horizontal positioning, and research on parachute design to reduce opening shock. Cites experiments on causes of detonation death (pulsating pressure waves) and on the problem of supersonic vibrations. Mentions human engineering research and experiments in low pressure and high temperature experiments. The report includes six appendices:

I. Hubertus Strughold, abstract, "Speed in Aerial Warfare and Physiologic Reaction Time".

II. Bibliography on Acceleration

III. Abstract from Information Report concerning the Investigation and Developments of the Parachute Division of the Forschungsanstalt Graf Zeppelin, including bibliography.

IV. Interrogation: Physiological effects of intermittent blasts, periodic blasts and supersonic vibrations of great energy, including bibliography

V. Interrogation: Research on medical aspects of aircraft design and on development and application of prosthetic appliance.

VI. List: Reports of Investigation on Effects of Reduced Body Temperatures.

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Lovelace, II, W. R. & A. S. Crossfield 1959 BIOMEDICAL ASPECTS OF ORBITAL FLIGHT. Soc. Exp. Test Pilots, 3(3):41-56, Spring 1959.

ABSTRACT: The biomedical aspects of a manned space flight is the topic of this article. Four stages of performance are required as guides to tolerance needed to obtain an adequate level of functioning of man in the respective phases. The seven phases of an orbit mission and the medical problems of each phase are examined. Also included is a description of the three types of manned orbital vehicles available for use in biomedical research.

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Lovelace, W. R., II and A. H. Schwichtenberg 1961 SPACE MEDICINE AND THE FUTURE
Astronautics, 6:58-59, 98-104, Oct. 1961.

ABSTRACT: Discussion that defines some problems in space medicine and indicates their future trends. These problems include ageing; behavioral science; biomedical data collection, processing, and utilization, environmental cycles; safety and reliability; and extraterrestrial life.

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Lovell, F. Warren and Harrison McMichael 1960
PATHOLOGY AS AN AID TO RECONSTRUCTION OF AIRCRAFT ACCIDENTS
(Armed Forces Inst. of Pathology, Army Medical Center, Washington,D.C.)
Aerospace Medicine, 31:745-748 September, 1960
ASTIA AD 247 847

ABSTRACT: Complete autopsy examination, including photographs and toxicology and x-ray studies, should be performed on all fatalities of aircraft accidents. The flight surgeon member of the board should be present at the autopsies. In the absence of a pathologist, the flight surgeon should do the autopsies himself. The prosecutor should be thoroughly briefed as to all of the accident details available at the time he performs his examination. The person doing the autopsies should make observations that might aid the accident-investigating board in reconstructing the sequence of events, bearing in mind that the questions the board will ask are rarely known at the time the necropsy is done. If this procedure is followed, valuable information will often be obtained that will aid in understanding how or why the accident occurred. (AUTHOR)

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Loving, D. L. 1947 AERODYNAMIC MEASUREMENTS MADE DURING NAVY INVESTIGATION OF HUMAN TOLERANCE TO WIND BLASTS. (National Advisory Committee for Aeronautics, Washington, D. C.) Report No. RM L7C25; 10 March 1947.

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Low, G. M. 1962 SUMMARY OF RESULTS. (In Results of the First U. S. Manned Orbital Space Flight, February 20, 1962) (NASA Manned Spacecraft Ctr.) Pp. 137-138.

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Lowenstein, O. and A. Sand 1940 MECHANISM OF SEMICIRCULAR CANAL RESPONSES OF SINGLE FIBER PREPARATIONS TO ANGULAR ACCELERATIONS AND TO ROTATION OF CONSTANT SPEED. Proc. Royal Soc. 129 B: 256-275

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Lowenstein, O. 1956 PERIPHERAL MECHANISMS OF EQUILIBRIUM.
Brit. M. Bull. 12(2):114-118

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Lowi, B.H. & T.J. Gallagher 1961 BIO-ASTRONAUTICS RESEARCH: WHAT SHALL WE SIMULATE? In Bergeret, P., ed., Escape and Survival: Clinical & Biological Problems in Aero Space Medicine.
(London; New York; Paris: Pergamon Press, 1961) AGARDograph 52.
Pp. 108-114. ASTIA AD 261 881

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Lowrey, R.O. 1960 SPACE FLIGHT SIMULATORS --DESIGN REQUIREMENTS AND CONCEPTS. Aerospace Engineering 19(10):50-56, Oct. 1960.

ABSTRACT: Man's experiences in spaceflight will be represented by the sum of the environmental factors which he perceives. The objective of spaceflight simulation is the representation of the total anticipated environment. Existing facilities are insufficient to provide the simulation capability for full exploitation of man's capabilities.

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Lowrey, R. O. & J. T. Ray 1961 HUMAN FACTORS OF THE LUNAR LOGISTICS MISSION.
(Paper SAE International Congress and Exposition of Automotive Engineering, Detriot, Mich., Jan. 9-13, 1961)
(Society of Automotive Engineers, Inc, New York, N. Y.)
Rep. 302C, Jan. 1961.

ABSTRACT: This paper is one in a series based on "Project Moonbeam--A 10,000-lb. Payload Lunar Vehicle." The area of human factors is considered from the standpoint of the requirements for providing man an acceptable environment within the vehicle and whether these requirements can be met by 1970. The major headings and contents of this paper are as follows: 1) physiological factors--conditions necessary to support man and maintain his well-being; 2) psychological factors--probable trouble areas; and 3) unusual hazards--radiation, meteoroids, and emergency escape system.

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Lowry, R. D. & W. M. Wolff 1961 DESCRIPTION AND PERFORMANCE EVALUATION OF THE AEROSPACE MEDICAL RESEARCH LABORATORIES' VERTICAL ACCELERATOR (Aeronautical Systems Division. Biomedical Lab., Aerospace Medical Research Labs., Wright-Patterson Air Force Base, Ohio) Project No. 7210, Task No. 71703, ASD Technical Report No. 61-743, Dec. 1961 ASTIA AD 287 996

ABSTRACT: The Aerospace Medical Research Laboratories' Vertical Accelerator was developed for bioastronautics research to simulate vibration and buffeting encountered in aerospace operations. The design, motion capabilities, control, and safety features are described. This Vertical Accelerator can be programmed with periodic or random acceleration patterns obtained from actual environmental measurements. It is a complex electromechanical device employing a unique type of friction drive to move a test platform with a 200-lb. load capacity. The accelerator, for continuous operation, can produce peak to peak amplitudes of +5 ft. over the frequency range from 0.5 c.p.s. to 10 c.p.s. The maximum acceleration output is from 2.5 to 3 g depending on load and permissible distortion.

(Author)

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Lowry, R. H. 1953 TEST TRIALS OF G-4A ANTI-BLACKOUT SUITS IN THE HUMAN ACCELERATOR.
(Defence Research Medical Labs.(Canada), Toronto, Ontario.) DRML Rept. No. 157, April 1953. AD 12 422

Summary: Tests in the human centrifuge using 50 jet pilots as subjects indicated that the G-4A Anti-G suit, gave an average improvement in blackout tolerance of 1.0 g. The improvement varied from 0.0 g to 4.0 g, depending on the test subjects. The G-4A Anti-G suit was easy to don, gave freedom of movement, and was comfortable during use in the human centrifuge. In order to obtain the maximum protection from fatigue and blackout, all aircrew must be individually fitted with their respective anti-blackout suits by qualified personnel.

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Lowry, R. H. and W. H. Johnson 1954 PSEUDO MOTION SICKNESS DUE TO SUDDEN NEGATIVE G: ITS RELATION TO "AIRSICKNESS," (Canada, Defence Research Medical Labs., Toronto) Report No. IR 811-54, ASTIA AD-43 007
See also J. Aviation Med., 25(2):103-106, April 1954.

ABSTRACT: "Pseudo" airsickness is the rapid regurgitation of food primarily due to the mass of food in the stomach being suddenly forced into the esophagus. It is brought about by aerobatics involving sudden negative "G".

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Lowry, R. H. and Johnson, W. H. 1954 "PSEUDO MOTION SICKNESS" DUE TO SUDDEN NEGATIVE "G"; ITS RELATION TO "AIRSICKNESS", J Aviation Med. 25(2):103-106.

SUMMARY & CONCLUSIONS:

1. It is suggested that there are two types of airsickness, namely, "true" airsickness and "pseudo" airsickness.

2. "True" airsickness is accompanied by nausea and is due to the stimulation of the non-auditory membraneous fibres. It is induced by rough air and aerobatics.

3. "Pseudo" airsickness is the rapid regurgitation of food primarily due to the mass of food in the stomach being suddenly forced into the esophagus. It is brough about by aerobatics involving sudden negative "G".

4. These two types of airsickness must be differentiated in any attempt to correlate motion sickness, induced in the laboratory, with airsickness.

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Lowry, R. H., M. D. April 1960 LIFE SCIENCES AND HYPER-ENVIRONMENTS 1960 Proceedings of the Institute of Environmental Sciences, C-3--C-7

ABSTRACT: This is a commentary on a paper presented by A. M. Mayo to the Institute of Environmental Sciences in April of 1960. The title of the paper was "Life Sciences and Hyper-Environments."

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Lubinski, T.P. 1962 TRACK TESTS OF CANOPY ESCAPE CAPSULE (Coleman Engineering Co., Inc., Torrance, Calif.)Project 1362, ASD TDR 62-404, Aug. 1962. ASTIA AD 287 281

ABSTRACT: The results of all of the track tests for the Air Force Canopy Escape Capsule are presented. The purposes of these tests were to evaluate the ejection and recovery of the capsule and to obtain aerodynamic, structural, component functioning, and physiological information. Descriptions of the capsule model, test equipment, and test procedure are included in the report. Feasibility of the canopy-type capsule method of escape was not fully demonstrated because the track tests were terminated prior to completing the design range of test velocities and because the test results indicated a need for an evaluation of the stability and impact problems of the capsule for these velocities. The tests showed that unguided separation of the capsule was successful, that proper functioning of the recovery system was demonstrated for the 150-kt run, and that lo-level ejection capability of the escape capsule was indicated. (Author)

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Luchsinger, C.W. 1949 ADDITIONAL KINETIC MEASUREMENTS ON A PILOT-DUMMY EJECTED FROM AN F-82 AIRPLANE. (Engineering Division, AMC, Wright-Patterson AFB, Ohio) March 1949. ASTIA ATI 63931.

ABSTRACT: Five ejection seat tests, simulating pilot escape from high performance aircraft, were conducted with an F-82 twin engined fighter. Kinetic measurement intelligence was successfully recording during four of these tests by means of a recording oscillograph in conjunction with acceleration and strain gages. The pilot ejected the test seat, which was loaded with a 185 lb. anthropomorphous dummy, from the right cockpit by closing a switch on the control stick in the left cockpit. The normal maximum acceleration produced by the M-1 (Service) catapult was in the range of 15 g to 17 g units. Average ejection velocity was slightly less than the recommended 60/ft sec. The drag coefficient of the seat and dummy is 1.56 at low Mach numbers, and has a percentage increase equal to that of a sphere with increase in Mach numbers.

3,280

Luchsinger, C.W. 1950 KINETIC MEASUREMENTS DURING PILOT EJECTION SEAT GROUND TESTS - AND APPENDIXES I AND IX
(Air Materiel Command, Engineering Division, Wright-Patterson AFB, Ohio) Aug. 1950. ASTIA ATI 83 127

ABSTRACT: Kinetic qualities were measured during pilot ejection seat ground tests conducted with various centers of gravity of the ejected components and with various lengths of ejection rails. Sensing and recording of the kinetic quantities was accomplished by the use of resistance-bridge accelerometers, pressure transmitters and multichannel oscillograph, together with bridge balancing controls and appropriate connecting circuits. The normal maximum acceleration produced by the M-1 catapult was in the range of from 12 to 16 G units and the CG location had no consistent effect on the maximum peak value. As the CG was moved forward, the maximum ejection velocity tended to decrease in magnitude and a further decrease in magnitude was encountered when 28-in. ejection rails were used in lieu of the 32 7/8 in. ejection rails.

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Luczak, A. 1945 DZIALANIE PRZYSPIESZEN NA USTROJ CZLOWIEKA (Influence of Acceleration on Human Body)
Lekarz Wojskowy (Warsaw) 36: 17-40, Feb. 1945

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Luhrs, H. N. & H. R. Spence 1961 INFLUENCE OF SHOCK MACHINE LOADING ON SHOCK SPECTRA. (Space Technology Labs., Inc., Los Angeles) Report No. 7103-0018-NU-000, May 1961. ASTIA AD-260 308.

ABSTRACT: The influence of shock machine loading, by the test item, was investigated to determine whether any peaks or notches are introduced into the acceleration shock spectrum which would cause excessive over or under testing at various frequencies. The results showed that the shock spectrum for a terminal peak saw-tooth pulse is quite insensitive to shock machine loading. The very low frequency end (below 100 cps for a 6 millisecond pulse) is most influenced, whereas the higher frequencies are virtually not influenced at all. The results also showed that even for a very high loading condition the primary spectrum is in all cases less severe than the residual spectrum. Curves have been generated to depict both the primary and the residual spectrum for various resonators to shock platform mass ratios, for the case of a terminal peak sawtooth pulse (Author)

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Luiden, R.W. 1961 APPROXIMATE ANALYSIS OF ATMOSPHERIC ENTRY CORRIDORS AND ANGLES. (National Aeronautics and Space Administration) NASA TN D-590, January 1961

ABSTRACT: A simple closed-form approximate solution is developed for corridor depths and entry angles as a function of maximum g load, initial entry velocity and configuration lift-drag ratio, for vehicles operating at constant angle of attack and modulated angle of attack. The vehicle design and mode of operation that result in the deepest corridors are determined, and the effects of hot-gas radiation and a limiting Reynolds number on corridor depth are discussed.

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Luidens, R.W. 1961 FLIGHT-PATH CHARACTERISTICS FOR DECELERATING FROM SUPERCIRCULAR SPEED. (National Aeronautics and Space Administration, Washington, D.C.) NASA Technical note D-1091, ASTIA AD-268 343, Dec. 1961.

ABSTRACT: Characteristics of six types of flight paths for the deceleration from circular and supercircular speeds are developed in closed form. The heating rate, heat input per square foot obtained from an integration over the flight path, the total heat vehicle, and the flight-path histories in terms of path angle, altitude, life coefficient, net acceleration, angle of attack and Reynolds number are discussed as a function of type of flight plan, initial net acceleration, and initial velocity. A flight plan with essentially a point landing capability is suggested. (Author)

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Luk'yanova, L.D. 1962 [RESEARCH IN THE HIGHER NERVOUS ACTIVITY OF WHITE RATS IN THE FLIGHT OF THE SECOND SPACESHIP-SATELLITE] In Akademiya nauk SSSR. Iskusstvennyye sputniki zemli, no. 12, Pp. 51-55.

ABSTRACT: To study the effects of space flight on higher nervous activity, the second Soviet spaceship-satellite contained two male white rats (nos. 12 and 18); five others served as controls. A stereotype consisting of six positive and one differentiated motor-food conditioned reflexes was developed and stabilized in all the animals over a period of several months before flight. Twenty experiments were conducted with each animal to determine the characteristics of its conditioned-reflex activity. The first experiment, condiucted on the fourth day after return to earth, showed that the animals had suffered no adverse effects from the space flight. Experiments conducted for 2.5 months to determine the condition of the higher nervous function showed that changes in the test rats differed little from those in the control group. Peripheral blood tests over the same period revealed no essential differences from the initial level or from the control group.

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Lund, D. W. 1946 EFFECT OF POSITIONAL VARIATION ON MAN'S TOLERANCE TO G. (USAF, AMC, Aero Med. Lab., Wright-Patterson AFB, Ohio) Memo Rept. TSEAA-695-72B, 24 June 1947.

3,287

Lund, D.W. 1946 PRELIMINARY STUDIES OF THE EFFECTS OF POSITIVE G UPON INDUCING HEADACHE, UPON PERCEPTION OF PAIN, AND UPON VASCULAR HEADACHE INDUCED BY INTRAVENOUS HISTAMINE. (USAF, Aero Med. Lab., Wright-Patterson AFB, Ohio) TSEAA-695-72, Nov. 1946.

CONTENTS:
Reports a paper of the same title by E.C. Kunkle, P.J. Maher, Jr. and D.W. Lund.

3,288

Lund, D.W. 1947 MAN'S TOLERANCE TO POSITIVE ACCELERATION IN DIFFERENT ORIENTATIONS OF THE BODY. Fed. Proc., 6:156

3,289

Lund, D. W., P. J. Maher, Jr., & W. F. Koerschner, Jr. 1947 STUDIES ON ACCELERATION DURING FLIGHT IN AN INSTRUMENTED AIRCRAFT. (Aero Medical Laboratory, Wright-Patterson AFB, Ohio) Rept. No. TSEAA-695-69A, 1 May 1947, ATI No. 180366

CONCLUSIONS AND RECOMMENDATIONS: The use of an instrumented, two place, highly stressed aircraft, such as the SBD-6, is a readily available, practical and reasonably safe means of studying those acceleration problems where rapid approach of high g is desired. Some method other than the present light signal response should be devised for objective studies on blackout for short-time exposure to g. Two pilots, despite much flight experience, required about ten hrs. of specific training in order to reach a predesignated maximum of 7 g or above in one second or less. At the outset they required 3.5 secs. or longer for approach to such values of g from 1.5 g. Preliminary observations indicate that pilots and subjects can withstand approximately 9.0 g for three secs., if the approach to this g is achieved in less than one second. The use of these observations have a direct relationship to flight tactics, pilot training and decisions as to wing loading requirements of fighter aircraft. That consideration should be given to the equipping of some highly stressed aircraft employed in advanced training with time-g recording accelerometers, so that pilot training may be extended to include time-g maneuvers. That if the tactical advantages indicated are further substantiated in an extended number of pilots, consideration should be given to modifying the present low stress point of 7.3 g for all operative aircraft so as to include aircraft which have a much higher maximal wing load factor. (AUTHOR)

3,290

Lundin, I.E. 1946 STATIC LOAD TESTS OF WMCA NO. 347 - PILOT SEAT ARMORED. (Warren McArthur Corporation, Bantam, Connecticut) Report No. 347 19 July 1946, ASTIA ATI 102228.

ABSTRACT: Tests were conducted for the purpose of applying static loads simulating acceleration forces on the Warren McArthur No. 347 Armored Pilot Seat to determine its behavior up to ultimate design loads. As a result of the tests, it was concluded that the seat unit supported the ultimate design loads without failure.

3,291

Lustig, B.T. 1947 BIOPHYSICS WITH SPECIAL REFERENCE TO ELECTROBIOLOGY - AND APPENDIXES I-III (FIAT FINAL REPORT) - L# MAY 1947
ASTIA ATI 68 711

ABSTRACT: This report reviews German development in ultra short wave therapy and research in dielectric constants and specific resistance of animal and human tissue. Sensitive detectors in the field of infra red, visible light,

ultra violet, X-ray and radio activity are described and photostatically illustrated. A new instrument for erythrocyte determinations is described. Several devices of interest to the biophysicist are referred to in this report and instruction as to where they may be obtained is included.

3,292

Lutterloh, C. H. 1937 THE CLINICAL SIGNIFICANCE OF THE EFFECTS OF POSTURE ON BLOOD PRESSURE. THE POSTURAL TEST AS A MEANS OF CLASSIFYING HYPOTENSION. Am. J. Med. Science 193:87-96

3,293

Lutz, W., & H.J. Wendt 1947 ANIMAL EXPERIMENTS SIMULATING PARACHUTE DROP FROM PRESSURIZED CABINS. (Tierversuche zum Fallschirmabsprung aus Uberdruckkabinen.) (Air Materiel Command, Wright-Patterson AFB, Ohio) F-TS-4050, June 1947. ASTIA ATI-32225.

ABSTRACT: The conditions related to free fall from a pressure cabin aircraft were studied by means of animal experiments and the probable outcome of jumping from various altitudes was determined.

The upper limit with a small scatter for jumps without oxygen is 14 km.

Jumps with oxygen equipment can be made safely from surprising altitudes. In this case, the upper limit is above 21 km, but one must remember that in addition to the danger of an accident during the "hypoxemic apparent death" which always occurs during jumps from an altitude of 18 Km and above, the great disturbance and even paralysis of respiration and the peculiar form of slow revival from the severe anoxia must be considered; this condition is called "Posthpoxemic soper" and is described in detail.

The process by which revival occurs and the time it requires after falling from an oxygen-poor altitude are determined and the necessity of using either a Pressurized suit and a parachute with an automatic release, is pointed out.

3,294

Luxenburger, Hans 1946 PSYCHOLOGY OF FLYING (PSYCHOLOGIE DES FLIEGENS) Translation by Air Materiel Command, Wright-Patterson Air Force Base, Dayton, Ohio Report No. F-TS-596-RE. ASTIA ATI-37141

ABSTRACT: A short discussion is given on the psychology of flying. It is stated that all empirical psychology is in the final analysis psychophysiology. The actual psychology of flying, insofar as it is not psychophysiology, has scarecely begun to exist. The theory of method of the psychology of flying is basically that of psychology in general,

namely, introspection including memory, objective observation and psychological experiment. Because of the close interconnection of the psychology of flying with physiology on the one hand, and psycho-pathology on the other, it follows that this field of inquiry must be left to psychologically trained physicians who must also be aviators.

3,295

Lyle, D. J., J. P. Stapp & R. Button 1956 OPHTHALMOLOGICAL HYDROSTATIC PRESSURE SYNDROME.
Transactions of the American Ophthalmological Society 54:121-128.

ABSTRACT: Criteria for human tolerance limits during escape from military aircraft are incipient reversible injuries, as well as the subjective evaluation. By this means it has been experimentally established that a human subject seated facing forward, exposed to deceleration perpendicular to the long axis of the body, can sustain a rate of onset of 1,500 G per second or less, a peak magnitude of 50 G, and total duration of forces higher than 25 G but less than 50 G of not more than one second. In two of the 76 human experiments accomplished to date, signs and symptoms suggestive of a syndrome have been found which correspond to those found in three cases of accidental exposure under widely different circumstances. In these five cases the syndrome is caused by high decelerative forces of abrupt onset applied from the rear to the front of the head while the blood vessels of the head and face are congested by high hydrostatic pressure.

Abrupt rise in introthoracic pressure, due to (1) displacement of abdominal viscera against the diaphragm or (2) abrupt compression of the abdomen or lower chest, can be transmitted through the blood vessels to the head and face, causing rise of hydrostatic pressure. Simultaneous application of the decelerative force results in signs of cerebral concussion with confusion, retrograde amnesia, circulatory shock, temporary loss of vision, retinal hemorrhages, subconjunctival hamorrhages, ecchymosis of the eyelids, and periocular edema. The paranasal sinuses are congested and even hemorrhagic.

3,296

Lyle, D. J., J. P. Stapp, & R. R. Button 1957 OPHTHALMOLOGIC HYDROSTATIC PRESSURE SYNDROME. Am. J. Ophthalmology 44:652-657

ABSTRACT: Criteria for human tolerance limits during escape from military aircraft are incipient reversible injuries, as well as the subjective evaluation. By this means it has been experimentally established that a human subject seated facing forward, exposed to deceleration perpendicular to the long axis of the body, can sustain a rate of onset of 1,500 G per second or less, a peak magnitude of 50 G, and total duration of forces higher than 25 G but less than 50 G of not more than one second. In two of the 76 human experiments accomplished to date, signs and symptoms suggestive of a syndrome have been found which correspond to those found in three cases of accidental exposure under widely different circumstances. In these five cases the syndrome is caused by high decelerative

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3,297

Lyman, H. W. 1919 VERTIGO AND AVIATION.
Trans. Amer. Laryng., Rhinol. and Otol. Soc. 25:150-156.

ABSTRACT: The author emphasized the importance of the medical problems, arising in the development of aviation, in connection with the causes, behavior and correction of the disabling vertigo or dizziness experienced by aviators.

The vestibular appratus is the most constant in its action; and, because it is a motion-sensing mechanism, pure and simple, it is one of the essential qualifications of the military aviator. Like all special senses, however, it occasionally conveys messages to the brain which, unless correctly interpreted, result in illusions. The illustration in this case is a false sensation of motion, or vertigo.

Various movements of the head have been worked out for the correction of the vertigo induced by the different stunts, and their practical value has been appreciated by the aviators instructed in them.

Vertigo tolerance is the result of practice which educates the brain to interpret correctly these vertigo impulses in all planes, and is not due, as often stated, to any disappearance of vertigo because of constant flying.

3,298

Lyman, J. H. 1953 CHARACTERISTICS OF THE HUMAN OPERATOR. (In Symposium on Frontiers of Man-Controlled Flight presented at Los Angeles, Calif., April 3, 1953) (Los Angeles: Instit. of Trans. and Traffic Engineering, Un iv. of Calif.) Pp. 64-67.

ACCELERATION

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3,299

McCabe, B.F. & M. Lawrence 1959 SUPPRESSION OF VESTIBULAR SEQUELAE FOLLOWING RAPID ROTATION. (Paper, Meeting of Aero Medical Association, Statler Hilton Hotel, Los Angeles, April 27-29, 1959)

ABSTRACT: It appears highly probable that man can, upon occasion, alter the functions of his normal vestibular centers. Evidence is taken from a group of individuals who demonstrate this ability quite clearly. Expert figure skaters, without recourse to "spotting" but through some process which is probably central suppression, can avoid all the usual sequelae to brief rapid rotation, viz., staggering, dizziness, disorientation, nausea and nystagmus. This is demonstrated and studied by means of high speed and regular motion picture photography. A 15-minute movie will be presented.
(J. Aviation Med. 30(3):194, March 1959)

3,300

McCally, M., and D.E. Graveline 1963 URINARY CATECHOLAMINE RESPONSE TO WATER IMMERSION.
(6570th Aerospace Medical Research Laboratories, Aerospace Medical Div., Air Force Systems Command, Wright-Patterson AFB, Ohio)
Rept. No. AMRL TDR-63-20, March 1963. ASTIA DDC 407 741.

ABSTRACT: The urinary excretion of adrenaline and noradrenaline was measured by bioassy for 16 normal human subjects during 6 hours of complete water immersion. The excretion of adrenaline was moderately increased, possibly related to the anxiety associated with the immersion. The excretion of noradrenaline was significantly (p 0.01) reduced during immersion. Six subjects were studied during passive vertical tilt following immersion. Orthostatic intolerance was demonstrated and the increase in pulse rate and decrease in pulse pressure were significantly different from the control tilt. The probable mechanisms of the reduced noradrenaline excretion during immersion and its relation to the postimmersion impairment of orthostatic tolerance are discussed.

3,301

McCarthy, C.D. 1960 GENERAL FLIGHT PROOF TEST PLAN MARK 5 RE-ENTRY VEHICLES. (Research and Advanced Development Div., AVCO Corp., Wilmington, Mass.) Rept. no. RAD-SR-7-60-76; ASTIA AD-269 365 ; Sept. 28, 1960

ABSTRACT: An outline is presented of the flight proof test program to be performed on Mk 5 re-entry vehicles. The environmental testing described will provide, prior to flight test, proof of adequate design integrity. Detail testing requirements for critical components and subas-semblies will be specified in the individual test plan. All components, systems, and re-entry vehicles to be used in the Mk 5 flight test program will be flight proof-tested. (Author)

3,302

McClaughry, R. I., & W. H. Seegers 1952 AN ACCELERATOR OF PROTHROMBIN CONVERSION ARISING IN PURIFIED PROTHROMBIN PREPARATIONS. (Dept. of Physiology & Pharmacology, Wayne Univ. College of Medicine, Detroit, Mich.)

ABSTRACT: Purified prothrombin prepared by the method of Ware and Seegers (J. Biol. Chem. 174:565, 1948), when heated to 53 degrees C. for 2 hours, is free from Ac-globulin. Such preparations may be dried by precipitation with acetone, and they remain stable for many months in the dried state. When dissolved in water or physiological saline solution and stored in a deep freeze, however, the prothrombin concentration progressively decreases over a period of 4-12 weeks. With the decrease in prothrombin activity, there becomes detectable in the purified prothrombin solutions an accelerator of prothrombin activation. This accelerator causes as much as a tenfold increase in the apparent Ac-globulin content of bovine plasma, as determined by the method described by Ware and Seegers (J. Biol. Chem. 172:699, 1948). The accelerator effect could not be demonstrated by attempting to substitute it for thromboplastin or Ac-globulin the activator analysis system; it seems rather to supplement these previously recognized activators. The accelerator is probably a derivative of prothrombin itself. The clotting time of fibrinogen solutions with standard thrombin solutions was not affected by the concentration of the prothrombin solution used in demonstrating the accelerator effect, although higher concentrations did cause an equivocal shortening of the clotting time. (Federation Proceedings 11(1):103, 1952)

3,303

McCollom, O.N. 1956 FINAL REPORT (San Diego State College, California) Contract Nonr-126801 Dec. 1, 1956 ASTIA AD 118 905

ABSTRACT: Work involved in compiling a human-engineering guide for equipment design is outlined. Bibliographies, abstracts, translations, experimental studies, and special reports were prepared in the following areas: (1) comparison

3,306

MacCorquodale, K., A. Graybiel, & B. Clark 1946 THE EFFECTS OF ANGULAR ACCELERATION AND CENTRIFUGAL FORCE ON NON-VISUAL SPACE ORIENTATION DURING FLIGHT. II. INFLUENCE OF HABITUATION AND TECHNIQUE OF ASSUMING THE TURN. (Naval School of Aviation Medicine, Pensacola, Fla.) Project NM 001 059-101.15; Rept. No. 15; MR005.13-6001.1.15., 22 July 1946

ABSTRACT: Additional data were collected on the non-visual perception of body orientation during flight. Three observers sat in the rear cockpit of an SNJ-6 aircraft with all visual cues excluded. They reported their sensations of turning, tilting force or aft, and right or left, and of body weight (i.e., centrifugal force) during a series of banked turns. Reports were recorded by an airborne wire recorder and analyzed in the laboratory.

An earlier study indicated that in the absence of visual cues, a subject's sensations of tilting backward during a turn, and tilting forward on recovery from the turn, were usually stronger than his sensations of banking to the right or left. It was thought that this sensation of backward tilt might be accounted for by the fact that, in the original study, the pilot increased the angle of attack of the wing as he was banking to the turn. This resulted in a forward deflection of the direction with which the g force strikes the observer, as well as an increase in the total amount of g, resulting from the centrifugal force of the turn itself.

The hypothesis that the sensation of backward tilt was due to this change in direction in g force was tested by a second series of trials in which the angle of attack remained constant during the turn; the necessary increase in lift was effected by an increase in power setting.

The results indicate that a change in angle of attack is not necessary to produce feelings of backward tilt. Other comparisons show some slight evidence for habituation and learning; in general the perceptions during these two conditions are markedly similar.

Data were collected on a third series of trials in which the constant and variable angles of attack were randomly mixed during successive trials in the same flight, in order to determine whether the lapse in time between the first two series had caused a shift in the observers' subjective scales of estimating backward tilt. Such a shift could have caused the lack of difference observed between the first and second series. These results show that, even when experienced consecutively, the two techniques of banking do not produce significant differences in the amount of backward tilt perceived. (DACO)

3,307

MacCorquodale, K 1948 THE EFFECTS OF ANGULAR ACCELERATION AND CENTRIFUGAL FORCE DURING FLIGHT. I. METHODOLOGY AND PRELIMINARY RESULTS. J. Exper. Psych. 37: 170-177

3,308

MacCorquodale, K. 1948 EFFECTS OF ANGULAR ACCELERATION AND CENTRIFUGAL FORCE ON NON-VISUAL SPACE ORIENTATION DURING FLIGHT. J. Aviation Medicine 19(13):146-157, June 1948.

See also (Naval School of Aviation Medicine, Pensacola, Fla.) Proj. MR005. 13-6001.1.14., 7-13-46

SUMMARY: Data were collected on the non-visual perception of motion and body position during flight. All observations were made while airborne. The subject was seated in the rear cockpit of an advanced Navy trainer. The maneuvers used were limited to turns at six angles of bank. Twelve observations at each angle of bank were made by each of 3 experienced observers. Visual cues were excluded by a blackout procedure. Reports of his perceptions of turning and tilting, judgements of the direction (left or right) of turn and tilt when possible, estimates of degrees of tilt forward or backward and right or left in degrees, and estimates of g force were made verbally by the observers into a wire recorder. These reports were later analyzed in the laboratory and related to the actual behavior of the aircraft as indicated on the same record by the pilot's signals of critical points in the maneuver. (DACO)

CONCLUSIONS: Non-visual spatial orientation during flight is subject both to gross limitations and to illusions. The perception of turning and tilting to the right or left appears after a considerable lag from the actual onset of the maneuver. The direction of the bank and turn may be in error, and the estimates of the amount of bank are markedly depressed. Perceptions of both tilting and turning are transient, and disappear before the plane recovers from the turning attitude. The recovery from the turning attitude is accompanied by sensations of tilting and turning away from the direction of the preceding turn, which persist into the period of straight and level flight following a maneuver. The onset of turn and the turn proper are accompanied by sensations of tilting backward which persist for the duration of the turn. Following recovery the observer feels himself tilting forward after a brief period of feeling upright. The perceptions of g per se are strong and accurate. (DACO)

3,309

McCourt, Francis P. 1960 AVIATION CRASH INJURY RESEARCH (Paper, Army Human Factors Engineering Conference, Ft. Belvoir, Virginia) October 3-6, 1960. ASTIA AD 251 312

ABSTRACT: Experience has shown that, under certain conditions, human structure can withstand exposure to impact forces which will normally disintegrate aircraft structure. Therefore, it becomes important to isolate and classify predominant injury producing factors which may be revealed through the crash-injury study of aircraft accidents. Useful crash survival data is produced

through the study of accidents. Excluding crash fire, drowning, etc., injuries sustained are generally produced through any of these five methods: (a) By having structure collapse sufficiently to impinge upon vital body areas; (b) By becoming a far-flung missile; (c) By becoming a near-flung missile; (d) By being struck by a missile; (e) By magnification of the crash force itself.

Another equally important phase of aviation crash injury research involves obtaining precise crash load data from experimental crashes. Testing on this subject utilizes relatively low-cost track-type test facilities on which air vehicles (fully instrumented with anthropomorphic dummies) can be crashed at the velocities and impact angles typical of their low speed operating range. Data derived from tests of this nature will permit precise engineering design for crash-safety without the weight penalties which result from static, rather than dynamic, testing.

3,310

McCourt, F. P. & W. J. Nolan June 1961 AVIATION CRASH INJURY RESEARCH. (U. S. Army Transportation Research Command, Ft. Eustis, Va. TREC Report No. 61-78)
See also: Paper, Symposium on Biomechanics of Body Restraint and Head Protection, MADC, June 14-15, 1961.

ABSTRACT; Because of human error, we can expect occasional accidents, and since some of the newer aircraft types are carrying greater numbers of people, we can also expect more casualties per accident. Accepting the inevitability of an occasional accident, it becomes the joint responsibility of certain medical, engineering, and research groups to provide the safest possible design within the limits imposed by operational and economical consideration. The Department of the Army has increased both the number of aircraft and its emphasis on safety. The emphasis has been directed toward: (1) The prevention of aircraft accidents, and (2) The prevention or reduction of damage or injury that may be expected in those accidents which occur. Tremendous improvements in safety have resulted from these procedures and from the investigation of plane crashes. However, it has become increasingly apparent that one further step is needed which would begin by simulating the deficiencies discovered in the accident investigations and statistical studies, under fully instrumented laboratory controlled conditions. The precise engineering data obtained from such experiments can then be incorporated into the basic aircraft design and can also be used to improve the investigative and analytical techniques used in accident investigation and in statistical studies.

3,311

McCourt, F. P. 1961 AVIATION CRASH INJURY RESEARCH
In Seventh Annual Army Human Factors Engineering Conference. USA Signal Corps Project Michigan, University of Michigan, Ann Arbor, Mich. 3-6 October 1961. Pp. 209-217.
(USA Office of the Chief of Research and Development, Washington, D. C.)
ASTIA AD 267 153

ABSTRACT: A long-range research program to obtain technical crash-performance data for rotary wing and VTOL aircraft has been initiated. This report presented the results of an exploratory, experimental study. A Piasecki Model H-25A helicopter was used to recreate a typical accident approximating an unsuccessful attempt to attain an autorotation from a low-altitude power failure. The helicopter, fully instrumented, was dropped from a moving crane at a height of 30 ft. and a forward speed of 30 mph. The recorded data were analyzed for their validity as actual crash-force measurements. The feasibility of airborne testing and the problems of dynamic testing were discussed. (Tufts)

3,312

McCourt, F. P. and W. J. Nolan June 1961 AVIATION CRASH INJURY RESEARCH.
(Paper, Symposium on Biomechanics of Body Restraint and Head Protection, Naval Air Material Center, Philadelphia, Penn. June 14 - 15, 1961)

See also: (U. S. Army Transportation Research Command, Ft. Eustis, Va.) TREC Rept. No. 61-78.

ABSTRACT: Because of human error, we can expect occasional accidents, and since some of the newer aircraft types are carrying greater numbers of people, we can also expect more casualties per accident. Accepting the inevitability of an occasional accident, it becomes the joint responsibility of certain medical engineering, and research groups to provide the safest possible design within the limits imposed by operational and economical consideration. The Department of the Army has increased both the number of aircraft and its emphasis on safety. The emphasis has been directed toward: (1) The prevention of aircraft accidents, and (2) The prevention or reduction of damage or injury that may be expected in those accidents which occur. Tremendous improvements in safety have resulted from these procedures and from the investigation of plane crashes. However, it has become increasingly apparent that one further step is needed which would begin by simulating the deficiencies discovered in the accident investigations and statistical studies, under fully instrumented laboratory controlled conditions. The precise engineering data obtained from such experiments can then be incorporated into the basic aircraft design and can also be used to improve the investigative and analytical techniques used in accident investigation and in statistical studies.

3,313

McCoy, T.M. 1960 HYPERENVIRONMENT SIMULATION.
(Wright Air Development Division, Wright-Patterson AFB, Ohio)
WADD Technical Report 60-785, ASTIA AD-257 775, December 1960

ABSTRACT: This report summarizes the approach, concept, design, and cost of hyperenvironmental simulation facilities for evaluating effects of space vehicle environment on specimens up to 250 pounds. With the objective of combining environmental variables wherever applicable and feasible, four basic facilities have been conceived with several environments each. Detailed design specifications for these facilities are contained under separate covers.

As part of the design back-up, some of the problems, methods and techniques of simulation are discussed. A summary is also given of the pertinent results of some experiments conducted to prove design feasibility in certain critical areas of simulation.

3,314

MacCurdy, J. T. 1934 DISORIENTATION AND VERTIGO WITH SPECIAL REFERENCE TO AVIATION.
Brit. J. Psychol. 25:42-54.

ABSTRACT: Vertigo is produced when the labyrinth is diseased, i.e. when the body is physiologically disoriented; and by disorientation under normal conditons when: (1) the individual is so much distracted by giddiness and nausea, or by efforts to maintain balance, as to make visual judgment ineffective, (2) objects are viewed with difficulty because they are in motion, or at some unfamiliar angle, (3) perception is inaccurate because its posture-balance component is absent or distorted. These three conditions may be acute but temporary, and may be compensated for by the use of an intellectually produced substitute perception. They occur during learning to fly. Nausea and vomiting appear to be produced by reactions of the abdominal muscles to sudden changes in the magnitude and direction of gravitational forces, and can be avoided by completely relaxing these muscles.

3,315

McCutcheon, E.P., C.A. Berry, G.F. Kelly, R.M. Rapp & R. Hackworth 1962
AEROMEDICAL STUDIES: B. PHYSIOLOGICAL RESPONSES OF THE ASTRONAUT
In Results of The Second United States Manned Orbital Space Flight, May 24, 1962. (Houston, Tex., National Aeronautics and Space Adm.)
Rept. No. NASA SP-6, N62-14691, May, 1962.

ABSTRACT: The observations of Astronaut Carpenter's physiological responses to the MA-7 mission are reviewed. Generally, the responses were within physio-

iogical ranges. No disturbing body sensations were reported as a result of the flight. Specifically, the heart-rate response to nominal exercise demonstrated a reactive cardiovascular system. The ECG tracing recorded during reentry was abnormal because of the increased respiratory rate associated with talking during maximum acceleration. Much of the data obtained during the flight is very valuable. For example, the biosensors provided good ECG data. The respiration rate sensor provided good prelaunch but minimal in-flight coverage. The in-flight blood pressure cannot be interpreted at the present time. Because of irregular amplifier behavior, the rectal temperature thermister gave invalid values for one-third of the flight.

3,316

MacDonald, H.D. 1961 DEVELOPMENT OF CATAPULT, AIRCRAFT EJECTION SEAT, XM10. (Wright Air Development Division, Wright-Patterson AFB, Ohio) WADC TR 60-452, March 1961. ASTIA AD 270 108.

ABSTRACT: Frankford Arsenal was requested to adapt the ballistic geometry of the rocket assisted pilot ejection catapult, RAPEC No. 1, to USAF aircraft requirements, specifically, as a replacement for M4 catapults presently installed in the F104 aircraft.

The existing RAPEC No. 1 catapult has been successfully scaled down to meet the USAF requirements.

The XM10 catapult supplies the necessary thrust and, consequently, ejection height to permit low-level ejections from high performance aircraft. This device is now ready for qualification and analysis tests. (Author)

3,317

MacDonald, H. D. & N. J. Waecker 1961 DEVELOPMENT OF CATAPULT AIRCRAFT EJECTION SEAT, T 20. (Aeronautical Systems Division, Wright-Patterson AFB, Ohio) WADD TR 59-306 Frankford Arsenal Report R-1557. ASTIA AD 299 138.

ABSTRACT: Frankford Arsenal was requested to develop a rocket-assisted catapult that would provide sufficient impulse to accomplish safe low-altitude ejection. Two problems were considered during the program; first, attaining sufficient impulse with the rocket-catapult combination; and second, eliminating the bending of the catapult tubes during ejection. The first problem was solved by using a rocket motor attached to the

bottom of the catapult. In this case, the rocket provides the sustained acceleration necessary to achieve the required final velocity. The problems associated with catapult tube bending in conventional catapults were eliminated by making the power stroke of the catapult section equal to the guided stroke of the seat in the rails. Flight stability and proper trajectory are obtained during ejection by angling the nozzle of the rocket so that the vector of the rocket thrust passes through the effective center of gravity of the seat-man mass and by igniting the rocket at the instant the rocket-catapult is released from the aircraft structure. The T20 catapult is now ready for qualification and analysis testing.

3,318

McDonald, R. K. & V. C. Kelley 1947 THE TYPE AND DEGREE OF INJURY RESULTING FROM ABRUPT DECELERATION: THE QUANTITATIVE DETERMINATION OF PULMONARY HEMORRHAGE. (Air Univ., School of Aviation Medicine, Randolph Field, Texas) Project No. 494, Report No. 1, 11 June 1947.

3,319

McDonald, R. K., V. C. Kelley, et al. 1947 THE TYPE AND DEGREE OF INJURY RESULTING FROM ABRUPT DECELERATION: The Etiology of Pulmonary Hemorrhage in Cats exposed to Abrupt Deceleration. (School of Avia. Med., Randolph AFB Texas) Proj. No. 494, Rept. No. 2; ASTIA AD 217 860, 21 Aug. 1947.

ABSTRACT: Animals exposed to high decelerative forces of short duration frequently sustain marked degrees of pulmonary hemorrhage and during deceleration show increased intra-abdominal pressure. Removing the pressure-transmitting medium (viscera) results in a remarkable mitigation of pulmonary hemorrhage. Applying a counter pressure device in the form of a narrow pressure cuff around the uppermost limits of the abdomen causes a decrease in pulmonary hemorrhage comparable with eviseration. The etiology of pulmonary hemorrhage in animals exposed to abrupt deceleration of short duration is dependent in large part on the generation of large intra-abdominal pressure waves and the transmission of this pressure to the lungs. (AUTHOR)

3,320

McDonald, R.K., V.C. Kelley, and R. Kaye 1948 ETIOLOGY OF PULMONARY HEMORRHAGE IN CATS EXPOSED TO ABRUPT DECELERATION. J. Aviation Med. 19(3:138-145, June 1948.

ABSTRACT:

1. Animals exposed to high decelerative forces of short duration frequently sustain marked degrees of pulmonary hemorrhage, and during deceleration show increased intra-abdominal pressure.

2. Removing the pressure-transmitting medium (viscera) results in a remarkable mitigation of pulmonary hemorrhage.

3. Applying a counter pressure device in the form of a narrow pressure cuff around the uppermost limits of the abdomen causes a decrease in pulmonary hemorrhage comparable with evisceration.

4. The etiology of pulmonary hemorrhage in animals exposed to abrupt deceleration of short duration is dependent in large part on the generation of large intra-abdominal pressure waves and the transmission of this pressure to the lungs.

3,321

McDonough, F.E. 1941 AVIATION MEDICINE: A SURVEY.
Proc. Staff Meet., Mayo Clin., 16:217-219

ABSTRACT: Present examination of candidates for flight training does not tend to select those persons who will necessarily make good aviators. It intends to eliminate those who, because of measurable physical and psychologic defects, should not be taught to fly. To better evaluate the problem, 10 members of the Mayo group of "flight surgeons" underwent pilot training. The group included an ophthalmologist, an otolaryngologist, a cardiologist, a neuropsychiatrist and others.

With regard to the care of the flier, it has been demonstrated that periodic examination of pilots does not protect them, but merely eliminates those unfit to fly.

Investigation of the effects of flying and aerial environment has been advanced remarkably, including the effects of altitude, under which aeroembolism, anoxia and altitude sickness are considered.

3,322

McDonough, F.E. 1942 AIRSICKNESS DURING AN AIRBORNE INFANTRY MANEUVER (School of Aviation Medicine, U.S.A.F. Randolph Base, Texas) Rept. No. 93-1 November 1942.

3,323

McDonough, F.E. 1942 AIRSICKNESS IN THE AIRBORNE INFANTRY (School of Aviation Medicine, USAF Randolph AF Base, Texas) Rept no. 93-2, November 1942.

3,324

McDonough, F.E. 1942 ROENTGENOGRAPHIC STUDIES OF GASTROINTESTINAL MOTILITY OBSERVED IN SWING TEST SUBJECTS (School of Aviation Medicine, USAF, Randolph AF Base, Texas) Rept. No. 102-1, December 1942

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McDonough, F. E. and M. W. Thorner 1942 REGULATION BARANY AND SWING TESTS IN NAVIGATION CADETS (USAF School of Aviation Medicine, Randolph AFB, Texas) Research Report No. 1. Project 100, December 1942.

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McDonough, F. E. 1943 ROENTGENOGRAPHIC STUDIES OF GASTROINTESTINAL MOTILITY OBSERVED IN SWING TEST SUBJECTS (USAF School of Aviation Medicine, Randolph AFB, Texas) Report No. 102-2, July 1943.

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McDonough 1943 AIRSICKNESS IN NAVIGATION TRAINING (School of Aviation Medicine USAF, Randolph AF Base, Texas) Rept. No. 165-1, July 1943

3,328

McDonough, F. E. 1944 THE USE OF DRUGS IN THE TREATMENT OF AIRSICKNESS (School of Aviation Medicine, USAF Randolph AFB, Texas) Rept. N. 194-1, July 1944.

3,329

McEacheron, D., G. Morton, & P. Lehman 1942 SEASICKNESS AND OTHER FORMS OF MOTION SICKNESS; A General Review of the literature. War Med. 2:410-428

3,330

McEvedy, C. P. and P. Howard 1959 THE EEG AND BLACKOUT. (IVth European Congress of Aviation Medicine, Rome, 1959.)

3,331

McFarland, R.A. 1939 A BIBLIOGRAPHY ON THE SELECTION, TRAINING AND PHYSICAL FITNESS OF AVIATION PILOTS. (National Research Council Committee on the Selection and Training of Civilian Pilots, and the Civil Aeronautics Authority, Wash., D.C.) December 1939

ABSTRACT:

This is an extensive bibliography covering the following subjects: psychological studies; sensory tests; physiological studies; the effects of moderate and high altitudes; medical examinations and tests of physical fitness; human factors in aeroplane accidents and a list of aeronautical journals.

3,332

McFarland, R. A. 1941 FATIGUE IN AIRCRAFT PILOTS
New England J. of Medicine 225(22):845-855.

SUMMARY: In this discussion of fatigue in aviation, an attempt is made to analyze some of the more important contributing factors to pilot fatigue. It is shown how the attempts to locate fatigue in certain tissues or organs have not proved to be very revealing in solving practical problems related to subjective fatigue and exhaustion. Likewise, the search for a fatigue toxin, such as lactic acid, has brought to light many significant variables related to fatigue, but the relations have been more restricted than was at first expected. Furthermore, it is shown that a pilot whose muscular activity in flight is limited could hardly exhaust the energy reserves sufficiently to explain the fatigue and exhaustion often observed in airmen. The essential variables in the phenomena of acute or chronic pilot fatigue and exhaustion are ascribed to psychologic factors such as emotional stress, regardless of whether it is related to adverse flying conditions, fear of accidents, economic and social insecurity, and unhappy marital adjustments. The major portion of the discussion is related to an analysis of certain contributing factors in pilot fatigue, especially lack of exercise, the reduced tension of oxygen encountered while in flight at high altitudes, the poor selection of food and the excessive use of alcohol and tobacco. Also, certain physical variables in the cockpits of airplanes are discussed as other contributing factors to fatigue, such as noise, vibration, poor illumination, glare, static from the radio and poor regulation of the ventilation and the temperature. Finally, the results obtained in a study of transoceanic airmen are analyzed to show the effects of long flights at moderately high altitudes.

3,333

McFarland, R. A. 1943 SOME PROBLEMS IN AVIATION MEDICINE
Bull. New Engl. Med. Cent. 5:1-6, 1943.

ABSTRACT: The human problems in aviation may be divided into two parts; (1) relating to placement and selection (gunners, fighters, bombardiers and pilots); (2) to physiologic and psychologic limitations.

Recent research on the effects of alcohol on the organism has revealed, that it diminishes the utilization of oxygen in the tissues. There is a close similarity between the behavior of a person suffering from acute oxygen deprivation and that of a person under the influence of alcohol; in both cases an oxygen deficiency is delivered to the tissues.

The search for a fatigue toxin, such as lactic acid, has brought to light many significant variables related to fatigue. Certain physical variables such as noise, vibration, poor illumination, glare and radio static are important.

The effects of acceleration or "blackout" during dive bombing; variations in temperature encountered at high altitudes; aero-embolism and the difficulty of ridding the blood of the nitrogen during rapid ascents to a great height; alcohol in relation to high altitudes; and the problem of pilot fatigue, due to anoxia, alcohol, poor diet and the effects of nicotine and carbon monoxide from excessive smoking are discussed.

3,334

McFarland, Ross A. 1952 SUMMARY REPORT OF A THREE YEAR RESEARCH PROGRAM ON HUMAN FACTORS IN HIGHWAY TRANSPORT SAFETY
(Harvard School of Public Health, May 20, 1952)

3,335

McFarland, R. A. 1955 HUMAN PROBLEMS IN JET AIR TRANSPORTATION
SAE Transactions 64:437-451, 1956

ABSTRACT: The human problem with jet aircraft begins even before take-off, the author points out, with discomfort and loss of efficiency from ground injuries on the field or in repair shops. In the air, human tolerance is matched against other extreme forces of acceleration direction changes, temperature and pressure variations.

3,336

McGehee, J. R. and V. L. Vaughan, Jr. 1962 MODEL INVESTIGATION OF THE LANDING CHARACTERISTICS OF A RE-ENTRY SPACECRAFT WITH A VERTICAL-CYLINDER AIR BAG FOR LOAD ALLEVIATION. (national Aeronautics and Space Administration, Washington, D. C.) NASA Technical note D-1027, March 1962, ASTIA AD-272 616.

ABSTRACT: Analytical and experimental investigations were made to determine the landing characteristics of re-entry spacecraft equipped with a vertical cylinder air bag for impact load alleviation. Assuming a rigid body and isothermal air compression and expansion, computations were made to determine accelerations for a landing on concrete from a flight-path angle of 90 degrees (vertical flight path) at a contact attitude of 0 degrees. Two models (1/6 and 1/2 scale) dynamic model of a spacecraft--air-bag configuration proposed for manned re-entry was landed on concrete, on sand, and in calm water from various flight paths for a range of contact attitudes. Reasonable agreement between computed and experimental data indicates that the scaling technique developed is satisfactory for prediction of full-scale characteristics from model tests with air bags in atmospheric environment. The maximum accelerations obtained during landings on sand were about 11 g along the X-axis and 8 g along the Z axis. The maximum accelerations obtained during landings in water were about 10 g along the X-axis and about 6 g along the Z-axis. (Author)

3,337

McGowan, W.A. and J.M. Eggleston 1961 A PRELIMINARY STUDY OF THE USE OF FINITE-THRUST ENGINES FOR ABORT DURING LAUNCH OF SPACE VEHICLES. (National Aeronautics and Space Administration, Washington, D.C.) NASA TN D-713, Dec. 1961. ASTIA AD-268 451.

ABSTRACT: Investigations were made of the aborts initiated along a typical launch trajectory in the region of relatively high flight-path angles at suborbital velocities while leaving the atmosphere and along another typical launch trajectory in the region between orbital and near-escape velocity. For aborts at suborbital velocities, the optimum times to apply thrust of given levels are determined from the standpoint of maximum reduction of the peak entry decelerations. For aborts at superorbital velocity the propellant weights required to return the vehicle to earth are established for several thrust levels and for the effect of time delay during separation and orientation.

3,338

McGuire, F. G. 1958 SOVIETS DISCUSS SATELLITE CREW RECOVERY Missiles and Rockets, August 11, 1958, p. 51

ABSTRACT: Isakov has reduced the means of accomplishing the safe return of satellite crews to two possibilities: return of the satellite as an entire unit, and

return of the crew only. According to the article, the second of these is the easier and most practicable method. Acceleration and deceleration problems are under study, Isakov, says, and states that "it has been established that man can withstand a force of 3--5 g's for short periods with no harmful after effects." But he notes that continued acceleration or deceleration to this extent results in serious change in a man's condition which sharply limit his efficiency. Isakov mentions the experiments of Italian scientists who subjected animals to g forces while the animals were submerged in water. The present experiments showed that under these conditions animals could withstand much higher g-loads than under normal conditions. Excessive rotation was also listed by the author as a dangerous phenomena. Rapid and irregular rotation of the body in all places can cause serious effects such as complete unconsciousness if a speed of 2-3 revolutions per second were experienced over a period of 10 to 15 seconds. Russian live-animal ejection experiments are reported to have been highly successful in proving that survival was indeed possible in extreme-altitude ejections, even though the vehicle was not travelling at orbital velocity. (CARI)

3,339

McGuire, T.F. and F.J. Leary 1958 A UNIFIED CONCEPT OF STRESS TOLERANCE: ITS RELATIONSHIP TO DRUGS AND THE AIRMAN AND ITS RELATIONSHIP TO A SYSTEM OF AIRCREW SELECTION BASED UPON PHYSIOLOGIC AND PSYCHOLOGIC CRITERIA. (Paper, 1958 Meeting of Aero Medical Association, Statler Hotel, Washington, D.C., March 24-26)

ABSTRACT: A unified concept of stress tolerance, utilizing all available data plus original experiments, is presented. The relationship of therapy with such drugs as the corticords, tranquilizers, and the amphetamines, is discussed in relationship to stress tolerance. With newer high performance aircraft and increased destructive potential of aircraft lofted weapons, fewer combat aircraft are needed. But the physical integrity of the entire aircrew has become more important to the mission than ever before while the potential stresses to which they may be exposed have increased. Selection of special or "premium" aircrews based on physiologic and psychologic criteria, aside from technical capability, is discussed. (J. Aviation Med. 29(3):242, March 1958)

3,340

McGuire, T. F. & F. J. Leary 1958 TRANQUILIZING DRUGS AND STRESS TOLERANCE. (Wright Air Development Center, Wright-Patterson AFB, Ohio) WADC-TR-58-64.

3,341

McGuire, T. F., H. W. Marshall, A. C. Nolan, E. F. Lindgerg & E. H. Wood 1961
COMPARISON OF CHANGES IN ARTERIAL OXYGEN SATURATION DURING TRANSVERSE ACCELERATION AS INDICATED BY EAR OXIMETRY AND BY DIRECT PHOTOMETRY ON ARTERIAL BLOOD.
(Paper, 1961 Meeting of Aerospace Medical Association, Chicago, April 24-27).

ABSTRACT: Six experienced men, tewnty-seven to thirty-five years old, were exposed to 2, 3.5, and 5 g for ten-minute periods while reclining in the Mercury Astronaut position in a human centrifuge. Centrifuge axis-to-subject distance was 15.5 feet. A Wood-Geraci oximeter was affixed to the pinna of one ear while and earpiece modified to detect arterial pulsations was attached to the other. Simultaneous cuvette oximetry determinations were made during acceleration via an indwelling needle or small catheter in the left radial artery. Ear-pulse changes during acceleration, useful in the headward (positive) acceleration position as an indicator of a critical decline in blood pressure at ear level, did not show apparent definitive changes in the transverse position. The oxygen saturation values of blood in the heat-flushed ear indicated by the oximeter decrease rapidly during the first minute of exposure to acceleration and then remained relatively stable at this decreased level for the duration of the ten-minute exposure. Arterial oxygen saturation levels below 85 per cent by cuvette oximetry were encountered in some subjects during exposure to 5 g. These decreases could be prevented by breathing 99.6 per cent oxygen. The discrepancy between ear oximeter and cuvette oximeter saturation values during exposure to acceleration is believed due to the retarded blood flow through the ear caused by the acceleration, with consequent increased extraction of oxygen from the ear blood by local-tissue metabolism. (Aerospace Med. 32(3):242, March 1961.)

3,342

McIntyre, A. K. EFFECT OF ANTI-MALARIAL DRUGS ON G TOLERANCE.
(Royal Australian Air Force, Sydney) Report FR-71.

ABSTRACT:
(a) Centrifuge tests were performed on a group of 33 aircrew trainees to determine blackout thresholds before and after anti-malarial drugs (quinine, atebrine, and "A.S.I.") in suppressive doses.
(b) Before treatment, blackout threshold averaged 4.9 "g" for 5 seconds, range 3.6 to 6.2 "g".
(c) No adverse effect on resistance to "g" was observed with any drug.
(d) In most cases, "g" tolerance improved progressively with successive centrifuge runs whether or not drugs were taken.

AVERAGE "G" TOLERANCE

	QUININE		ATEBRINE		ATEBRINE & ASI	
	Before	After	Before	After	Before	After
Drug	5.1	5.4	4.7	5.2	4.7	5.5
Control	5.2	5.6	4.2	4.2	4.2	4.7

3,343

McIntyre, A. K. 1941 DISORIENTATION. AIRSICKNESS. Notes on FR-10 (Royal Australian Air Force, Sydney) FPRC Rept. No. 358 (i)

3,344

McIntyre, A. K. 1941 MOTION SICKNESS, PRESENT STATUS OF RESEARCH. (Royal Australian Air Force, Sydney) FR-91, June 1941.

3,345

McIntyre, A. K. 1943 THE EFFECT OF HEAD POSITIONS ON SUSCEPTIBILITY TO MOTION SICKNESS (Royal Australian Air Force, Sydney) Report FR 86.

3,346

McIntyre, A. K. and I. D. R. Gardiner 1943 CORRELATION BETWEEN SWING AND SIR SICKNESS (Royal Australian Air Force, Sydney) Report FR 67.

3,347

McIntyre, A. K. 1944 PRELIMINARY REPORT ON CURRENT ACTIVITIES OF THE R. A. F. PHYSIOLOGICAL LABORATORY, FARNBOROUGH. (Royal Australian Air Force, Sydney)FR-101B, 14 Dec 1944.

3,348

McIntyre, A. K. 1945 SOME SUBJECTIVE EFFECTS OF ANGULAR AND CENTRIFUGAL ACCELERATIONS. (R. A. A. F., Sydney)
(Paper, Meeting of the Physiological Society, 10 February 1945)

ABSTRACT: Different combinations of linear and angular accelerations are encountered with different methods of producing high values of G. Such abnormal environments may produce complex, unfamiliar sensations, the study of which may throw further light on the mechanism of spatial orientation.
In the orthodox type of centrifuge a sequence of apparent changes in gravitational orientation is experienced by the subject who has no fixed visual horizon. With the onset of rotation, a sensation of upward and backward movement is noticed,

which is replaced during constant angular velocity by the general sensations of increased weight; during deceleration, a feeling is experienced of falling with forward rotation around a transverse axis. Vertical nystagmus (quick component downward) is observed at this stage and continues for some seconds after cessation of rotation. These effects are related to the magnitude of the angular acceleration around the axis of the centrifuge.
In the Australian accelerator, the magnitude of G may be varied without the production of associated angular accelerations. This is achieved by moving the subject radially away from or towards the axis during rotation of the machine at constant angular velocity. No sensations of rotation are experienced by the occupants, since the desired angular velocity is attained so slowly that appreciable stimulation of the semicircular canals is avoided.
Variations in radial acceleration in this centrifuge produce illusions of changes in bodily attitude. The resultant between gravity and centrifugal force is accepted as if it were simple gravitational pull, even if its direction is nearly horizontal. Thus a subject, although actually lying on his back, feels as if tilted into the upright position during the application of G, while the observer, seated upright and facing the axis of rotation, experiences the illusion of lying on his back throughout the period of rotation.
The angular momentum of the centrifuge may produce another striking illusion. If the head is tilted in any plane other than that of rotation, strong sensations are experienced of turning in a plane at right angles to the actual head movement, apparently because of precessional phenomena in the labyrinths. The occurrence of nystagmus (in the plane of subjective rotation) indicates that the semicircular canals are involved. This phenomenon may also be observed in spinning aircraft, and may lead to gross spatial disorientation in the absence of visual clues. (J. of Physiology 104:11P-12P, 10 Feb. 1945)

3,349

Mc Iver, J.W. 1950 FULL SCALE MEASUREMENTS OF IMPACT LOADS ON A LARGE FLYING BOAT. PART I. DESCRIPTION OF APPARATUS AND INSTRUMENT INSTALLATION. (Gt. Britain Marine Aircraft Engineering Estab.) F/Res/216 March 1950

3,350

MacKay, R. A., & T. K. W. Ferguson 1951 INFLUENCE OF CERTAIN ANTI-MOTION-SICKNESS DRUGS ON PSYCHOMOTOR AND MENTAL PERFORMANCE. J Aviation Med. 22(3):194-195, June 1951.

3,351

McKenzie, R. E., & B. O. Hartman 1960 AN APPARATUS FOR THE SPIRAL AFTEREFFECT TEST (SAET) (USAF, School of Aviation Medicine, Aerospace Med. Ctr., Brooks AFB, Texas) Research Rept. 60-69, Sept. 1960

3,352

The McKiernan-Terry Corp., Dover, N. J. 1960 FEASIBILITY AND DESIGN STUDY FOR AN ADVANCED HUMAN ENVIRONMENTAL RESEARCH ACCELERATOR (Wright Air Development Division, Wright-Patterson AFB, Ohio) WADD TR 60-225; ASTIA AD-236 026; March 1960

ABSTRACT: This study presents an analysis of the engineering problems inherent in the design of a high performance accelerator research device capable of producing controlled high levels of centripetal acceleration, and simultaneously, linear and rotary motion of a payload about various axes. Engineering feasibility is studied and related to various combinations of acceleration parameters, including acceleration level, rate of change of acceleration, radius of rotation, payload mass, and displacement and rotary degrees of freedom. The conclusions resulting from a study of these factors are integrated to yield specifications for accelerators of optimum performance. All significant facets of accelerator concept are treated, including prime mover considerations, arm strength, aerodynamic loss problems, gimbal mechanisms, capsule layout, and basic dynamic and kinematic properties. Automatic control and analogue simulation of the acceleration problem is also discussed. (AUTHOR)

3,353

McKiernan-Terry Corp. 1961 MODIFICATION OF HUMAN CENTRIFUGE AT THE AVIATION MEDICAL ACCELERATION LABORATORY: PROGRESS REPORT CONCERNING (U.S. Naval Air Development Center, Johnsville, Pennsylvania) NADC-MA-L6101, 1 March 1961, ASTIA AD- 251 947

ABSTRACT: A program of modification of the centrifuge at the Aviation Medical Acceleration Laboratory was proposed (reference(a)) based on the experience which had been accumulated during the flight simulation testing of the X-15 research aircraft. References (b) through (g) detail the history of appropriations pertaining to the modification program.

A contract has been let to the McKiernan-Terry Corporation of Dover, N.J. for the following: a. A feasibility study for the entire modification program as presently envisioned. b. A new and completely rewired centrifuge arm which will support a larger and heavier gondola without depreciating the performance capabilities of the present centrifuge drive motor. c. A sperical 10 ft. diameter gondola which is substantially larger than the present 10 ft. X 6 ft. oblate speriod gondola. This new gondola will be capable of having its internal structure removed to allow a completely checked out instrument panel, pilot control system, seat configuration. It will also be capable of continuous relation and have increased slip ring capacity.

3,354

McLaughlin, J., & I. Gray 1956 BIOCHEMICAL RESPONSE TO TRAUMA. II CORTICOSTERONE AND 17-HYDROXYCORTICOSTERONE LEVELS IN PLASMA OF RATS SUBJECTED TO TUMBLING TRAUMA. (Walter Reed Institute of Research, Wash., D. C.) WRAIR-86-56; ASTIA AD-112 801, April 1956

ABSTRACT: Corticosterone and 17-hydroxycorticosterone levels were determined in plasma of normal and traumatized rats. In general, it was found that the plasma levels rose with increasing number of turns at zero time after tumbling. When the corticosterone and 17-hydroxycorticosterone plasma levels of rats were examined over a period of 24 hours from the end of drumming, it appeared that the levels changed markedly. However, these changes were not parallel for the two steroids examined. The fractions separated as corticosterone and 17-hydroxycorticosterone showed the same elution behavior, ultraviolet absorption, fluorescence development and similar Rf by paper partition chromatography as those of known samples of corticosterone and 17-hydroxycorticosterone. (AUTHOR)

3,355

McLaughlin, J., Jr. & I. Gray 1959 BIOCHEMICAL RESPONSE TO TRAUMA. IV. CORTICOSTEROID LEVELS IN PLASMA OF RATS SUBJECTED TO TUMBLING TRAUMA. Am. J. Physiol. 196(4):893-895. ASTIA AD 219 560.

SUMMARY: The effect of tumbling trauma on the concentration of corticosterone (CS) and other corticosteroids (X-steroids) in the plasma of rats has been followed using a fluorimetric method for the analyses of the corticosteroid. Sprague-Dawley rats weighing 225-275 gm were used. The animals were tumbled for 300, 400, 500, 600 and 700 turns giving a 24-hour mortality ranging from 0 to 100%. The corticosterone levels immediately after the tumbling were increased 2-5 times while the X-steroid concentrations increased 5-10 times. When followed in time after tumbling, the corticosterone remained elevated for 1-2 hours and returned toward normal within 24 hours whereas the X-steroids rose to a peak about 1 hour and then fell to near zero between 1 and 2 hours after which a secondary rise occurs which rises about 8 hours and then returns toward normal within 24 hours. (Author)

3,356

McLennan, M. A. 1959 A DATA SYSTEM FOR SELECTIVELY MONITORING PHYSIOLOGICAL SIGNALS
In Proceedings of the Pilot Clinic on the Instrumentation Requirements for Human Comfort and Survival in Space Flight. Ohio State University, Columbus, Ohio. October 26-27, 1959.
(Foundation for Instrumentation Education and Research, New York, N. Y., April 1960.) Pp. 41-50.

ABSTRACT: The "Viability Monitor" telemetry system for selective monitoring of physiological signals is described. The point is made that it is impractical to extend present telemetry practices to cover long-term physiological experiments in the space field because the continuous registry of all signals become too cumbersome. The basic principles for a system that would eliminate noninformative signals are stated. (Tufts)

.3,357

McMichael, H. 1961 INJURY PATTERNS AS SEEN IN MATERIAL FROM AIRCRAFT ACCIDENTS AVAILABLE AT THE ARMED FORCES INSTITUTE OF PATHOLOGY. (Paper, Symposium on Biomechanics of Body Restraint and Head Protection, Naval Air Material Center, Philadelphia, Penn. June 14-15, 1961)

ABSTRACT: A number of patterns of injury seen in material from aircraft accidents are described and interpreted with respect to the probable causative forces producing the injuries. The injuries commonly seen in passengers fatally injured in commercial airline accidents are described and related to the problem of the design and tie-down of passenger seats. The "rocking seat" type of aircraft passenger seat is described as a possible solution to the seating problem. A number of other injury patterns are described, including visceral ruptures, blast induced injury, and injuries sustained during high speed ejection. The use of the study of traumatic injury in reconstruction the sequence of events occurring in aircraft accidents is illustrated.

.3,358

McMichael, A. E. & A. Graybiel 1963 RORSCHACH INDICATIONS OF EMOTIONAL INSTABILITY AND SUSCEPTIBILITY TO MOTION SICKNESS. Paper: 34th Annual Meeting of the Aerospace Medical Association, Statler-Hilton Hotel, Los Angeles, Calif., April 28 - May 2, 1963.

ABSTRACT: Almost all studies of motion sickness have referred to "underlying personality factors" but have not included such factors in the variables studied. The present study investigates relationships between aspects of personality, as measured by the Rorschach test, and susceptibility to experimentally indiced motion sickness.

Eleven volunteer normal subjects were administered a battery of psychological tests, of which one was the Rorschach, prior to their exposure to four experimental conditions designed to induce motion sickness. These experimental conditions included exposure to: aerial acrobatics; going to sea in a power boat; a Slow Rotating Room; experiencing zero G. An overall rating on susceptibility to motion sickness was also made by another experimenter as a composite of these four criterion conditions.

Five composite dimensions of the Rorschach test (Bech) were correlated to the results of each of the five criteria. These dimensions were: drive, dependency; rigidity; anxiety; impulsivity. The resulting rank order correlations are presented and discussed in light of the previous findings.

3,359

McNally, W. J., & E. A. Stuart 1942 PHYSIOLOGY OF THE LABYRINTH REVIEWED IN RELATION TO SEASICKNESS AND OTHER FORMS OF MOTION SICKNESS. War Med. 2:683

3,360

McNally, W. J. 1947 THE PHYSIOLOGY OF THE VESTIBULAR MECHANISM IN RELATION TO VERTIGO. Ann. Otol. Rhinol. & Laryngol. 56:514-533

3,361

McNally, W. J. & E. A. Stuart 1955 AN ADDITIONAL FIVE-YEAR REVIEW OF SOME CASES OF VERTIGO REPORTED IN 1949.
Ann. Otol. Rhin. & Laryng. 64:519-536, June 1955.

3,362

McNey, Thomas John 1960 THE ELECTROENCEPHALOGRAM DURING POSITIVE ACCELERATION. (Master's Thesis: University of Southern California, Los Angeles) ASTIA AD-244 235; June 1960

ABSTRACT: The present investigation permits the following conclusions concerning the relationship between the EEG and the clinical state of the individual exposed to positive acceleration: (1) careful study of electrical, electrode and muscle artifact is necessary in order to evaluate properly the electrical activity recorded in the centrifuge environment; (2) given a prominent and particular form of alpha wave activity, it is possible to evoke an alpha wave response during blackout which may constitute an objective measure of blackout; and (3) individual differences, both in the resting EEG and in the EEG recorded during acceleration stress, make it difficult to reach general conclusions concerning the recorded electrical activity and the state of consciousness in the individual. (AUTHOR)

3,363

McNulty, C. F. 1962 SIMULATION TECHNIQUES FOR SPACECREW TRAINING, STATE-OF-THE-ART REVIEW (6570th Aerospace Medical Research Laboratories, Wright-Patterson AFB, Ohio) MRL-TDR-62-32; ASTIA AD-283 343; April 1962

ABSTRACT: The capabilities of the existing simulation technology are discussed and various government and industrial programs for the development of new techniques required for spacecrew training are described. These techniques are divided into categories and discussed in generalities and specifics. The category most

basic to the simulation of a system is the development of a suitable set of mathematical models for expressing its characteristics to the degree required. Existing equation techniques are based upon simplifications that are not valid for future type vehicles. Classical equations, although not complete, are too complex to be practical for complete simulation. Programs are discussed for the development of new coordinate schemes and generalized aero-dynamic and motion equations. The application of special and general purpose analog and digital computers to simulation problems are discussed, and the development of a real-time digital computer and hybrid analog-digital computers, which appear most promising for future simulation, is reviewed. The requirements for visual capabilities in future training simulation are presented. (AUTHOR)

3,364

McNutt, D. C., S. N. Morrill, A. B. Headley, & H. W. Ades 1963 THE ELECTRO-ENCEPHALOGRAPHIC FINDINGS IN PASSENGERS DURING ACROBATIC FLIGHT. Aerospace Medicine 34(3):218-321, March 1963

ABSTRACT: Three groups, namely, experienced, inexperienced and "clinical referrals" were studied while undergoing similar acrobatic sequence. The EEG, ECG, and moving pictures were recorded. Approximately fifty per cent of the "clinical" group were activated by this sequence, whereas only five per cent and fifteen per cent of the other groups were. Unconsciousness was accompanied by high voltage slow waves. These were most frequently found during a loop maneuver. The spiking and other phenomena normally correlated with epilepsy were not seen in any of these records.

From these findings it is concluded that the airborne recording of the encephalogram has a definite place in the workup of aviators who have had some incident of unconsciousness. It would also be of value as a baseline, and as an aid in selection of a small group of astronauts such as prior to space flight. (AUTHOR)

3,365

McPherson, A. E. 1952 THE MEASUREMENT OF FORCES ACTING ON A PILOT DURING CRASH LANDING.
Proc. Soc. Exper. Stress Analysis 9(2):159-162.

ABSTRACT: Instrumentation is described for the purpose of measuring the deceleratory forces to which a pilot is exposed during crash landing. As the commonly used decelerometers were inadequate for this purpose, two forms of a "crash dynamometer" were developed using the deformation of metal rings as a measure of acceleratory forces.

3,366

McPherson, A.E. 1948 THE MEASUREMENT OF FORCES ACTING ON PILOT DURING CRASH LANDING
In: Marcus, Henri et al, Shock and Vibration Bulletin No. 7, Naval Research Lab. Rept. No. S-3229, pp. 59-63. ASTIA ATI 75 153

ABSTRACT: This paper describes the development of a dynamometer for recording the maximum loads reached in a pilot's lapstrap and shoulder harness during a crash landing. The work is sponsored by the Airborne Division of the Bureau of Aeronautics as part of their program to determine the force acting on pilot restraining harness during a crash.

3,367

McRuer, D. T., I. L. Askenas, & E. S. Krendel 1958 A POSITIVE APPROACH TO MAN'S ROLE IN SPACE. (Systems Technology Inc., Inglewood, Calif.) 28 Nov. 1958

3,368

McShera, J. T. & J. W. Keyes 1961 WIND-TUNNEL INVESTIGATION OF A BALLOON AS A TOWED DECELERATOR AT MACH NUMBERS FROM 1.47 to 2.50. (National Aeronautics and Space Administration, Washington, D. C.) NASA TN D-919, Aug. 1961. ASTIA AD 261 700.

ABSTRACT: A wind-tunnel investigation has been conducted to study the characteristics of a towed spherical balloon as a drag device at Mach numbers from 1.4 to 2.50 Reynolds numbers from 0.36 times 10 to the 6th power to 1.0 times 10 to the 6th power, and angles of attack from -15 to 15 degrees. Towed spherical balloons were found to be stable at supersonci speeds. The drag coefficient of the balloon is reduced by the presence of a tow cable and a further reduction occurs with the addition of a payload. The balloon inflation pressure required to maintain an almost spherical shape is about equal to the free-stream dynamic pressure. Measured pressure and temperature distribution around the balloon alone were in fair agreement with predicted values. There was a pronounced decrease in the pressure coefficients on the balloon when attached to a tow cable behind a pay load. (Author)

3,369

McShera, J. T., Jr. 1963 AERODYNAMIC DRAG AND STABILITY CHARACTERISTICS OF TOWED INFLATABLE DECELERATORS AT SUPERSONIC SPEEDS. (National Aeronautics & Space Administration, Langley Research Ctr., Langley Station, Va.) NASA TN D-1601; N63-13716; Mar. 1963

ABSTRACT: A wind-tunnel investigation has been conducted to study the possibility of inflating balloon and cone devices to give the same drag and stability characteristics as their solid counterparts over the Mach number range from 2.00 to

4.65. The results include some effects of Mach number, tow-cable length, and inlet configurations on the drag and stability of these inflatable decelerators. Both the closed pressure-inflatable and self-inflatable (ram-air) decelerator configurations were fully inflated and had approximately the same drag and stability as their solid counterparts. The decelerator exhibits excellent stability in the supersonic wake region. The drag reaches a maximum and has little change with increases in tow-cable length when the decelerator reaches the supersonic wake region. (AUTHOR)

3,370

McSurely, A. 1952 GOOD SEATING ENGINEERING SAVES LIVES
Aviation Week, 24 Nov. 1952.

ABSTRACT: The importance of seat design and construction is exemplified by the analysis of an airplane crash involving a Convair 240 (in Flushing Bay near La Guardia Airport, New York, on January 14, 1952). The plane ditched in 15 ft. of water at a speed of about 135 mph., and a normal rate of descent of about 500 ft per minute. Peak decelerations in the range of 10 to 15 g were absorbed by hull and wings. Failure of some seat anchorages indicated that standard load specifications of 6 g forward, 6.6 g downward, and 1.5 g sideways were exceeded. Still, no major injuries were incurred by the passengers due to the resilient structure of seat backs and the firm anchorage of the seats. The following improvements are recommended: (1) seats which will stand 15 g loads; (2) seat backs of ductile metal that will cushion body or head shock; (3) firm anchoring of passengers to their seats with snugly tightened 3000-lb. load seat belts.

ACCELERATION

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3,371

Maaske, C. A. 1943 REPORTS OF THE COMMITTEE ON AVIATION MEDICINE, NATIONAL RESEARCH COUNCIL, ON RADIAL ACCELERATION AND ITS EFFECT ON THE HUMAN AND ANIMAL ORGANISM. (Wright Field) Memo Rept. ENG-M-49-696-36; 8 Apr. 1943

ABSTRACT: Report and summary of the third meeting of the subcommittee on acceleration, CAM-NRC, Washington, D. C., 29 March 1943.

3,372

Maaske, C.A. 1943 CONFERENCE ON ACCELERATION AT THE MONTREAL NEUROLOGICAL INSTITUTE. (USAAF, AMC, Aero Med. Lab., Wright Field, Ohio) ENG-49-696-4B, 14 June 1943.

ABSTRACT: Animal results obtained to date were reviewed by means of conferences, written reports, graphs and other illustrations; the most pertinent of which are summarized below.

a. The normal cardiac response during radial acceleration is a tachycardia superseded by a bradycardia on removal of the "g", provided no anti-"g" protection is employed. Failure to obtain a tachycardia indicates poor or depressed cardiac reflexes and as such is a grave sign. However, a bradycardia is often but not invariably seen during exposure to "g" with protection. The situation is altered here in the sense that the form of the electrocardiogram is the best index of the subject's cardiac condition. It was suggested that the Wright Field group continue electrocardiographic studies and employ a leg reference electrode in addition to the chest lead now used. This lead can be used successfully only on those subjects who can attain a satisfactory degree of muscular relaxation while exposed to "g".

b. The results of animal experimentation indicate that physiological events immediately following "g" exposure are as significant as results obtained during radial acceleration. Furthermore, these events vary with the duration of the "g" exposure. The important indices include changes in blood pressure, in electrocardiogram, in electroencephalogram, and in respiration. Therefore, it appears necessary to make all centrifuge studies conform in time relationship to flight maneuvers. Wright Field centrifuge studies are so designed.

3,373

Maaske, C. A., G. A. Hallenbeck, & E. E. Martin 1944 EVALUATION OF ANTI-"G" SUITS. (Wright Field) Rept. No. 4; Eng-49-696-51D; CAM No. 348; 10 June 1944

ABSTRACT: The efficacy of a single pressure pneumatic suit (G-2) was compared with that of a gradient pressure suit (g-1) with a view to lightening and simplifying anti-"g" protection. The G-1 suit plus oil filter and valve weighs 15.5 lbs the G-2 assembly weighs 8.5 lbs.

In the G-2 the oil filter has been removed and the abdominal bladder simplified. It is pressurized at 1 psi/"g" for values of "g" over 2. There are one abdominal, 2 calf, and 2 thigh bladders. Air is metered to the suit by a 2 unit single pressure "g" activated valve. Pressure source is the positive pressure side of the B-12 vacuum instrument pump rotating at 3,000 rpm and working on -5 inches Hg intake.

Twenty experienced subjects who tested the G-2 by 10 second exposures on the centrifuge obtained an average protection of 1.2 "g" against visual dimming and peripheral light loss and of 1.9 "g" against blackout. This compares favorably with the performance of the G-1 suit.

3,374

Maaske, C. A., A. L. Roach, E. E. Martin & G. L. Maison 1944 EVALUATION OF ANTI-G SUITS.
(USAAF, AMC, Wright Field, Ohio) TSEAL-3-696-51-F; Rept. No. 6; 16 Nov. 1944.

ABSTRACT: (a) Tests have been made on the Wright Field centrifuge of efficacy of the G-3 (cutaway) and G-4 (coverall) anti-"g" suits. Eleven subjects tested the G-3, 10 subjects the G-4. Protection was determined relaxed with maximum "g" lasting 10 seconds.

(b) Protection offered was as follows:

Graying	1.0 "g"	1.0 "g"
Peripheral light loss	1.05"g"	1.14"g"
Blackout	1.26 "g"	0.9 "g"

(c) The G-3 is pressurized at 0.86 psi per "g" in maneuvers exceeding 2 "g". The G-4 is pressurized at 0.88 psi/"g". The slightly greater protection against blackout offered by the G-3 is though to be due to the better fit obtained with adjustable lacings, which are not incorporated in the G-4.

(d) The G-3 has been reported to offer 2 "g" protection in planes, quite adequate for the aircraft now being flown.

3,375

Maaske, C. A., G. L. Maison, & G. A. Hallenbeck 1945 PATTERN OF HUMAN CARDIAC RESPONSE TO CENTRIFUGAL FORCE. Abstract: Federation Proceedings 4(1):48, March 1945

ABSTRACT: Man is admirably adapted for life on a planet where the normal force of gravity is as it is on earth. If he is seated, his circulatory system is

adequate in most cases to maintain his sensorium alert at three times normal gravity. The primary mechanism by which this is accomplished seems to be increased cardiac rate.

Centrifugal force has been used to simulate multiplication of normal gravity. At the highest force level which over a ten second exposure did not produce visual changes the average increase in cardiac rate in 47 subjects was 27.42 per minute with a range from 13 to 47. At force levels which abolished peripheral vision heart rate rose (average) 31.65 per minute (range 3 to 53) in 47 subjects. When force was adequate to abolish central vision cardiac rate rose 34.11 per minute average (range 14 to 66) in 44 subjects. When the force is rapidly withdrawn at the end of the 10 seconds a bradycardia is the rule with strong "vagal" beats. On the other hand continuance of these force levels beyond 10 seconds permits recovery of symptoms without accompanying further rise of cardiac rate.

3,376

Maaske, C. A. 1945 THE HOURLY VARIATION OF HUMAN "G" TOLERANCE AND THE EFFECT OF BENZEDRINE MEDICATION.
(USAAF Air Tech. Serv. Com., Aero Med. Lab., Wright Field, Ohio) Memo Rept. TSEAL 3-696-4F, 18 Sept. 1945.

ABSTRACT: Determination that repeated exposures of (10 seconds duration each) to radial acceleration throughout the course of eight hours has no appriciable effect on the subjects's 'g' tolerance, and that a single oral dose of 10 mgm. benzedrine sulfate did not cause a significant change in "g" tolerance of any subjects studies.

3,377

Maaske, C. A. 1946 HUMAN TOLERANCE TO CENTRIFUGAL FORCE REPEATED HOURLY THROUGHOUT THE DAY
Federation Proceedings 5:68.

ABSTRACT: Following repeated exposures to high radial accelerations, either in a human testing centrifuge or in aircraft, some personnel may complain of varying degrees of fatigue (subjective). To determine whether such repeated physiologic stresses had any effect upon the individuals G-tolerance per se; 8 young men, who had a known G-tolerance history of many months, were given complete G-tolerance assays at intervals of 45 minutes to an hour throughout the normal working day on the Air Technical Service Command human testing centrifuge. This series of assays also served as a control in a benzedrine medication study.

The standard AAF technique was used to determine the highest acceleration tolerated with retention of clear vision in a ten second interval. Likewise the lowest accelerations which produced dimming, narrowing and complete loss of vision (blackout), and in some cases loss of consciousness were determined in ten second exposures.

Complete abolition of vision was lost at 4.8 Grams with a range from 3.6 to 7.2. There was no significant difference in any of the values for the various symptom levels either individually or collectively throughout the series of repeated hourly exposures for an entire day.

3,378

Mackie, R. R., L. Morehouse, & D. A. Clegg 1956 MEASUREMENT OF FORCES AFFECTING HUMAN BODIES IN AIRCRAFT ACCIDENTS. (Human Factors Research, Inc., Los Angeles, Calif.) Contract Nonr-152700, Rept. No. TR-2, Feb. 1956. ASTIA AD 93 351

ABSTRACT: A study has been conducted to develop a method for recording deceleration forces in airplane crashes. To do this, accelerometers were placed in drone aircraft used by the Navy for missile evaluation. The accelerometers, which are self-actuating, were mounted in the seats of drone aircraft immediately prior to take-off. The accelerometer design is such that upon being stimulated with a force of 8 g or more, the accelerometer starts, and continued recording the pattern of forces for a period of 8 seconds. In this manner it was possible to obtain a record of both the magnitude and the pattern of g forces with respect to time, for the duration of the crash.
This report presents the findings of two airplane crashes which were similar in nature. Both airplanes crashed during landing striking the runway nose down, at approximately the same angle. The severity of the two crashes differed somewhat, but in the main, they were the same kind of crash. This report contains the results of the crashes, the summary of accelerometers records and recommendations for future research. (CARI)

3,379

Maciolek, J. A. 1955 CIRCULATORY REFLEX ACTIVITY AS A G-PROTECTIVE DEVICE. (Aero Medical Lab., Wright Air Development Center, Wright-Patterson AFB, Ohio) Report No. WCRD-55-1. Jan. 1955. ASTIA AD 75 056.

ABSTRACT: The response on the human centrifuge of 7 seated subjects to positive accelerations of normal rapid onset (1 g/sec) was compared with their tolerance in runs having 0.07 to 0.1 g/sec rate of onset. The

approximate blackout threshold of the group was 3.7 g for the standard runs. The runs of slow onset attained 6.2 g before equivalent symptoms occurred. The 2.5 g difference in symptom level is a measure of the response of the various hemostatic mechanisms tending to sustain blood pressure in man exposed to a gravitational stress which is acting from head to foot. The technique seems to be a simple and practical method of evaluating the activity of the protective reflexes in different persons and in the same person under varying conditions.

3,380

Mackie, R.R., L. Morehouse, D.A. Clegg 1956 A STUDY OF THE CRASHES DURING LANDING OF TWO INSTRUMENTED F6F DRONE AIRCRAFT (Human Factors Research, Incorporated Los Angeles, California) February 1956, ASTIA AD-93352

ABSTRACT: A study has been conducted to develop a method for recording deceleration forces in airplane crashes. To do this, accelerometers were placed in drone aircraft used by the Navy for missile evaluation. The accelerometers, which are self actuating, were mounted in the seats of drone aircraft immediately prior to take-off. The accelerometer design is such that upon being stimulated with a force of 8 g or more, the accelerometer starts, and continues recording the pattern of forces for a period of 8 seconds. In this manner it was possible to obtain a record of both the magnitude and the pattern of g forces with respect to time, for the duration of the crash.
This report presents the findings of two airplane crashes which were similar in nature. Both airplanes crashed during landing, striking the runway nose down, at approximately the same angle. The severity of the two crashes differed somewhat, but in the main, they were the same kind of crash. The principal findings and summary of accelerometer records are presented in this report.

3,381

Mackworth, N.H. 1950 RESEARCHES ON THE MEASUREMENT OF HUMAN PERFORMANCE. (His Majesty's Stationery Office, London) Med. Res. Council, Special Rep. Ser. No. 268.

3,382

Macrae, D. 1960 THE NEUROLOGIC ASPECTS OF VERTIGO: ANALYSIS OF 400 CASES. Calif Med. 92:255-9, April 1960

3,383

Madson, R. A. 1957 HIGH ALTITUDE BALLOON DUMMY DROPS. PART I. THE UNSTABILIZED DUMMY DROPS.
(Wright Air Development Division, Wright-Patterson AFB, Ohio) WADD TR 57-477. ASTIA AD 130 965

ABSTRACT: The characteristics of instrumented dummies carried aloft to predetermined altitudes were studied during the free fall in unstabilized situations. These dummies were observed to assume an attitude permitting spins about a transverse axis, and the angular velocities recorded on accelerometers exceeded rates compatible with human tolerance. This study justifies further tests to develop a method of stabilizing a man descending from high altitudes.

3,384

Madson, R.A. 1961 HIGH ALTITUDE BALLOON DUMMY DROPS. II. THE STABILIZED DUMMY DROPS. (Aerospace Medical Lab., Wright-Patterson AFB, Ohio) WADC TR 57-477, Aug. 1961. ASTIA AD 270 880.

ABSTRACT: A study was conducted to develop a means of eliminating body tumbling, spinning, and rotation which are inherent in a long free-fall from extremely high altitude. Dummy men, wearing seat-style instrument kits and stabilization parachute assemblies, were carried to altitudes between 30,000 and 98,000 feet. They were released from the balloons by radio-command, and the instrument kits recorded effectiveness of the parachutes and movements of the dummies. The tests proved that an effective means of stability could be provided and that live jumps could be made safely from high altitude with the parachute developed during this program. (Author)

3,385

Maekawa, M. et al. EXPERIMENTAL STUDY ON AVIATION MEDICINE. II. ACCELERATION. Kokuigaku, 2:149, 1944.

ABSTRACT: Electrocardiogram for fur seal during receiving positive 6 G for 10 to 30 seconds. Pulse rate increasing, augmentation of P wave and depressed ST segment was observed. The compression of abdomen by appropriate band diminished the findings.

J., Jr. 1948 HUMAN TOLERANCE TO NEGATIVE G IN AIRCRAFT. Materiel Command, Wright-Patterson AFB, Ohio) MCREXD 695-69B, 19 1 1948. ASTIA AD 126 361; ASTIA ATI 26 477.

: Subjective sensations in humans resulting from exposures to negative tions up to 3.6 g of 7 sec duration in A-24 aircraft are described. A ee to 50 degree dive was started from 11,000 ft. and sustained until a speed of from 360 to 380 mph was reached (6000 - 7000 ft); the aircraft was then leveled out, inverted, and abrupt forward pressure applied to the stick, causing the aircraft to climb vertically, Each subject was exposed to at least 5 negative runs and as high as 17 runs. The discomfort experienced in the aircraft was similar to or less than experienced on the centrifuge. The phenomenon known as "red-out" was not observed. It was demonstrated that a human subject may safely tolerate 3.6 negative g for 7 sec. (ASTIA)

3,387

Maier, E. 1943 LATERAL STRESSES ON AIRCRAFT UNDERCARRIAGES. (Lilienthal Gesellschaft, Rept. No. 169, 1943, pp. 19-27) RAE Translation No. 277.

3,388

Main, R. J. 1937 ALTERATIONS OF ALVEOLAR CO_2 IN MAN ACCOMPANYING POSTURAL CHANGE. Amer. J. Physiol. 118:435-440

3,389

Mains, R.M. 1961 STRUCTURAL RESPONSE TO DYNAMIC LOAD. In: Shock, Vibration and Associated Environment Bulletin No. 30 (Office of the Secretary of Defense, Washington, D.C., January 1962) pp. 66-84, ASTIA AD 273 514

ABSTRACT: This paper represents an attempt to generalize the problem of calculating responses to random vibration and shock into a set of simple principles, which are sufficient to produce numerical solutions to practical problems.

Within the limitations of superposition and linearity, there are no restrictions on the recipes given so that the methods are general. The use of a digital computer with narrow frequency or time intervals leads to solutions as precise as desired, yet the numerical summations can be done by slide rule or hand computer and still give acceptable results. The related subjects of load definition and damage evaluation are discussed so that the prediction of structural response is placed in a proper frame of reference.

3,390

Maison, G. L. 1943 CONFERENCES AND TESTS AT THE CENTRIFUGE OF THE MAYO AERO MEDICAL UNIT.
(USAAF, AMC, Wright Field, Ohio) ENG-49-660-11y, 24 April 1943.

ABSTRACT: Report of conference held by Army representatives, Mayo Clinic group, and suit manufacturers. The difference between types of acceleration encountered in centrifuges and planes is explained.

3,391

Maison, G. L., C. A. Maaske, & E. E. Martin 1943 DESCRIPTION OF THE MATERIEL COMMAND HUMAN CENTRIFUGE, TECHNIQUES EMPLOYED THEREWITH AND RESULTS OF STUDIES OF NORMAL G-TOLERANCE OF HUMAN SUBJECTS. (Wright Field, Dayton, Ohio) Rept. No. ENG-49-696-4D, 11 Oct. 1943

ABSTRACT: (a) The Wright Field centrifuge, which was placed in operation 15 March 1943, is driven by a 180 HP motor driven in turn by a 250 HP AC-DC motor generator set. Automatic control is provided by a photoelectric scanning device. The safety factor is 3, and failure of any part of the driving mechanism or opening of the doors to the centrifuge room automatically stops the centrifuge. The system of signal lights and the recording mechanism are described.
(b) Standard operating procedure is given. For 10 second exposures the following average thresholds have been determined in 772 centrifuge runs on 35 normal male subjects:

Clear vision	4.0 "g"
PLL	4.5 "g"
Blackout	5.0 "g"

3,392

Maison, G. L. & E. E. Martin 1943 HUMAN PICK-UP.
(USAF, AMC, Wright Field, Ohio) ENG-49-696-53, 8 October 1943.

3,393

Maison, G. L., C. A. Maaske, G. A. Hallenbeck & E. E. Martin 1943 THE EFFECT OF TAPING THE BODY ON "G" TOLERANCE IN MAN.
(National Research Council, Committee on Aviation Medicine, Washington, D. C.) CAM Rept. No. 204; 29 Sept. 1943.

ABSTRACT: It has been reported that Japanese pilots sometimes tape their bodies to increase their "g" tolerance. In 416 10-second centrifuge trials on 18 subjects, taping the body with 2 and 4 inch Ace bandage from the ankles to the xiphoid process and from the axillae to the wrists gave the following protection:

Clear vision	0.8 "g"
Grayout	0.5 "g"
Peripheral light loss	1.2 "g"
Blackout	1.1 "g"

Unavoidable variations in tightness of bandages produce very variable results. The process is exceedingly uncomfortable and time consuming and is not considered practical.

3,394

Maison, G.L. 1944 EVALUATION OF ANTI-G SUITS.
(USAF, AMC, Wright Field, Ohio) Rept. No. 3, ENG-49-696-51C, CAM No. 309, 18 April 1944.

ABSTRACT: A total of 22 Berger Bros pneumatic gradient pressure suits and 22 hydraulic Franks flying suits were flight tested by 26 pilots of the 9th Air Force in P-47 and P-51 aircraft, Complete visual protection was obtained with both suits.

Eighty per cent of the pilots thought anti-"g" protection desirable in P-51 aircraft but only about 40 per cent thought it necessary in P-47's, probably because the latter planes are less maneuverable. Protection was especially desired for combat flying.

Of the 17 pilots who tested both types of suit, 11 preferred the GPS, one the FFS, and 5 had no preference. The GPS was preferred because it is lighter, less cumbersome, can be worn over ordinary clothing, fitting is less critical, and it does not need to be serviced with water prior to take off.

3,395

Maison, G. L. 1944 REPORT TO THE AIR SURGEON ON STATUS OF ANTI-G DEVICES AS OF 25 March 1944.
(Wright Field, Ohio)

ABSTRACT: Simplification of the three pressure GPS suit (G-1) into the one pressure (G-2) suit is reported. Service tests in the ETO have been performed and are reported.

3,396

Maison, G. L., & C. A. Maaske 1944 EVALUATION OF ANTI-G SUITS. REPORT NO. 5 (TO REPORT THE STATUS OF ANTI-"G" DEVICES FOR FIGHTER PLANES IN THE VARIOUS THEATERS). (Wright Field) Eng-49-696-51E-1; 11 Aug. 1944

ABSTRACT: Two models of the anti-"g" suit have been shown to be necessary, a cut-out suit (G-3) consisting only of the cloth covered bladders to be worn with regular officer's clothing in cold climates, and the G-4, a very light weight coverall for wear in tropical localities where a minimum of clothing is desirable. G-suits are now optional in the 9th Air Force for P-47's and P-51's; they are mandatory in the 8th AAF for P-51's.

The G-3 is a cut-out G-2 (single pressure) suit. Comparative weights:

G-2 suit.....6 lbs.
G-2 plane installation .....4 lbs.
G-3 suit.....2¼ lbs.
(Plane installation interchangeable with G-2).

The G-4 coverall is made of rayon marquisette; probably is too porous to protect against sunburn. (NB this has been replaced by solid weave nylon at a later date) Total number of "g" suits delivered to date is 3500. 6600 are on order.

Photographs of G-1, G-2, and G-4 suits are included.

3,397

Maison, G.L., C.A. Maaske, G.A. Hellenbeck & E.E. Martin 1945 ACCELERATION AND G SUIT. Air Surgeon's Bull. 1:3-7, Jan. 1945.

3,398

Maison, G. L., C. A. Maaske, & E. E. Martin 1945 SENSORY EFFECTS OF CENTRIFUGAL FORCE ON MAN WHEN SEATED. Fed. Proc. 4(1):48, March 1945.

ABSTRACT: As of 1 January, 1945, 276 persons have been exposed to centrifugal force on the AAF human centrifuge during its 19 months in operation. The character of the exposures involves a rigid pattern in which the centrifugal force is brought as rapidly as possible to the peak force desired, maintained at that level for 10 seconds, and withdrawn as rapidly as possible. The actural rate of rise of force is between 2 and 3 gravitational units per second.

The outstanding sensory effects of centrifugal force on man are visual. Subthreshold levels averaged 3.4 gravitational units with a range from 2.6 "g" to 4.9 "g". Peripheral vision dimmed on the average at 3.9 "g" with a range from 2.8 to 5.2. Peripheral vision was lost at 4.5 "g" (average), range 3.1 to 6.6. Central vision was lost at 5.0 "g" range 3.2 to 7.0. Complete abolition of sight and hearing occurred at 5.6 "g", range 4.0 to 7.0. Prolongation of a given force level beyond 10 seconds if it does not cause unconsciousness usually results in a recovery of the sensorium to a greater or lesser degree.

3,399

Maison, G. L. & K. E. Penrod 1945 COMPARISON OF SHOCK FORCES AT OPENING OF SILK AND NYLON PARACHUTES AT VARIOUS ALTITUDES.
(USAF, Wright Field, Ohio) TSEAL-3-696-661, 20 July 1945.

3,400

Maison, G. L., K. E. Penrod & Hall 1945 DESCENT TIMES OF 200-POUND DUMMIES WITH 28-FOOT SILK, 28-FOOT NYLON AND 24-FOOT NYLON PARACHUTE.
(USAF, Wright Field, Ohio) TSELA-3-696-66H, 30 May 1945.

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Maison, L. PARACHUTE SHOCK FORCES.
Air Surg. Bulletin, 2:350

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Maitland, T.G. 1931 GENERAL OBSERVATIONS ON SEA-SICKNESS AND THE LABYRINTHINE THEORY. Brit. med. J., 1:171-176

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Majer, E. H. 1961 UBER DIE DREHNACHEMPFINDUNGSDAUER (Concerning the Duration of the Postrotatory Sensation)
(Trans. of Arch. f. Ohren.-Nasen.-Kehlkopfheilk. 149:210-218, 1941.)
(SLA Translations Center, Chicago, Ill.) 61-14306.

3,404

Makarchenko, A. 1962 BIOLOGICAL PROBLEMS IN ASTRONAUTICS
(In: "Medical and Biological Aspects of USSR Space Flights", Joint Publications Research Service Translation No. 16,277. ASTIA AD 400 411
Original Source: Russian newspaper, Meditsinskiy rabotnik, 17 August 1962, P. 3

ABSTRACT: The flight of a man into outer space, beyond the ordinary atmospheric shell of the earth, can be effected only by using a space rocket. In this connection much still remains to be done, not only by engineers, astraonomers, designers and astrophysicists but also biologists, physiologists and medical personnel. It is necessary to perfect a whole system of medical and biological measures to assure safety on such long flights. The most serious medicobiological problems are those of acceleration, weightlessness, the effect of cosmic, ultraviolet and x-rays, variation in heat exchange, vibration, etc.

3,405

Makarov, A. 1961 [GREEN LIGHT FOR SPACE FLIGHTS]
Tekhnika molodezhi 1961(9):20-23

ABSTRACT: The article contains data on developments in the conquest of space. Yuriy Gagarin is mentioned and some well-known details of German Titov's flight, his behavior and physical reactions during flight and his landing by parachute are given. Titov's working efficiency during flight was excellent and while sleeping his pulse rate was 58 strokes per minute. In the section "Space Calls", the author mentions some serious injuries which may befall the human body in space vehicles due to its increase in weight during acceleration and deceleration of the space vessel. The blood may accumulate in the legs or in the head, the heart may become bloodless, and the vessels may burst. The most comfortable position for the astronaut during flight has already been established in ground laboratories. Practice has proved that the organism is able to endure the acceleration force created by a 20 million h.p. engine and the change from acceleration to the state of weightlessness without any harmful effects. Within a 25-hour flight Titov covered a distance of 700,000 km which is equivalent to a two-way flight between the earth and the moon. The author is convinced that in the near future space vessels will land on the moon and flights to Venus and Mars will become reality.

3,406

Makino, R.C. 1956 AN APPROXIMATION METHOD IN BLAST CALCULATIONS (Ballistic Research Labs., Aberdeen Proving Ground, Md.) proj. no. TB2-0001; BRL Memo. rept. no. 1034; Feb 1956, ASTIA AD-114 875

ABSTRACT: A heuristic study is made of reducing the system of partial differential equations describing blast waves to a system of ordinary differential equations by

the imposition of approximating constraints on the flow. The procedure is illustrated for plane, cylindrical, and spherical blast waves only. Boundary and initial conditions are satisfied up to the order of approximation. The analysis includes equations of motion, constraints and shock-front conditions. The shock-line is calculated, and from it, the remainder of the flow field is determined. The analysis assumes continuity in the flow field through n+1 derivatives, when n is the differential order of the constraint function. Several applications are made to illustrate the approximation method. No analysis is made of errors introduced by the constraint, and the sufficiency conditions on the constraint are not examined.

3,407

Makuuchi, S and K. Iwabuchi 1944 A FEW EXPERIMENTS ON CENTRIFUGAL TOLERANCE. Kokuigaku, 2(1,2):163, Aug. 1944.

ABSTRACT: Tolerance of positive and negative G stress (83 to 85G) and changes of body weight between the malnutritious young mice and control group.

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Malcik, Vladimir 1957 LETADLOVA NEMOC. (Air Sickness) Vojenske zdravotnicke listy 26 (10):459-467, Oct. 1947. In Czech.

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Malcik, Vladimir, 1958 ILUSE ZA LETU (Illusions While Flying) Vojenske zdravotnicke listy 27, Suppl. 3:19-26, 1958.

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Malkin, V. B. 1957 ISUCHENIE SERDECHNOI DEIATEL 'NOSTI PRI DEISTVII RADIAL' NYKH USKORENII (Studies on Cardiac Function in Radial Acceleration.) Voen. med zh. (Moskva) (9):57-61, Sept. 1957.
Translation, (Joint Publications Research Service, Washington, D. C.) JPRS L-1724-D.

3,411

Malkin, V. 1958 PHYSIOLOGICAL INVESTIGATIONS IN THE UPPER ATMOSPHERE. Meditsinsky Rabotnik (Medical Worker) September 5, 1958

ABSTRACT: The creative genius of Soviet scientists is continuously advancing and opening up new vistas. Recently, the latest achievement broadcast throughout the world was the launching of a single-stage, 1,690 kilogram geophysical rocket by Soviet scientists. The rocket carried a hermetically-sealed cabin containing two experimental dogs, "Belyanka" and "Pestraja,". During take-off, when the animals inside the rocket were subjected to back to chest acceleration, an increase in pulse frequency was noted in all animals. During the period of weightlessness, the pulse frequency decreased, and increased again after the parachutes opened up and animals were subjected to deceleration. No substantial change was noted in the behavior of experimental animals under conditions of weightlessness. Examination of moving picture films revealed a sharp rise of the head during weightlessness. This apparently was due to the fact that the tonus of extensors of the neck and back ceased to be in conformity with the force of gravity. During the first few minutes of weightlessness, the blood pressure, pulse frequency, and respiration in the dogs remained high and became normal only after a lapse of 4-6 minutes. The Soviet researchers came to the conclusion that the G-forces create the most adverse effect on the organism during deceleration of the detachable part of the rocket. (CARI)

3,412

Malkin, V. 1958 MEDICO-BIOLOGICAL INVESTIGATIONS ON ROCKETS. Sovet. Aviat. (USSR) Sept. 9, 1958 (Air Technical Intelligence Ctr., Wright-Patterson AFB, Ohio). Rept. No. ATIC-IR-1613-58

ABSTRACT: This paper discusses the flights of dogs in non-hermetic chambers up to altitudes of 110 km, and in hermetically sealed cabins to an altitude of 212 km.

3,413

Malkin, V.B. 1959 PROBLEMS OF BIOLOGY IN COSMIC FLIGHT (TSIOLKOVSKII'S CONCEPTS HAVE BEEN TRANSFORMED INTO REALITY). Trans. of Priroda (USSR) 48(10):35-44, 1959 (SLA Translations Center, Chicago, Ill.) 60-11516. See also (Joint Publications Research Service, Washington, D.C.) JPRS 2531.

3,414

Malkin, V. 1959 A SIGNIFICANT STAGE IN THE EXPLORATION OF OUTER SPACE
Sovetskaya Aviatsiya (Moscow) 259(3429):4- , Nov. 3, 1959

ABSTRACT: This article states that the next step in space exploration will consist of attempts to probe the space around the sun. Layka, the experimental dog aboard the ship, was subjected to the simultaneous action of acceleration, vibration, and noise during the take-off. The animal was situated in the cabin in such a way that acceleration acted from chest to back. Although the dog was pressed against the floor of the cabin during the entire period of acceleration, it did not show any noticeable effects. The pulse frequency increased immediately after take-off, possibly due to the effects of intense noise and vibration. The frequency of the pulse beats subsequently decreased; the electrocardiogram showed that the heart activity remained normal despite acceleration. (CARI)

3,415

Malcik, V. 1961 OTAZKY KOSMICKEHO LEKARSTVI (Problems of Space Medicine)
Tvorba (Prague) 26(17):387-388, 27 April 1961, (in Czech.).
See Also; U. S. Joint Publ. Research Service, Washington, D. C., Trans. no. 4717 (1842-S), 22 June 1961.
Also (Office of Technical Services, Washington, D.C.) 62-19362.

ABSTRACT: Some of the physiological problems of space flight are reviewed. Vibrations of high amplitude cause general fatigue, create disturbances of the autonomic nervous system, vision, and hearing. To raise tolerance to acceleration, the space ship may be equipped with an anti-g capsule which rotates, keeping the astronaut transverse to the direction of acceleration. Weightlessness does not interfere with vital functions, e.g., respiration, heart rate, blood pressure, but it has a disturbing effect on coordination of movements and orientation in space. A different composition of the cabin atmosphere from that of earth is considered; it may consist of 60% oxygen, 20% helium, and 20% nitrogen. The high oxygen content will permit reduction of cabin pressure, and together with helium, avert some of the consequences of explosive decompression. Other problems result from the effects of accumulation of carbon dioxide, radiation, isolation, and disturbance of the diurnal rhythm. Sanitation problems to be solved include hygiene of skin and clothing, elimination, and disposal of wastes.

3,416

Mallan, Lloyd 1955 MEN, ROCKETS AND SPACE RATS
(New York: Julian Messner, 1955)

ABSTRACT: The accomplishments in rocket technology, which made possible the

announcement of a planned earth satellite, are brought together in terms of the men who are pioneering in the design and testing of rocket ships and are risking their lives as the guinea pigs of space medicine to determine the effects of space flight upon human beings.

3,417

Mallan, L. 1956 SECRETS OF SPACE FLIGHT
(Greenwich, Conn.: Fawcett Publications, Inc., 1956). (Fawcett Book No. 298)

ABSTRACT: A photographic account is presented of rocketry and space flight. Subjects covered include studies in space medicine; escape capsules and rocket sleds; development of the space suit; launch into the stratosphere; training of space pilots, and research rocket takeoff.

3,418

Malassez, J. 1930 DE LA PERCEPTION DES ACCELERATIONS ANGULAIRES DANS LE MAINTIEN DE L'EQUILIBRE ET D'UNE FORME PARTICULIERE DE VERTIGE DE ROTATION (The Perception of Angular Acceleration in the Maintenance of Equilibrium and a Particular Form of Vertigo of Rotation)
Bulletin de la Société philomathique de Paris (Paris) 19: 37-55

3,419

Malmgren, B. & T. Holme 1961 [CONSTRUCTION OF A HORIZONTAL-ROTOR CENTRIFUGE.] (Karolinska Inst., Stockholm, Sweden)
Contract DA 91-591-EUC-1619, November 1961. ASTIA Doc. No. AD-270 204L.

ABSTRACT: The basic ideas which had only been tested on a small aluminium model were use d as the basis for the construction of the big apparatus shown in the attached drawings. A number of difficult mechanical problems were analysed and solutions were adopted which would permit occasional runs at 25.000 g. For normal operations it was decided that 20.00 g would probably be sufficient, considering the rapid acceleration and short travelling distance of the particles. The principle of the apparatus are summarized.

3,420

Maloney, J.A., & F.G. Richardson 1961 TESTS OF A LIFE SUPPORT SYSTEM UNDER SIMULATED OPERATING CONDITIONS. In 1961 Proceedings of the Institute of Environmental Sciences National Meeting, April 5, 6, 7, 1961, Washington, D.C. (Mt. Prospect, Ill.: Institute of Environmental Sciences) Pp. 379-394

ABSTRACT: As an initial step in man's exploration of space the McDonnell Aircraft Corporation under the sponsorship of NASA has developed a "space capsule" complete with all necessary controlling systems for orbital flights about the Earth. This project, known as Project Mercury, is to place a man in orbit approximately 100 miles above the earth and return him safely. Time required for one orbital revolution will be approximately 90 minutes and the first orbital flight will consist of three orbits making a total flight time of four and one half hours. A primary requirement for a successful orbiting mission is the satisfactory operation of a Life Support System. In addition to the basic requirement to sustain the Astronaut in this flight, there will be periods of "on-the-pad" time prior to launching and "in the ocean" time after re-entry during which the system must provide for the Astronaut's safety and comfort. The satisfactory operation of the life support system of spacecraft must be assured before man can safely venture beyond his normal environment. Complete system operation under conditions as nearly like those expected to be encountered is one means of evaluating design adequacy. A program for evaluating and demonstrating operation of the Environmental Control System of the Capsule Mercury was conducted in McDonnell's Systems Laboratory.

The system test installation, instrumentation, methods of simulating essential capsule environments, test procedures, safety precautions, and medical monitoring instrumentation and methods are described. The basic program for system demonstration is outlined and a brief evaluation of the test installation is presented. (Author)

3,421

Mammen, R. E., G. T. Critz, D. W. Dery, F. M. Highly, & E. Hendler 1963 EFFECTS OF SEQUENTIAL EXPOSURE TO ACCELERATION AND SPACE CAPSULE ATMOSPHERIC CONDITIONS (Paper, 34th Annual Meeting of the Aerospace Medical Association, Statler-Hilton Hotel, April 28 - May 2, 1963)

ABSTRACT: A study was conducted to determine the physiological suitability of a proposed space capsule atmosphere. Six subjects were each exposed to typical launch and re-entry acceleration profiles. Between exposures to acceleration, each subject spent 14 days at a simulated altitude of 27,000 feet breathing 100 per cent oxygen. Frequent determinations were made before, during and after the 14-day confinement period to assess the physiological status of the subjects. Blood and urine constituents, including arterial gas tensions, pulmonary, and cardiac activity were closely monitored. Performance was measured at regular intervals using a specially designed task. The results of these measurements are presented and discussed. (Aerospace Med. 34(3):260, Mar. 1963)

3,422

Managan, Richard F., James W. Brinkley, George Lokatos & Robert N. Headley
1960 HUMAN FACTOR RESPONSES DURING GROUND IMPACT
Paper: 31st Annual Meeting of the Aerospace Medical Association, Americana Hotel, Bal Harbour, Miami Beach, Fla., May 9-11, 1960

ABSTRACT: This research effort was undertaken to establish human factor and design parameters of restraint systems and impact attenuators for future manned space flight. The Inclined Test Facility at the Wright Air Development Center is presently being used to simulate vertical impact conditions as experienced in the soft landing of aerospace vehicles. (Soft landing velocities do not exceed 45 ft./sec.) The facility has a capability for simulating soft landings utilizing vehicles weighing up to 30,000 pounds at velocities up to 45 ft./sec. vertical and 60 ft./sec. horizontal velocities. Data gathering techniques have consisted of: oscillograph recordings from accelerometers mounted within the vehicle and on the subject, high speed motion picture coverage, electrocardiogram prior to, during and immediately following impact, a complete physical examination preceding and following each experiment, and accessory laboratory analysis. Vertical accelerations up to 38 G's at the rate of onset of 12,000 G/sec. and duration of .003 sec. have been recorded from accelerometers mounted on the human subjects. To date, a total of thirty-six experiments have been conducted with human subjects. These experiments have been eupplemented by a series of twenty-eight control tests utilizing fully articulated anthropomorphic dummies. Information gained from this research effort will be applied to all future restraint and impact attenuator requirements for manned aerospace vehicles.

3,423

Mandel, M.J. 1962 EFFECT OF SINUSOIDAL VERTICAL VIBRATION ON THE URINARY SEDIMENT IN MAN. (6570th Aerospace Medical Research Lab., Aerospace Medical Division, AFSC, Wright-Patterson AFB, Ohio)
Report No. MRL-TDR-62-63, June 1962. ASTIA AD 283 844.

ABSTRACT: Experiments were conducted to determine whether sinusoidal, low frequency vertical vibration for 1 minute at subjective tolerance levels could produce renal damage. Two groups of vibrated sitting subjects (frequency, 4 to 9 cps) were compared to a control group which had never been exposed to vibration experiments. One group had long experience, varying from 6 months to 2 years, with experimental sinusoidal vibration at subjective tolerance levels. The other group was experiencing its first shake at high levels (near subjective tolerance). No difference could be detected in the urinary sediment between the two experimental groups or between the vibrated groups and the control subjects. Although the data does not indicate renal damage, it might have occurred if the vibrations had been continued for a longer time period.

3,424

Mandel, M. J., & R. D. Lowry 1962 ONE-MINUTE TOLERANCE IN MAN TO VERTICAL SINUSOIDAL VIBRATION IN THE SITTING POSITION. (6570th Aeromedical Research Labs., Wright-Patterson AFB, Ohio) AMRL-TDR-62-121

ABSTRACT: One-minute subjective tolerance in man to sinusoidal vertical vibration was determined in the sitting position. In comparing the data to previously published information, we noted that, although the new levels were higher, the contour of the curve remained unchanged. The reasons for this difference, as well as specific subjective complaints leading to tolerance, are presented and discussed. (AUTHOR)

3,425

Mandel, M.J., F.R. Robinson, and E.A. Luce 1962 SGOT LEVELS IN MAN AND THE MONKEY FOLLOWING PHYSICAL AND EMOTIONAL EXERTION. Aerospace Med. 33(10):1216-1223, Oct. 1962.

ABSTRACT: Ten students and four instructors observed the nature and duration of their after-sensations following the cessation of a 45° banked turn at 90 knots in a Chipmunk Aircraft.

Observations were made under three conditions: (a) eyes closed, (b) eyes open u under an instrument hood, and (c) eyes open with attention directed towards the horizon.

The after-sensations always included a component described as rotation in the opposite direction to the stimulus turn.

Some observers reported a component of descent and described their after-sensations as a slipping turn or spiral dive.

The after-sensations gradually decreased in intensity and the end points were difficult to detect.

The durations of the after-sensations experienced with closed eyes were in general accord with the published psycho-physical data.

The durations of the after-sensations diminished as the amount of visual information about the true state increased.

The more experienced pilots reported after-sensations of shorter duration.

3,426

Mangelsdorf, J.E. 1959 LOGISTIC SUPPORT TO MAN'S ECOLOGY IN SPACE Mechanical Engineering 81:79, July 1959

ABSTRACT: This paper discusses the ecological elements with which the system must provide the satellite crew. Provision for potable water and nutriment

and means of ingestion; gases for breathing; disposal of body wastes; protection from thermal, noise, radiation, psychological and G-stresses are treated in some detail. It is shown that the solution of the problem of man's ecology in space requires talent from a number of technical areas. The author briefly examines the Lockheed ecological model, first as a means of illustrating man's metabolic exchange, and second, as a tool for solving some of the problems of designing for long-endurance, manned satellites.

3,427

Mann, C.W., N.H. Berry, and H.J. Dauterive 1949 THE PERCEPTION OF THE VERTICAL: I. VISUAL AND NON-LABYRINTHINE CUES J. Exp. Psychol 39:538-547

3,428

Mann, C. W. & N. H. Berry 1949 THE PERCEPTION OF THE POSTURAL VERTICAL. II. VISUAL FACTORS. (Naval School of Aviation Medicine, Pensacola, Fla.) Proj. NM 001 110 500.5, 23 June 1949. ASTIA ATI 80 464.

SUMMARY: Under the conditions of this experiment there was no significant difference in the precision of the individual's judgment of the visual vertical and visual horizontal.

As in a previous investigation, the mean errors and variability of judgment are significantly increased when a soft padded seat is substituted for a hard seat.

The mean error and variability of the judgments of the visual horizontal are significantly greater when the individual is in a position of tilt than when he makes the judgment from a vertical position

3,429

Mann, C. W., & G. E. Passey 1949 THE PERCEPTION OF THE VERTICAL. V. ADAPTATION EFFECTS. (Naval School of Aviation Medicine, Pensacola, Fla.) Proj. NM 001 110 500.9., 17 Nov. 1949

ABSTRACT: Ten subjects placed in positions of lateral tilt were required to return themselves to the postural vertical after a delay of 60 sec. in the position of tilt and with no delay in the tilt position. Each was given 10 trails in random order at 10^{o}, 45^{o}, and 90^{o} of tilt in both right and left quandrants. The positions were presented for immediate and delayed adjustment and under modified and nonmodified somesthetic conditions. The index of postural adjustment used was the constant error. Adaptation, as measured by a shift of constant error toward the direction of initial inclination and by an increase in the number of errors in the direction of inclination, was present under conditions of delay for both modified and nonmodified somesthetic conditions.

3,430

Mann, C. W., & H. J. Dauterive 1949 THE PERCEPTION OF THE POSTURAL VERTICAL. I. THE MODIFICATION OF NON-LABYRINTHINE CUES. (Naval School of Aviation Medicine, Pensacola, Fla.) Proj. NM 001 110 500.4., 3 June 1949

3,431

Mann, C. W., G. E. Passey, & R. K. Ambler 1950 THE PERCEPTION OF THE VERTICAL. VII. EFFECT OF VARYING INTERVALS OF DELAY IN A TILTED POSITION UPON THE PERCEPTION OF THE POSTURAL VERTICAL. (Naval School of Aviation Medicine, Pensacola, Fla.) Proj. NM 001 110 500.12., 25 Jan. 1950

ABSTRACT: The effects of varying durations of exposure upon adjustment to the gravitational vertical were investigated. Passey and Guedry have shown that when adjustments to the vertical were made following a 60-sec. exposure to tilt there was a statistically significant increase in the average error of adjustment to the gravitational vertical. Following 60-sec. exposure they also noted a greater number of errors in the direction of initial tilt. Artifacts of their appartus made it impossible to use the index of constant error. In this study 12 subjects (Ss) were subjected to a tilt of 45° in either quadrant in the lateral plane using the Tulane lateral tilt chair. They were exposed to tilt for periods of 0, 15, 30, and 45 sec. following which they readjusted to the gravitational vertical in the absence of a visual frame of reference. Each S made 24 adjustments for each duration of exposure to tilt, 12 determinations from each upper lateral quadrant. Data for the determinations in each quadrant were subjected to statistical analyses separately since it was demonstrated that adjustments differed with respect to the quadrant from which they were made for the delayed readjustment trials. With increasing time of exposure to tilt there was an increase in the constant error in the direction of initial tilt. With increasing time of exposure there was also an increasing average error and an increasing number of errors made in the direction of initial tilt. With increasing time of exposure there was no increase in the variability of the data for average, constant, or number of errors in the direction of initial tilt.

3,432

Mann, C. W. & G. E. Passey 1950 THE PERCEPTION OF THE VERTICAL. VIII. ADJUSTMENT TO THE VERTICAL AS A FUNCTION OF THE MAGNITUDE OF TILT EXPOSURE. (Naval School of Aviation Medicine, Pensacola, Fla.) Proj. NM 001 110 500.14., 23 Feb. 1950.

ABSTRACT: The object of the present experiment was to determine the effect of varying amounts of initial tilt and various times of exposure in position of initial tilt upon the adjustments made to the postural vertical in the absence of a visual frame of reference. Three subjects (Ss) were subjected to tilts 5°, 15°, 25°, 45°, and 55° in the lateral plane, and were maintained in these

positions of lateral tilt for periods of 0, 5, 15, 25, 35, 45, 55 and 65 sec. prior to being allowed to return themselves to the gravitational vertical. Each S was given 10 adjustments from each position of tilt and time of exposure making 480 adjustments for each S. Half of the adjustments of S were made from the left upper lateral quadrant and half from the right upper lateral quadrant. The adjustments were made during 20 experimental sessions for each S. With increasing duration of exposure to tilt there is an increasing average error of adjustment and a shift of constant error of adjustment in the direction of initial tilt. Increasing the amount of initial tilt is accompanied by an increasing average error of adjustment and a shift of constant error in the direction of initial tilt. An increase in the duration of exposure to tilt and an increase in amounts of initial tilt produces no significant change in variability of either average or constant error. The results are related to previous work in this area and curves are fitted to the empirical data. These curves are proposed as theoretical functions.

3,433

Mann, C. W. 1950 STUDIES IN SPACE PERCEPTION. (Naval School of Aviation Medicine, Pensacola, Fla.) Proj. NM 001 110 500. 18., 31 Oct. 1950 ASTIA ATI 198 564

ABSTRACT: The evidence presented supports the hypothesis that space orientation is a complex function involving, in the intact organism, all sense modalities that, under the circumstances, are appropriate. Moreover, it involves not only the receptor but the motor aspects of perception. The total effect of body tilting under static conditions or under the influence of centrifugal force is that the organism not only received the impulses but reacts to them. With a tilted visual field there is a tendency towards postural compensation by appropriate motor responses. The perceptions involved in space orientation, both visual and postural, are motor as well as receptive.

3,434

Mann, C. W. 1951 THE EFFECTS OF AUDITORY-VESTIBULAR NERVE PATHOLOGY ON SPACE PERCEPTION. (Naval School of Aviation Medicine, Pensacola, Fla.) Proj. NM 001 110 500.22., 15 Aug. 1951

3,435

Mann, C. W., F. E. Guedry & J. T. Ray 1951 POST-ROTATIONAL PERCEPTION OF APPARENT BODILY ROTATION.
J. exper. Psychol. 41:114-120. ASTIA ATI 122 199.
Also see: Naval School of Aviation Medicine, Pensacola, Fla. Research Rept. NM001 11050013, Feb. 3, 1950.

ABSTRACT: This investigation was designed to determine the relative contributions of the visual and postural factors to the post-rotational effects of the oculogyral phenomenon. Comparisons were made of the post-rotational effects produced under conditions of (a) no visual stimulus, (b) continuous visual stimulus, and (c) flickering visual stimulus. Three sophisticated Ss were used in the investigation. The equipment consisted of a Link Trainer modified to rotate at 20 rpm. Reports by the Ss of the cessation of post-rotational apparent movement under all conditions yielded subjective measures of the duration of the first effect of the oculogyral phenomenon. The duration of the first effect under conditions A, no visual stimulus, and B, continuous visual stimulus, were of the same order. A Phi phenomenon was experienced by observers at the commencement of the first effect. It was of variable duration for each observer, but in each case was of lesser duration than the total visual first effect. It is concluded that the perceptual nature of the first effect of the oculogyral illusion is a result of two components: (a) a visual component which produces the rapid Phi phenomenon, probably a corollary of nystagmic eye movements, and (b) a postural component which contributes the smooth unidirectional apparent motion characteristic of the first effect. It is proposed to designate the postural component the "postural negative aftereffect."

3,436

Mann, C. W. and G. E. Passey 1951 THE PERCEPTION OF THE VERTICAL: V. ADJUSTMENT TO THE POSTURAL VERTICAL AS A FUNCTION OF THE MAGNITUDE OF POSTURAL TILT AND DURATION OF EXPOSURE.
J. Exp. Psychology 41:108-13, Feb. 1951

3,437

Mann, C. W. 1952 AN ANALYSIS OF THE OCULOGYRAL EFFECT
J. of Aviation Medicine 23(3):246-253, June 1952

ABSTRACT: In a recent series of articles, Mayne has suggested that, within the limits of the linearity of the vestibular system, the duration of the subjective effects arising from the stimulation of the semicircular canals is proportional to the angular velocity. He arrives at a formula for the duration of the first effect of the form $Y = ae^{bx}$. The application of this formula to the data of nystagmus in pigeons by Mowrer and the audiogyral effect obtained by Clark and Graybiel gives a good fit to the exponential curve.

In this study an attempt was made to apply Mayne's formula to the first effects during and after rotation in the oculogyral illusion. The curve of the data derived from the total first effects appeared sigmoidal, but a good fit to Mayne's exponential curve was obtained at velocities up to 20 r.p.m. when the formula was applied to the gross visual effects--described in this article as the "picket fence" phase of the first effect.

Analysis of the results indicates that the total first effect of the oculogyral illusion is made up of two components. One of these is produced by the rapid oscillations of the cupula due to its inertia during and following rotation, and the other by the finer movements of the cupula induced by the inertia of the endolymph of the semi-circular canals.

3,438

Mann, C. W. 1952 VISUAL FACTORS IN THE PERCEPTION OF VERTICALITY. (Naval School of Aviation Medicine, Pensacola, Fla.) Proj. NM 001 110 500. 29., 19 Aug. 1952. ASTIA ATI 188193

ABSTRACT: This experiment investigates Gibson's hypothesis that errors in the perception of verticality will be less under consistent visual-proprioceptive stimulation than under discrepant conditions. The present results considered in relation to a previous experiment by Boring indicate that only where the subject can identify himself with the visual framework will there be a difference in responses to "consistent" and discrepant" conditions.

3,439

Mann, C. W. 1952 VISUAL FACTORS IN THE PERCEPTION OF VERTICALITY J. exp. Psychol. 44:460-464

3,440

Mann, C. W. 1952 SUBJECTIVE EFFECTS OF DIFFERENT ROTATIONAL VELOCITIES. (USN School of Aviation Medicine, Pensacola, Fla.) Proj. No. NM 001 063.01.24, March 30, 1952. ASTIA ATI 159 446.

ABSTRACT: Mayne's formulation for the duration of the first subjective effect following stimulation of the semicircular canals is of the form $\& = ae^{bx}$. An

attempt was made to apply Mayne's formula to the first effects of the oculogyral illusion during and after rotation. A good fit was obtained to Mayne's exponential curve up to velocities of 20 r.p.m. for the gross visual effects. The analysis indicated that the total first effect of the oculogyral illusion is made up of two components rapid oscillations of the cupula, and finer movements of the cupula induced by the inertia of the endoylmph of the semicircular canals. (Naval School Aviation Medicine abstract)

3,441

Mann, C. W., & R. O. Boring 1952 THE ROLE OF INSTRUCTION IN EXPERIMENTAL SPACE PERCEPTION. (Naval School of Aviation Medicine, Pensacola, Fla.) Proj. NM 001 110 500.30., 1 Sept. 1952. ASTIA ATI 188194

ABSTRACT: Two groups of four subjects were required to set a luminescent rod to a "vertical" during exposure to visual frameworks which were sometimes tilted and sometimes upright. One group was given careful instructions as to what was meant by "vertical." The other group was simply instructed to set the luminescent rod to vertical. The constant and average errors made by the naive group were consistently larger than those made by the sophisticated group. It is inferred that a number of criteria of verticality are possible in the relatively simple experimental situation employed and that different criteria may be selected by different subjects.

3,442

Mann, Cecil W. 1955 CATALOG OF TRANSLATED MATERIAL IN SPACE PERCEPTION (The Tulane University of Louisiana & U.S. Naval School of Aviation Medicine, Pensacola, Fla.) Joint Project Report No. 37, May 15, 1955. ASTIA AD 760 64

ABSTRACT: This report is a catalog of bibliographic materials in the area of proprioceptive, vestibular function and vision which have been translated from foreign languages. The catalog lists 427 items. The catalog is arranged in the author-alphabetical format adopted by the American Psychological Association.

3,443

Mann, C. W. 1956 FINAL TECHNICAL REPORT. (Naval School of Aviation Medicine, Pensacola, Fla.) Proj. NM 001 110 500. 43., 30 June 1956. ASTIA AD 119 601.

3,444

Mann, C. W. & J. T. Ray 1956 THE PERCEPTION OF THE VERTICAL. III. AN INVESTIGATION OF QUADRANT DIFFERENCES.
(The Tulane Univ., New Orleans, Louisiana & U. S. Naval School of Aviation Medicine, Pensacola, Fla.) Joint Project Rept. No. 39, May 18, 1956. ASTIA AD 107 736.

ABSTRACT: An experiment was designed to investigate the possibility of right and left quadrant differences in the judgment of the postural vertical. Under the conditions of this experiment, no quadrant differences of statistical significance were found. The prediction that differences would be found between subjects tested, and under the interacting conditions producing adaptation was justified.

3,445

Mann, C. W., & C. J. Canella 1956 AN EXAMINATION OF THE TECHNIQUE OF CUPULOMETRY. (Naval School of Aviation Medicine, Pensacola, Fla.) Proj. NM 001 110 500.42., 30 May 1956

3,446

Mann, C. W. & J. Ray 1956 ABSOLUTE THRESHOLDS OF PERCEPTION OF DIRECTION OF ANGULAR ACCELERATION.
(Tulane Univ., New Orleans, Louisiana and U. S. Naval School of Aviation Medicine, Pensacola, Fla.) Joint Project NM 001 110 500, Rept. No. 41, May 25, 1956. ASTIA AD 119 602.

ABSTRACT: The threshold of perception of angular acceleration was defined in this experiment in terms of a component of angular acceleration applied for a given time of exposure and judged correctly as to direction at a 75 per cent level of confidence. The results indicate that the curve of best fit describes a hyperbolic relationship between acceleration and exposure time. The maximum time of exposure of 30 seconds was determined by previous experiments on adaptation, and at this maximum the defined angular threshold acceleration was of the order of $0.035^{\circ}/sec^{2}$.

3,447

Mann, C. W., & J. T. Ray 1956 THE PERCEPTION OF THE VERTICAL. XIII. AN INVESTIGATION OF QUADRANT DIFFERENCES. (Naval School of Aviation Medicine, Pensacola, Fla.) Proj. NM 001 110 500.39., 18 May 1956. ASTIA AD 107 736.

SUMMARY: An experiment was designed to investigate the possibility of right and left quadrant differences in the judgment of the postural vertical.

Under the conditions of this experiment, no quadrant differences of statistical significance were found. The prediction that differences would be found between subjects tested, and under the interacting conditions producing adaptation was justified.

3,448

Mann, C. W. & J. T. Ray 1956 THE PERCEPTION OF THE VERTICAL. XIV. THE EFFECT OF RATE OF MOVEMENT ON THE JUDGMENT OF THE VERTICAL.
(The Tulane Univ., New Orleans, Louisiana and U. S. Naval School of Aviation Medicine, Pensacola, Fla.) Joint Project Rept. No. 40, May 22, 1956. ASTIA AD 105 716.

ABSTRACT: An experiment was designed to test the effect of different rates of tilting movement upon the judgment of the postural vertical in the absence of visual cues. Subjects were tilted at combinations of speeds, delay at the tilted position, and in right and left quadrants. Analysis of variance of the constant errors indicates that the errors of judgment are significantly greater when the subjects are returned to the vertical at slower rates of movement. It is suggested that the problem of differential adaptation to inclination as an influence upon vertical judgment should be examined in the airplane under conditions of relatively rapid and relatively slow return from a bank to a straight and level attitude.

3,449

Manning, G. W. & W. G. Stewart 1942 THE EFFECT OF POSITION ON THE INCIDENCE OF SWING SICKNESS.
(National Research Council, Canada) Rept. No. C-2426, Dec. 1942.

ABSTRACT: Experiments on 825 men used in a total of 1005 swing experiments showed: (1) the incidence of swing sickness varies with different body positions; (2) the maximal susceptibility to swing sickness occurred in the sitting position when the subject was completely enclosed in a cabin-like arrangement; (3) Minimal susceptibility to swing sickness was found when the subject was swung in the supine position with the eyes open; (4) Seasonal variation in susceptibility may be an important factor and is certainly worthy of further consideration; (5) When swung on different occasions individuals vary in their swing susceptibility; (6) The group incidence of swing sickness (Type 2 and 3) does not change when the same subjects are reswung at an interval of 7 days or longer; (7) The time of day, meals and room temperature (range limited to 68 to 80 degrees Fahrenheit) do not apparently affect group susceptibility to swing sickness; (8) Apprehension does not appear to be a factor in group susceptibility to swing sickness; (9) These studies support the thesis that motion sickness is primarily a labyrinthine disturbance. This effect on the labyrinth can be modified considerably by visual orientation. The subsequent train of events characterized by nausea, vomiting, pallor, sweating, weakness and dizziness are the result of this stimulation.

3,450

Manning, G. W. 1943 ACCLIMATIZATION TO SWING SICKNESS (National Research Council, Canada) Rept. No. C2623, October 1943.

ABSTRACT: One hundred and two unselected Initial Training School aircrew were divided into groups. Fifty-one of these men swung themselves 15 minutes daily for 10 consecutive days, remaining 51 men selected at random from the total of 102 men acted as controls and were not swung until the 11th day. On the 11th day the 102 men were swung on 10-foot, 2-pole swings and the incidence of sickness in each group determined. The experiments were done in 2 groups, of 51 men each, over a period of approximately 4 weeks. The incidence of swing sickness was significantly lower (18%) in the group of men swung daily for 15 minutes than in the group of normals (42%) who had experienced no swinging prior to the assessment swing.

3,451

Manning, G.W. 1943 CHOLINE ESTERASE ACTIVITY IN RELATION TO AIRSICKNESS. (National Research Council, Canada) Report #C2513, May 21, 1943

ABSTRACT: Choline esterase determinations were carried out before and after swinging or after the development of nausea and vomiting in 14 cases of persistent airsickness and 31 Initial Training School trainees. In 8 of those men blood enzymes activities were determined before, during and after swinging or the occurrence of airsickness on the swing.

3,452

Manning, G.W. 1943 FAILURE OF A VERTICAL ACCELERATOR TO PRODUCE MOTION SICKNESS. (National Research Council, Canada) Report #C-2649, 10 December 1943

ABSTRACT: In order to ascertain the effect of vertical forces on the incidence of motion sickness, a simple vertical spring accelerator was devised which reproduced only the vertical radial forces (same magnitude and frequency), of a 10-foot 2-pole swing.

Forty unselected men were subjected to a simple vertical G change of 0.6 G to 1.4 G 33 times per minute on the spring accelerator and 40 others to the same frequency and quantity of vertical G change on the swing. No sickness occurred in the group exposed to simple vertical motion as compared to a 50% incidence of motion sickness in the group who were swung. Either vertical forces are not responsible for the occurences of swing sickness or some additional stimulus, which occurs on the swing, is also necessary. Further investigation with the vertical accelerator is necessary to ascertain the effects of visual orientation, direction of vertical force in respect to the labyrinth, and of combining other accelerative forces.

3,453

Manning, G.W. 1944 **FAILURE** OF A VERTICAL ACCELERATOR TO PRODUCE MOTION SICKNESS. Proc. Assoc. Comm. Aviation Med. Research, Appendix H. 25 February 1944

3,454

Manning, G. W. & G. W. Stewart 1949 EFFECT OF BODY POSITION ON INCIDENCE OF MOTION SICKNESS.
J. Appl. Physiol. 1(9):619-628.

3,455

Manning, L.A. 1960 IONIC VELOCITY SENSOR FEASIBILITY STUDY (Varian Associates, Palo Alto, Calif.) Engineering rept. no. 207-6Q, Contract AF 33(616)5200), ASTIA AD-242 611

ABSTRACT: Three essentially different schemes are considered for measurement of the air speed of a vehicle traveling in the atmosphere at altitudes above 100 kilometers. Use of the dielectric displacement of a neutral gas stream in an electric field gradient is shown to produce too small a deflection for use in a practical device. On the other hand, a rotating-disc type mechanical velocity sorter, using both ionized and unionized particles, is shown to have altitude limitations and to require large mathematical data reductions. A third system utilizing a pair of rotating pressure-sensitive microphones appears to hold great promise owing to its simplicity. The development of sufficiently low noise resistant microphones would permit this device to be used at greater altitudes and at lower velocities. (Author)

3,456

Manzurov, A. R. 1956 RENTGENOLOGICHESKIYE ISSLEDOVANIYA PRI DEYSTVIL NA ORGANISM CHELOVEKA RADIAL'NYKH USKORENIY. (X-RAY EXAMINATIONS OF THE HUMAN ORGANISM SUBJECTED TO RADIAL ACCELERATION). Voyenno-meditsinskiy Zhurnal (Military Medical Journal). 10:59-64, 1956. (Translation in USAF Air Intelligence Information Report "Two Problems in Acceleration: Cumulative Effect and X-Ray Examinations". IR-1600-57, 23 July 1957)

3,457

Marbarger, J. 1942 PROPOSED EQUIPMENT FOR THE SELECTION OF PERSONNEL WITH RESPECT TO THE PROBLEM OF MOTION SICKNESS (School of Aviation Medicine, USAF Randolph AFB, Texas) Rept. No. 84-1, September 1942

3,458

Marbarger, J. P., ed. 1951 SPACE MEDICINE. THE HUMAN FACTOR IN FLIGHTS BEYOND THE EARTH.
(Urbana, Ill.: University of Illinois Press, 1951)

CONTENTS:

Armstrong, H. G., Space Medicine in the United States Air Force;
von Braun, W., Multi-Stage Rockets and Artificial Satellites;
Strughold, H., Physiological Considerations on the Possibility of Life Under Extraterrestrial Conditions,
Haber, H., Astronomy and Space Medicine;
Campbell, P. A., Orientation in Space;
Buettner, K., Bioclimatology of Manned Rocket Flight

3,459

Marchesseau and Fabre 1961 ROLE AND IMPORTANCE OF THE FLIGHT SURGEON IN FRANCE WITH REGARD TO AIR SAFETY. (Rôle et importance du médecin de l'air en France dans la securité aérienne) Revue internationale des services de santé des armées de terre, de mer, et de l'air (Paris) 34(1-2):21-24 Jan. - Feb. 1961. (In French, with English summary, [p. 21]).

3,460

Marcus, Hn. J. E. Walsh, L. P. Clark et al 1948 SHOCK AND VIBRATION BULLETIN NO. 7.
(Office of Naval Research, Washington, D. C.) NRL REpt. No. S-3229.
ASTIA ATI 75 153.

ABSTRACT: The eight symposium on shock and vibration was held at Naval Research Laboratory. Papers presented were concerned with the effect of shock and vibration on structures, vibration porblems of aircraft, theoretical and experimental research on flutter in aircraft, photoviscous flow channel, static stress in aircraft structures, the measurement of mechanical transients following landing impact of a model airplane, ejection of pilots from aircraft, and the measurement of forces acting on the pilot during crash landing.

3,461

Margaria, R. 1940 ACCELERATION AND THE PILOT.
Aircraft Engr. 12:165.

3,462

Margaria, R. 1950 ALCUNI IMPORTANTI DE URGENTI PROBLEMI DI MEDICINA AERONAUTICA (Important and Urgent Problems of Aeronautic Medicine)
Minerva Medica. (Torino), 41:229-232, July 28, 1950.

3,463

Margaria, R. 1953 ON THE FUNCTIONS OF CEREBROSPINAL FLUID.
Exp. Med. Surg. 11:297-301.

ABSTRACT: 1. The functions of crebrospinal fluid, commonly given as (a) fluid buffering, (b) being a reservoir of fluid, and (c) being a nutrient medium for the brain, are discussed.

2. The essential function of the cerebrospinal fluid, in which the brain is suspended, is to reduce the effective mass of the brain to 1/26 of the mass of the organ as measured in air.

3. This mechanism reduces the effective weight of the brain ot the equivalent of about 50 g., a weight which is tolerated by the delicate nervous and vascular structures of the base of the brain.

4. Forces acting on the brain as a consequence of acceleration (linear, angular or centripetal) are reduced proportionately; this is the reason why the brain is one of the last structures to be damaged in spite of its praticularly delicate and fragile texture. Only accelerations of a very high order of magnitude, over 100 times the acceleration of gravity, are liable to damage the brain tissue structures.

5. A disadvantage of the fluid is that, like all liquids, it is incompressible and therefore cannot act as a pressure-volume buffer such as is required to prevent damage to the brain in some emergency cases, for instance when a body makes an "air tight" entry into the cranium.

This explains the explosive character of certain lesions of the head caused by gunshot.

3,464

Margaria, R. 1953 LA CONDIZIONE DI SUBGRAVITA E LA SOTTRAZIONI DALL'EFFETTO DELLE ACCELERAZIONI (The Condition of Subgravity and the Elimination of the Effects of Accelerations)
Rivista di Medicina Aeronautica (Rome) 16(4): 469-474; Oct.-Dec. 1953.

3,465

Margaria, R. 1956 EFFECT OF ACCELERATIONS ON CEREBELLAR POTENTIALS IN BIRDS AND ITS RELATION TO THE SENSE OF DIRECTION.
(USAF Office of Scientific Research) AFOSR TN 57-519, June 1, 1956.
ASTIA AD 136 601.

ABSTRACT: Rotatory and post-rotatory cerebellar responses of homing and domestic pigeons and of migratory and sedentary doves have been studied by means of an orientable centrifuge, the speed and position in the space of which could be changed at will. These results are discussed taking in account the Ising theory about the detection of the vertical component of Coriolis acceleration as a base for direction sense in animals.

Further work has been performed later and the following results have been obtained: (1) In order to make sure that muscular potentials did not play a role in the recorded responses to acceleration, the pigeon has been deeply curarized during centrifugation and recording from the cerebellum. (2) In order to investigate the reports about the loss of orientation of homing pigeons when hit by radar beams, rotatory and post-rotatory responses have been recorded immediately after subjecting the animals to up to 2 min. of radar waves. The effect of radar might be reduced to disruption of the equilibrium sense and other injuries due to increase of temperature in the head: it is well known in fact that local rise of temperature succeeds in exciting the labyrinth.

3,466

Margaria, R. 1957 PROLONGED AFTER-EFFECT OF CENTRIPETAL AND TANGENTIAL ACCELERATIONS ON CEREBELLAR POTENTIALS. Final Report 1 June 1956 - 30 Sept. 1957. (Laboratorio di Fisiologia dell'Universita di Milano, Italy)
Rept. No. AFOSR TR-58-37; Contract AF 61(514)968; ASTIA AD-152 246.

Abstract: The rotatary and post-rotatory responses of domestic and nonmigratory species were compared with the responses of homing pigeons and migratory birds. Results indicated that the cerebellar cortex of birds if highly sensitive to rotatory acceleration. A response was obtained at a value as low as 0.01 to 0.02 g. The stimulation of the cerebellar neurons resulted from changes of the sensory inflow coming from the laby-rinth. Bilateral labyrinthectomy completely abolished the cerebellar response. A highly typical, spindle-like afterdischarge was found only in homing pigeons and migratory birds. (ASTIA)

3,467

Margaria, R. 1957 LE FORZE DI ACCELERAZIONE E LA CONDIZIONE DI SUBGRAVITA IN VOLO. (ACCELERATION FORCES AND THE SUBGRAVITY STATE DURING FLIGHT) Riv. Med. Aeronaut. (Rome) 20:(2):175-186

3,468

Margaria, R. and T. Gualtierotti 1957 AVOIDANCE OF ACCELERATION FORCES IN THE ANIMAL BY IMMERSION IN WATER.
(Paper, 1957 Meeting of Aero Medical Association, Denver, Colo., May 6-8)

ABSTRACT: A body immersed in a liquid of the same density is not subjected to acceleration forces. The specific weight of the single components of the animal body is not the same; therefore, the consequences of the immersion in a liquid of the same density of the animal as a whole, when subjected to acceleration forces, ought to be limited to the differences of density of the single organs. This is expected to be a minor effect. Fishes subjected to centrifugation at 1500 G for up to ten minutes survived over twenty-four hours having only the otolithic system destroyed. Frogs, centrifuged when immersed in water, survived when exposed to several hundred G for some minutes. Mice contained in a missile in free fall for nine minutes and decelerated to stop in 1 cm. were killed instantly, but they survived a number of successive such falls when immersed in water. (J. Aviation Med. 28(2):210, April 1957)

3,469

Margaria, R. 1958 WIDE RANGE INVESTIGATIONS OF ACCELERATIONS IN MAN AND ANIMALS: FOURTH ANNUAL LOUIS H. BAUER LECTURE.
Riv. med. aeronaut. 21:655-690
See also J. Aviation Med. 29(12):855-871, Dec. 1958.
See also (Milan University, Italy) AFOSR TN-58-516, ASTIA AD 158 327

ABSTRACT: This article discusses many aspects of the problem of accelerative forces on man and animals. The viewpoint presented is that much more information can be gathered with less troublesome experimental situations that the gravity-free or free-fall situation. Several examples of simpler data-gathering circumstances are included. Discussion also considers protection from acceleration forces, disadvantages of a gravity-free condition, sensitivity of the labyrinth to gravitation, and effects of gravitation upon various animals. The author includes several experiments conducted under non-free-fall conditions, especially underwater studies.

3,470

Margaria, R. 1958 WIDE RANGE INVESTIGATIONS OF ACCELERATION IN MAN AND ANIMALS: FOURTH ANNUAL LOUIS H. BAUER LECTURE (Milan University, Italy) AFOSR TN 58-516; ASTIA AD-158 327
See also J. Avia. Med. 29(12):855-871, Dec. 1958
See also Rivista di Medicina Aeronautica 21:655-690, 1958

ABSTRACT: This article discusses many aspects of the problem of accelerative forces on man and animals. The viewpoint presented is that much more information can be gathered with less troublesome experimental situations that the gravity-free or free-fall situation. Several examples of simpler data-gathering circumstances are included. Discussion also considers protection from acceleration forces, disadvantages of a gravity-free condition, sensitivity of the labyrinth to gravitation, and effects of gravitation upon various animals. The author includes several experiments conducted under non-free-fall conditions, especially underwater studies.

SECOND ABSTRACT: On the basis of elementary laws of physics, describing the behavior of bodies floating in a fluid and subjected to acceleration, consideration has been given to possible protection against acceleration forces. Immersion of mammals (mice) in water increases the resistance to acceleration more than ten fold. Impacts of more than 1000 G have been sustained by such animals as opposed to 100 G when not immersed. Animals without air cavities in the body, such as fish or mammalian foetuses, can support higher acceleration forces. The threshold of physiological stimulation of the otolithic apparatus in all directions has been determined in man floating in water. Lack of impulses from this apparatus is possible of no serious consequences on the functionality of the brain. The threshold for gravity stimulation of the labyrinth in mammals as from the induced changes of the electrical activity of the floculo-nodular lobe of cerebellum is of the order of 0.01 to 0.005 G. The loss of orientation, as an effect of radar on homing pigeons, is considered as a possible temperature effect.
Migratory animals respond to acceleration stimulus with peculiar spindlelike bursts of cerebellar action potentials lasting some time after removal of the stimulus. This peculiarity is in accord with the hypothesis that migration in animals is possibly supported by a higher sensitivity to geodetic forces. The possible geodetic forces that may induce migration are considered, particularly the accessory Coriolis acceleration; they are of the order of magnitude of 1 x 10-6G, which is much lower than the threshold to stimulation as found experimentally on the same animals. The physiological basis to account for animal migration is still lacking. (CARI)

3,471

Margaria, R. 1958 WIDE RANGE INVESTIGATIONS OF ACCELERATION IN MAN AND ANIMALS. THE FOURTH ANNUAL LOUIS H. BAUER LECTURE
J. of Aviation Medicine 29(12):855-871, December 1958

SUMMARY: On the basis of elementary laws of physics, describing the behavior of bodies floating in a fluid and subjected to acceleration, consideration

has been given to possible protection against acceleration forces. Immersion of mammals (mice) in water increases the resistance to acceleration more than ten fold. Impacts of more than 1000 G have been sustained by such animals as opposed to 100 G when not immersed. Animals without air cavities in the body, such as fish or mammalian foetuses, can support higher acceleration forces.

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3,472

Margaria, R., T. Gualtierotti, & D. Spinelli 1958 PROTECTION AGAINST ACCELERATION FORCES IN ANIMALS BY IMMERSION IN WATER. (Proceedings of the XXVIII Congress of the Aeromedical Association, Denver, Colorado). See also J. Aviation Med. 29(6):433-437.

ABSTRACT: Experimentally an animal immersed in water can stand acceleration forces more than ten times greater than in air, the probability of survival being very high even at 1,000 G. A limit to the resistance to acceleration forces is given by parts of the body having a specific weight different from that of the rest of the body, particularly the lungs for their air content, and the otoliths. Rat foetuses, having no air in their lungs, can survive impacts corresponding to accelerations higher than 10,000 G when the mother is floating in water. (CARI).

3,473

Margaria, R. 1959 SPATIAL FLIGHT PHYSIOLOGY.
Scientia Medica Italica 7(4):605-637

ABSTRACT: A discussion of the requirements of the first inhabitants of satellites and the first interplanetary travellers. The greatest functional stress will not fall on the circulatory or respiratory apparatus, but on the central nervous system, particularly on the cerebral cortex. It is therefore especially to this organ that the attention of physiologists should be directed when selecting the first men to be sent into space and when training the candidates for this extraordinary enterprise.

3,474

Margaria, R. & T. Gualtierotti 1960 BODY SUSCEPTIBILITY TO HIGH ACCELERATIONS AND TO ZERO GRAVITY CONDITION. (Paper, Intern. Council. Aero. Sci., 2nd Intern. Congress, Sept. 12-16, 1960, Zurich)

ABSTRACT: Experiments were conducted on pigeons, birds and frogs in order to investigate possible effects of satellite flight on humans. This report gives the results of those experiments and observations.

3,475

Margaria, Rodolfo 1960 SPINAL REFLEXES IN MAN AND ANIMAL DURING REST AND AFTER STRESS. RHYTHM OF DISCHARGE OF SINGLE MOTONEURON IN MAN. ROTATORY RESPONSES AND INJURIES OF THE VESTIBULOCEREBELLAR SYSTEM. REMOTE STIMULATION OF THE MOTOR CORTEX IN THE CAT. (Milan University, Italy) Contract AF 61 (052)23; AFOSR-605; ASTIA AD-259 051

ABSTRACT: Oligo- and multisynaptic reflexes in the sciatic-gastrocnemius territory have been studies in man during rest and after exhaustive physical exercise. During exhaustive physical exercise the only significant change consisted in a decrease of the spinal reflex time. The effect of curarelike substances on the same parameters as above has been also investigated in man. Changes in the reflex responses and in the excitability of nerve fibers have been found. The rhythm of discharge of the single motoneuron in man has been studied by recording the action potentials of the single muscle fiber in ten muscular groups from head to leg muscles. The rate of firing of the neuromuscular units has been found to be constant except at the very beginning of a voluntary contraction. The responses of single units of the flocculo-modular lobe to rotatory accelerations has been studied and differential discharges have been found. (AUTHOR)

3,476

Margaria, R. 1960 SPINAL REFLEX RESPONSES DURING STRESS AND FATIGUE (Milan U. Italy) Contract AF 61(052)-23; Project 9777(805); AFOSR, DLS.

ABSTRACT: This is a consolidation of two previous contracts held by Margaria in which several spinal reflex responses have been used to measure fatigue and stressful states. Studies will be made of the effects of hypoglycemia, hypoxia, sleeplessness, and drugs upon the monosynaptic reflex patterns in persons. Cats and possibly monkeys will be subjected to brain damage and the effects on these reflex patterns determined. The possibility of a vestibular cerebellar mechanism underlying direction sense in birds will be investigated by measuring cerebellar discharges in homing pigeons after rotation. These monosynaptic reflex studies may lead to the development of methods for measuring fatigue or stress.

3,477

Marko, A.R. 1961 MULTI-CHANNEL PERSONNEL TELEMETRY SYSTEM USING PULSE POSITION MODULATION.
(Paper, 1961 Meeting of Aerospace Medical Association, Chicago, April 24-27)

ABSTRACT: Personnel telemetry systems are used to obtain physiological information for instance heart rate, respiration, etc., from a human subject without using trailing wires. Most important requirements on such a system are minimum encumbrance, accuracy under different environments, low power drain, small size and weight. Pulse position modulation has several advantages for this type of application. The ratio between effective signal radiated and average power drain is much higher for other modulation systems. Necessary circuitary in the transmitting heart rate, respiration rate and body temperature. Operating time on one small battery is approximately 50 hours, transmitting range 60 feet. A simple cathode ray scope display system is described as well as a system for permanent recording. (Aerospace Med. 32(3):240, March 1961)

3,478

Marko, A. R. 1961 MULTI-CHANNEL PERSONAL TELEMETRY SYSTEM USING PULSE POSITION MODULATION
Aerospace Medicine 32(11):1019-1022, Nov. 1961.

ABSTRACT: A feasibility study was undertaken of a pulse position modulation, personal telemetry system. A three-channel laboratory model was assembled capable of transmitting heart rate, respiration rate, and body temperature at ranges up to approximately 100 ft. The characterstics of the system were given along with block diagrams for the recording and display units. (Tufts)

3,479

Marko, A.R., M. A.McLennan & E. G. Correll 1961 A MULTI-CHANNEL PERSONAL TELEMETRY SYSTEM USING PULSE POSITIONS MODULATION (USAF Biomedical Lab., Wright-Patterson AFB, Ohio) Proj. 7222, Task 71751, ASD TR 61 290, July 1961.

ABSTRACT: A personal telemetry system using the pulse position modulation technique is described. The laboratory model transmits heart rate, respiration rate, and body temperature within a range of 100 ft. Compared with FM-FM Systems this system has the advantage of very low power consumption (20 milliwatts), light weight (six ounces with batteries for 80 hours continuous operation), small sizes (4 3/4 by 3 1/2 by 1 inches), and sufficient accuracy and stability for physiological measurements. The recording and display systems are also described. Certain limitations of the system are pointed out. (Tufts)

3,480

Marko, A.R., M.A. McLennan, E.G. Correll 1962 A SOLID STATE MEASURING DEVICE FOR GALVANIC SKIN RESPONSE. (6570th Aerospace Medical Research Laboratories, Wright-Patterson AFB, Ohio) TDR No. AMRL-TDR-62-117. ASTIA AD 292 690

ABSTRACT: The problem of monitoring galvanic skin resistance, especially when used in combination with electrocardiographic or electroencephalographic recordings is discussed. A new approach is outlined that eliminates interference from other measurements. A small, lightweight laboratory model has been built that has low power consumption and is insensitive to vibration and acceleration forces. The performance, stability, and accuracy of the model is equivalent to larger, more conventional instruments used for the same purpose.

3,481

Marrow, D.J. 1949 ANALYSIS OF INJURIES OF 1942 PERSONS IN 1422 LIGHT PLANE ACCIDENTS. (CAA Med. Serv. Records, Wash., D.C., Unpub. data, 1949)

3,482

Marsh, C.L. & R.C. Moore 1957 DECELERATION TRAUMA. Am. J. Surg. Series 2, 93(4):623-631, Apr. 1957.

3,483

Marshall, G. S. 1933 THE PHYSIOLOGICAL LIMITATIONS OF FLYING.
Flight 25:99-100
See also J. Royal Aero. Soc. 37:389-410

3,484

Marshall, G.S. 1939 INVESTIGATION OF EFFECTS OF ACCELERATION ON HUMANS. (RAF, Institute of Aviation Medicine, Farnborough)
FPRC 76, Dec. 1939.

3,485

Marshall, G.S. 1940 PHYSIOLOGICAL PROBLEMS OF HUMAN FLIGHT.
Lancet, 1:270-271. See also Brit. Med. J. 1:226-227.

ABSTRACT: The physiological problems of flight are divided into those of position and those of movement. "Blacking out" is the most common sympton of excessive acceleration. The effect can be alleviated by bending the body forward and tightening the muscles. The pilot faints when the pressure is continued for a long time. The movement of the body fluids into the splanchnic area cause the symptoms. Temporary blindness is probably caused by a failure in the arterial pressure in the neighborhood of the eye to a point at which the blood can no longer overcome the intra-ocular pressure of from 20 to 25 mm.

3,486

Marshall, G. S. 1940 PHYSIOLOGICAL PROBLEMS OF HUMAN FLIGHT.
(Lecture, Medical Society of London, Jan. 29, 1940)

ABSTRACT: A lecture. Describes oxygen problems briefly. Discusses problems of acceleration and centrifugal force, especially those encountered in dive-bombing. Estimates 3-6 G tolerance for the average pilot, 7-8 G for highly experienced men. Suggests posture and muscle-tensing as means of increasing tolerance. (Lancet 1(238):270-271, Feb. 1940)

3,487

Marshall, G. S. 1940 PHYSIOLOGICAL PROBLEMS OF HUMAN FLIGHT. (Lecture, Medial Society of London, Jan. 29, 1940)

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3,488

Marshall, H. W., E. F. Lindberg, & W. F. Sutterer 1961 CARDIAC OUTPUT, CIRCULATORY PRESSURES AND ARTERIAL OXYGEN SATURATION DURING FORWARD ACCELERATION.

ABSTRACT: Six men were exposed to varying periods of forward (transverse) acceleration of up to 10 mins' duration on a centrifuge at plateau levels of 2, 3½, and 5 g while supported in the supine position, with hips and knees flexed at right angles, by a nylon net stretched tightly over a contoured metal frame. The back was elevated 12 degrees in the direction of acceleration. Cardiac output (dye method) right atrial and aortic pressures, respirations, E. C. G., ear opacity, ear opacity pulse and arterial oxygen saturations were recorded in the control situation (1 g) and during exposure to acceleration. During forward acceleration of up to 5 g, cardiac output showed either no systematic change or a slight increase; right atrial pressure increased from 8 (1 g average) to 22 mm. Hg at onset of 5 g; intraesophageal pressure measured in 3 subjects increased similarly; and mean aortic pressure averaged 31% above control values. Arterial oxygen saturation below 85% encountered in some subjects during exposure to 5 g, but prevented by breathing 99.6% oxygen, suggests a change in ventilation perfusion relationships in the lung during forward acceleration. (Federation Proc. 20(1): 131, Mar. 1961)

3,489

Martin-Baker Aircraft Co. THE MARTIN- BAKER AUTOMATIC EJECTOR SEAT-MARK 3 (Martin-Baker Aircraft Co., Ltd., England) ASTIA ATI 88684

ABSTRACT: The design of the Martin-Baker automatic ejector seat is described which enables pilots and aircrew personnel to escape from high-speed aircraft at all altitudes. It is effective at any speed and under any G accelerations that may occur whatever the altitude of the aircraft. By the simple movement of a hand lever, the airman has his parachute available for normal rip-cord operation either without ejection with the seat or at any time after ejection has taken place. The seat is ejected from the aircraft by means of a cartridge operated gun and slides during ejection on four rollers in a guide rail. The ejection gun is fired by the withdrawal of a flexible screen, which covers and protects the occupant's face against the effects of the air stream. On ejection, the seat leaves the aircraft at 60 fps.

3,490

Martin Co., Denver, Colo. 1961 MTSS. GENERAL HUMAN FACTORS CONSIDERATIONS. VOLUME III.
(Aeronautical Systems Division, Wright-Patterson AFB, Ohio) ASD-CR-61-14, ASD-TR-61-211, July 1961. ASTIA AD 273 005L

ABSTRACT: Contents include material in the following subjects:
Acceleration
Weightlessness
Artificial Gravity
Labyrinthine Sensitivity in Space Flight
Vibration
Summary of Vibration Test Results
Summary of Literature Surveyed

3,491

Martin, E.D. & J.T. Howe 1960 AN ANALYSIS OF THE IMPACT MOTION OF AN INFLATED SPHERE LANDING VEHICLE.
(National Aeronautics and Space Administration, Washington, D.C.) NASA TN D-314, 1960.

3,492

Martin, E.D. 1961 A DESIGN STUDY OF THE INFLATED SPHERE LANDING VEHICLE, INCLUDING THE LANDING PERFORMANCE AND THE EFFECTS OF DEVIATIONS FROM DESIGN CONDITIONS. (National Aeronautics and Space Administration, Washington, D.C.) NASA TN D-692, April 1961.

ABSTRACT: The impact motion of the inflated sphere landing vehicle with a payload centrally supported from the spherical skin by numerous cords has been determined on the assumption of uniform isentropic gas compression during impact. The landing capabilities are determined for a system containing suspension cords of constant cross section. The effects of deviation in impact velocity and initial gas temperature from the design conditions are studied. (Author)

3,493

Martin, E.D. 1961 SKIN STRESSES IN AN INFLATED SPHERE DURING IMPACT.
(National Aeronautics and Space Administration) NASA TN D-1070, Aug. 1961. ASTIA AD 260 764.

ABSTRACT: An analysis is made of the stresses in the skin of an inflated non-stretchable sphere during normal, nonrotating impact with a hard flat surface,

assuming infinite modulus of elasticity in the skin and infinite propagation speed of stress waves. The analysis is further applied to the study of the inflated sphere landing vehicle containing a payload suspended at the center. Curves are presented showing the stress distributions during impact for cases corresponding to those calculated in previous reports in which the impact motion and payload landing performance capabilities of the landing vehicle have been studied.

3,494

Martin, E.E., J.P. Henry, J.L. Gamble & R.S. Shaw 1948 EVALUATION OF THE ANTI-G SUIT. (USAF Air Material Command, Wright-Patterson AFB, Ohio) MCREXD-689-2C, Report No. 8. 24 July 1948.

ABSTRACT: Three subjects were each exposed to one or more series of runs on the human centrifuge. Each series consisted of direct arterial pressure measurements at 1 g, 2.5 g, 3.5 g, and 5 g without and with each of the anti-g suits. This report presents direct radial artery pressure results obtained while comparing three anti-G suits on the human centrifuge. The G-5 suit proved to be more efficient than the G-4A which gives more than twice the protection afforded by the G-3A suit. The added protection given by the three suits when using the M-1 maneuver is as follows: ½ g for the G-3A, 2.3 g for the G-4A and 0.1 g for the G-5. This protection is over and above the normal 2 g protection obtained while performing the M-1 maneuver alone. The direct arterial pressure method for evaluating G-suit protection can be used to confirm the results obtained by the visual method of G-suit evaluation. Experiments should be conducted to measure cerebral perfusion pressure head and blood flow rates during positive acceleleration to determine how they vary in proportion to cerebral arterial pressure.

3,495

Martin, E.E. & J.P. Henry 1950 THE SUPINE POSITION AS A MEANS OF INCREASING TOLERANCE TO ACCELERATION. (Air Materiel Command, Engineering Div., Wright-Patterson AFB, Ohio) AF Report No. 6025. Aug. 1950. ASTIA ATI 89 949

ABSTRACT:A new supine hammock seat is described as a method for enhancing tolerance to positive acceleration. The protection afforded by the seat used in a fixed position is compared with the conventional upright seated posture. Protection afforded in the supine seat while wearing a modified anti-G suit compressing the legs alone, exceeds that presently found when using an anti-G suit in the upright seated posture by approximately 1 g.

3,496

Martin, E. E., & J. P. Henry 1951 THE EFFECTS OF TIME AND TEMPERATURE UPON TOLERANCE TO POSITIVE ACCELERATION. Tech. Data Digest 16(6):19-23, June 1951
See also J. Avia. Med. 22:382-390

ABSTRACT: Eleven subjects have been repeatedly exposed to 2-minute runs on the human centrifuge in the upright seated posture at a room temperature of 24 degrees C (72 degrees F). Peripheral lights were lost and central vision dim. A sustained compensatory vasopressor effect reduces the duration of the visual symptoms to 6% of the long runs; during the remaining 94% of the run vision was clear. In further tests with 7 subjects in a temperature-controlled cockpit tolerance to long-term acceleration when sweating (skin temperature 37 degrees C) was only 0.5 g less than when shivering (25 degrees C). Even when the subject is in a state of heat vasodilation the normal cardiovascular system can still compensate for the stress of accelerations of 3.5 to 4.0 g lasting for 2 minutes. (DACO)

3,497

Martin, E. E., & J. P. Henry 1951 THE EFFECTS OF TIME AND TEMPERATURE UPON TOLERANCE TO POSITIVE ACCELERATION. J. Avia. Med. 22:382-390
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3,498

Martin, F. 1930 AIRSICKNESS AND SEASICKNESS.
Proc. Roy. Soc. Med. 24:635

3,499

Martin, J. 1949 REPORT ON RESEARCH AND DEVELOPMENT CARRIED OUT BY MARTIN-BAKER AIRCRAFT CO. LTD. IN CONNECTION WITH EJECTION SEATS FOR HIGH SPEED AIRCRAFT.
(Martin-Baker Aircraft Co., England) June 1949. ASTIA ATI 89 438

ABSTRACT: A description is given of British research and development carried out in connection with ejection seats and the escape of personnel from high-speed

aircraft. The early history of the ejection seat project is presented as well as information on work done on the Defiant and Meteor III fighters, and the 16 and 65 ft test rigs. The design and construction of the test installation for the Meteor III fighter and the design, development and construction of the Mark I seat and the fully automatic seat is discussed. Consideration is given to the work conducted for the U. S. Navy and the development of the 110 ft test righ and the 50 ft training rig for the RAF. A schedule of dummy and live ejections from the Meteor III is included. Photographs and drawings illustrate some of the equipment and graphs show acceleràtion data.

3,500

Martin, J. 1955 EJECTION FROM HIGH SPEED AIRCRAFT.
(Martin Baker Aircraft, Ltd., Denham, Uxbridge, Middlesex)
See also J. Royal Aero. Soc. 60(550):659-668, 1956.

ABSTRACT: Early studies to determine physiological acceleration limits on a ground ejection rig and to test operational designs of the Martin-Baker aircraft ejection seat in flight are described. The chief design features of the seat, including an automatic ejection device, main time release, ejection gun, leg restraining device, and duplex drogue system are described, and the peculiar conditions and methods of ejection at high altitude, high speed, and low altitude are discussed.

3,501

Martin, J. 1956 EJECTION FROM HIGH SPEED AIRCRAFT.
J. Royal Aero. Soc. 60(550):659-668, Oct. 1956.

ABSTRACT: Early studies to determine physiological acceleration limits on a ground ejection rig and to test operational designs of the Martin-Baker aircraft ejection seat in flight are described. The chief design features of the seat, including an automatic ejection device, main time release, ejection gun, leg restraining device, and duplex drogue system are described, and the peculiar conditions and methods of ejection at high altitude, high speed, and low altitude are discussed.

3,502

Marks, A. 1960 [CAN MAN STAND IT?]
Horyzonty Techniki 1960(2):51-57

ABSTRACT: The author describes the much-discussed hazards of space travel and particularly the presumed effects of space travel on certain body functions, such as breathing. He also deals with the problem of feeding, the effects of acceleration and heat on humans traveling in space ships, with the psychological aspects of cosmic flights, with the dangers from meteors and cosmic radiation and with the survival on the Moon, Mars or Venus. The author points out that the severe tests undergone by the dog "Layka" during its 8 days in space show that man will also be able to exist in space provided the journey does not last too long and that all the scientific measures have been taken for his survival. Since several endurance tests have already been undergone successfully, there is no doubt that a short journey, such as the one to the Moon, taking 8 days there and back, would present no insurmountable difficulties. Each member of the space ship crew should be assured about 1.25 kg of oxygen per 24 hours. Research has also shown that each member of the crew would require about 1 kg of food in concentrated form and 2 kg of water per 24 hours. The pressure in the space ship should be decreased to 2/3 or even 1/2 atm. A table showing the highest and lowest temperatures which can be obtained inside the space ship, depending whether the black or silver-painted side of the ship is turned towards the Sun, is included in the article. In the opinion of the author the crew of a space ship should consist of 1) mechanical-chemical-electronic engineer (as pilot mechanic); 2) astronomer-mathematician (as navigator) and a doctor-biologist. In case of a flight to the Moon a geologist-geodetic-geophysicist should also be included. The age of the crew should be between 30 and 40. (CARI)

3,503

Marks, A. 1961 [ROCKETS AS MEDIUM OF AIR PASSENGER TRANSPORTATION.]
Skrzydlata Polska 1961(37):9

ABSTRACT: This article deals with the problem of utilization of rockets and rocket planes as a means of mass transportation. It seems almost certain that with progress in rocket engineering they will become even safer means of passenger transportation than modern conventional aircraft. An automatic control of the spaceship's navigational system would be the decisive safety factor for travel at high speeds, especially, at the rocket landing stage. On the other hand, it is highly improbable that rockets can entirely supercede conventional aircraft as the sole means of transportation. (CARI)

3,504

Marukhanian E. V. 1960 ELECTROCARDIOGRAPHIC OBSERVATIONS DURING A PROLONGED EXPOSURE TO ACCELERATION.
In Pat. Fiziol. Eksp. Ter. 4:72-73, Nov. - Dec. 1960 (Russian).

3,505

Marukhanian, E. V. 1961 IZMENENIIA V ELEKTROKARDIOGRAMME I NARUSHENIE SOSTOIANIIA TSENTRAL'NOI NERVNOI SISTEMY POD VLIIANIEM USKORENIIA (ELECTRO-CARDIOGRAPHIC CHANGES AND CENTRAL NERVOUS SYSTEM DISTURBANCES PRODUCED BY ACCELERATION) Fiziologicheskii zhurnal SSSR (Moskva) 47(7):843-851, July 1961
English Translation: Sechenov Physiol. J. USSR (New York: Pergamon Press, 1962) 47(7):921-931, Jan. 1962

ABSTRACT: Various electrocardiographic changes indicative of moderate deflection of the electrical axis of the heart to the right and of the primary effect of acceleration on the right heart were seen when subjects were exposed to the action of centrifugal forces in the head-to-foot direction. When there was profound functional disturbance of the central nervous system, the subjects' ECGs exhibited moderate displacement of the ST interval from the isoelectric line and reduction in the size of the T wave or a negative T wave. The most pronounced displacement of the ST interval and most pronounced change in the T wave were 10-20 sec. before the manifestations of disturbed cerebral circulation. Slight displacement of the ST interval and slight change in the T wave in subjects undergoing acceleration gave warning of the possible development of profound functional disturbances of the CNS on further increase or prolongation of the acceleration. Weakened cardiac activity as a result of primary changes in the cardiac muscle produced by hemodynamic disturbances was apparently the cause of the functional disturbance in the CNS in many cases. (AUTHOR'S CONCLUSIONS)

3,506

Marukhanian, E. V. 1962 ELECTROCARDIOGRAPHIC CHANGES UNDER THE INFLUENCE OF TRANSVERSE ACCELERATION.
In Fiziol. Zh. SSSR Sechenov. 48:700-705, June 1962 (Russian)

3,507

Marukhanian, E. V., P. K. Isakov et al 1962 ELECTROPHYSIOLOGICAL RESEARCH ON THE ACTIVITY OF CUTANEOUS AND MOTOR ANALYSERS DURING ACCELERATION
Zh Vyssh Nerv Deiat Pavlov 12:1021-1028, Nov.-Dec. 1962 (Russian)

3,508

Mases, P., R. Falet & C. Jacquemin 1959 MODIFICATIONS RESPIRATOIRES ET CIRCULATOIRES ENGENDREES PAR CERTAINES POSITIONS DE TRAVAIL DU PERSONNEL NAVIGANT AU COURS DU VOL (Respiratory and Circulatory Changes Caused by Certain Work Positions of Flying Personnel in Flight)
Medecine Aeronautique (Paris) 14(1): 1-3.

3,509

Mason, J. K. 1958 PATHOLOGICAL FINDINGS FOLLOWING UNSUCCESSFUL EJECTION FROM HIGH SPEED AIRCRAFT.
J. Forensic Med., (Johannesburg, S. Africa), 5(4):173-184, Oct.-Dec. 1958.

ABSTRACT: Operational and performance features of the standard British ejection seat are outlined. Post-mortem examinations of victims of unsuccessful escapes during flight are analyzed. The findings suggest human or instrumental failure in the preparatory stage or during actual ejection. Potential pathologic findings are correlated with various ejection stages. Illustrations are included showing how the post-mortem examination may disclose the circumstances surrounding the unsuccessful escape. On the basis of the degree of pulmonary fat embolism and of local reaction to injury, general observations are made with regard to timing of injuries. The role of post-mortem examinations in preventive medicine is stressed with particular regard to the common causes of death encountered in unsuccessful ejections.
(J. Aviation Med. 30(5):378, May 1959)

3,510

Massachussetts Institute of Technology 1946 IMPACT INVESTIGATION ON TEXTILE MATERIALS. (Textile Division, Massachusetts Institute of Technology) 30 June, 1946. ASTIA ATI 87219.

3,511

Massard, J.M. 1956 THE EFFECT OF UNDERWATER EXPLOSIONS ON SHIP AND SUB-MARINE HULLS.
(Illinois U. Engineering Experiment Station Urbana) Contract NObs-62250; Continuation of Contract NObs-55889; Dec. 1956; ASTIA AD 128 073.

ABSTRACT: The basic objectives of this investigation, both analytical and experimental, were to develop scaling parameters and numerical procedures for predicting the strength of submarine structures under explosive loadings, to investigate the feasibility of reproducing the action of full-size submarines by means of scale models (by determining the least possible scale factors at which reproducibility of structural action can be assured) to develop means for analyzing the dynamic response of stiffened cylindrical shells to blast pressures produced by underwater explosions with particular attention to numerical or approximate methods and with the objectives in mind of determining a correlation between the results of analysis and such test results as have been obtained or which are likely to be developed in the future, and to determine the patterns of force on various types of structures at various aspects due to the underwater detonation of explosives. (Author)

3,512

Masters, P.G., W. Lehman, P.W. Wood & D.M. Bland 1960 INTEGRATED FLIGHT CAPSULE IMPACT AND FLOTATION BAG INFLATION SYSTEM. (Chance Vought Aircraft, Dallas, Texas) Naval Weapons Contract Noas 59-6150-c, Interim Report No. AER-EOR-12836, 1 March 1960.

ABSTRACT: This report describes the studies made and system selected for inflation of the impact bags and flotation bags used on the integrated flight capsule. The use of a hot gas generator inflation system was considered early in the study. However, contact with Vendors indicated that the hot gas generator system hardware is feasible, but bag materials are not available which will withstand the generated gas temperature. Three different types of cold gas inflation systems were investigated. The single air bottle, single pressure regulator system requires extremely large lines to achieve desired results. A system using a single air bottle with a pressure regulator at each bag allows use of smaller lines but the required inflation time of 3 seconds is not feasible using the proposed 900 cu. in. air bottle. Both of these systems can be designed; however, calculations are presented only to the point that the assumptions made for system design are insufficient to meet established criteria. The system recommended for this application is individual air bottles with no pressure regulators. The most apparent advantage of this system is insurance against loss of the entire recovery system in the event of failure of one bag.

3,513

Maswell, S.S. 1923 LABYRINTH AND EQUILIBRIUM (New York and London, Lippincott, 1923)

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Matsuo, T. 1960 EXPERIMENTAL ELECTRONIC EQUIPMENT FOR MEDICAL TELEMETRY
(Trans. of Mitsubishi Electric and Mfg. Co. (Japan) Material TM-51001, 20 Nov. 1959)
(Office of Technical Services, Washington, D.C.) 61-11123

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Mathews, C.W. 1960 REVIEW OF THE OPERATIONAL PLANS FOR MERCURY ORBITAL MISSION. (Paper, 28th Annual Meeting of the Inst. Aero. Sci., New York, N.Y., 25 Jan. 1960)

...on, J.H., & D.M Severy 1953 RAPID DECELERATION TESTS OF CHEST ...VEL SAFETY BELT. (ITTE-UCLA, LosAngeles, Calif.) Rept. No. 27 ...eprint, Bulletin No. 73 - Highway research Board, Washington, D.C.

...ewson, J.H., and D.M. Severy 1954 AUTOMOTIVE IMPACT RESEARCH ...tional Safety Council, Transactions 28:93-101

...hewson, J. H., et al. 1960 AUTOMOBILE SIDE-IMPACT COLLISIONS. J. of the Society of Automotive Engineers SP 174

...thewson, J. H., et al. 1960 HEAD-ON COLLISIONS, SERIES III (Society Automotive Engineers National West Coast Meeting, San Francisco, Calif., 16-19 Aug. 1960)

...tlock, H., E.A. Ripperger, J.W. Turnbow, & J.N. Thompson 1957 HIGH VELOCITY IMPACT CUSHIONING, PART I. DROP-TEST FACILITIES AND INSTRUMENTATION. (Structural Mechanics Research Lab., University of Texas, Austin, Texas) Aug. 1957. ASTIA AD 220 737

ABSTRACT: Three drop-test installations were developed for research on impact cushioning. These range from a small indoor facility, 28 feet high, to 275-foot tower which provides for both vertical and inclined guided drops of masses weighing up to 5000 pounds. Instrumentation measures time, force, and displacement during impact for determining energy-absorbing properties of materials and systems. (Author)

...ock, H., & J.N. Thompson 1957 HIGH-VELOCITY IMPACT CUSHIONING, PART III. PRELIMINARY TEST ON A NONPRESSURIZED AIR BAG. (Structural Mechanics Research Lab., Texas University, Austin, Texas) Contract No. DA 19-129-qm-817, 15 Oct. 1957. ASTIA AD 220 822

3,522

Matlock, H., E.A. Ripperger, et al. 1957 HIGH-VELOCITY IMPACT CUSHIONING, PART II, ENERGY-ABSORBING MATERIALS AND SYSTEMS. (Structural Mechanics Research Lab., Texas University, Austin, Texas) Contract No. DA 19-129 qm-817, 26 Aug. 1957. ASTIA AD 220 738

ABSTRACT: The cost of air drop can be substantially reduced to the proper combination of aerial retarder and ground cushioning, which depends upon the relative cost of the retarder and cushioning. Laboratory studies of the impact energy absorption of various materials and systems including paper honeycomb foamed plastics, and metal cylinders indicate that minimum cost is achieved with smaller parachutes than those currently in use.

3,523

Matranga, G. J. 1961 ANALYSIS OF X-15 LANDING APPROACH AND FLARE CHARACTERISTICS DETERMINED FROM THE FIRST 30 FLIGHTS (National Aeronautics and Space Administration, Washington, D. C.) NASA TN D-1057; July 1961

SUMMARY: The approach and flare maneuvers for the first 30 flights of the X-15 airplane and the various control problems encountered are discussed. The results afford a relatively good cross section of landing conditions that might be experienced with future glide vehicles having low lift-drag ratios.
Flight-derived drag data show that preflight predictions based on wind-tunnel tests were, in general, somewhat higher than the values measured in flight. Depending on configuration, the peak lift-drag ratios from flight varied from 3.5 to 4.5 as compared with a predicted range of from 3.0 to 4.2.
By employing overhead, spiral-type patterns beginning at altitudes as high as 40,000 feet, the pilots were consistently able to touch down within about $\pm$1,000 feet of a designated point.
A typical flare was initiated at a "comfortable" altitude of about 800 feet and an indicated airspeed of approximately 300 knots, which allowed a margin of excess speed. The flap and gear were extended when the flare was essentially completed, and an average touchdown was accomplished at a speed of about 185 knots indicated airspeed, an angle of attack of about 7 degrees, and a rate of descent of about 4 feet per second.
In general, the approach and landing characteristics were predicted with good accuracy in extensive preflight simulations. F-104 airplanes which simulated the X-15 landing characteristics were particularly valuable for pilot training. (AUTHOR)

3,524

Matthes, M. 1940. UNTERSUCHUNGEN UBER DAS VERHALTEN EINIGER KREISLAUFGROSSEN BEI HOHEN BESCHLEUNIGUNGEN IM FLUGVERSUCH UND UBER DEN EINFLUSS VON CO_2 - ZUSATZ ZUR ATEMLUFT AUF DIE BESCHLEUNIGUNGSERTRAGLICHKEIT (Behavior of Blood Pressure and Pulse During Extreme Acceleration in Flying Experiments and Effect of Addition of Carbon Dioxide to Air on Acceleration Tolerance) Luftfahrtmedizin 4:123-137
See also ASTIA ATI 71 122

ABSTRACT: Additional CO_2 increases the resistance to acceleration. While a field of 4-6g applied centrifugally in the direction head-foot is the average that can be tolerated; additional CO_2 allows it to be increased by 0.5-1.2g which enables it to be endured longer. The experiments were carried out on a mechanical trainer and in aircraft in dives or spirals. The estimations were made by blood pressure measurements and subjective accounts. No reason could be found why some of the experimental subjects had clonic cramps in the front muscles of the neck and upper arm.

3,525

Matthews, B.H.C. PHYSIOLOGICAL EFFECTS OF HIGH ALTITUDE. (Flying Personnel Research Committee, Gt. Britain) FPRC 3, ASTIA ATI 208 744

ABSTRACT: In reviewing the physiological effects of high altitude, the author discusses lowered barometric pressure and lowered oxygen tension. Also included in this report is a summary of present knowledge of physiological effects of high acceleration. In connection with this subject, the author discusses the possible methods of reducing effects of high g and the investigation and measurement of g effects.

3,526

Matthews, B.H.C. 1943 HUMAN LIMITS IN FLIGHT.
Proceedings of the Royal Institution of Great Britain 32(3):558-569, 1943.
See also Nature 153(3893):698-702, 1944.
See also Annual Report of the Smithsonian Institution, 1944, pp. 273-284.

ABSTRACT: The two greatest stresses which an aircraft puts upon a pilot are (1) those due to acceleration or rapid change of motion and (2) those due to high altitude flying.

Posture and seating can do much to relieve the effect of centrifugal force upon the body. A crouched position with legs raised lessens distance the heart must raise the blood to the head, and also less blood goes to the feet. In a prone position where head and heart are nearly the same height, the body can withstand a force of 10 g. However, this posture is fatiguing and inconvenient.

Breathing air the human safety limit is 16,000 feet, 40,000 feet with oxygen.

3,527

Matthews, B.H.C. 1944 HUMAN LIMITS IN FLIGHT.
Nature, (London), 153:698-702

ABSTRACT: Stresses of flying are enumerated and means of minimizing their effect on the pilot are described.

Posture and seating minimize the effects of centrifugal force. If the pilot is in a crouching position with legs raised the effect is lessened. In the prone position, since heart and head are at the same height, a man can withstand a centrifugal force of 10 g. This position is convenient and fatiguing. The effect of position on tolerance of acceleration is shown graphically. Tolerance is greatest in supine position with the feet extended in the direction of flight.

3,528

Matthews, R.H.C. 1945 HUMAN LIMITS IN FLIGHT
(Smithsonian Institute, Washington, D.C.) Publication 3785

ABSTRACT: A modern aircraft will climb in a few minutes to heights at which the air is so thin that will no longer support life. It can turn and maneuver so fast that pilot may easily be rendered unconscious from the mechanical forces which it imposes on his body, and in an aircraft which is moving rapidly in three planes of space the pilot can be subjected to stresses beyond the limits which the human body can stand. Besides the stresses from wind pressure, cold, vibration, and noise, the pilots body must also be protected from other less obvious stresses. The two greatest stresses which an aircraft puts upon the pilot and those reviewed in this publication are those stresses due to acceleration and those due to high flying in the rarefied air of the upper atmosphere.

3,529

Matthews, B. H. C. 1953 ADAPTATION TO CENTRIFUGAL ACCELERATION.
(Physiological Laboratory, University of Cambridge)

ABSTRACT: The well-known effects of centrifugal acceleration on man and large animals spring from the disturbance of the circulation resulting from the hydrostatic pressure gradients set up. In addition, the hindrance to muscular movement in man is subjectively striking.

In small animals, however, it is to be anticipated that the short hydrostatic columns will not lead to great circulatory disturbance. The effective increase of weight of body and limbs, however, remains.

3,530

Rats have been reared under continual centrifugal acceleration giving a total of three times that of gravity. They thrive under these conditions and are able to perform normal locomotion; a functional derangement of the whole mechanism of antigravity tonus appears to take place to enable them to do so.

The rats remain of below control weight and have lived for over a year and a half under these conditions. A few have been decerebrated and show striking extensor tonus. They also show some abnormal types of movement when placed under normal conditions.
Growth in an environment where the normal ratio of mass to weight is altered by a factor of three shows that functional adaptation can occur within the nervous system to meet these conditions; this adaptation is achieved without great macroscopic distortion, but some microscopic changes seen are thought to relate to the changed environment. (J. of Physiology 122:31P, July 24-25, 1953)

3,531

Matthews, B. H. C. 1953 ADAPTATION TO CENTRIFUGAL ACCELERATION
Jour. Physiol.,London, 122 (3):31P

Abstract: The well-known effects of centrifugal acceleration on man and large animals spring from the disturbance of the circulation resulting from the hydrostatic pressure gradients set up. In addition, the hindrance to muscular movement in man is subjectively striking. In small animals, however, it is to be anticipated that the short hydrostatic columns will not lead to great circulatory disturbance. The effective increase of weight of body and limbs, however, remains. Rats have been reared under continual certrifugal acceleration giving a total of three times that of gravity. They thrive under these conditions and are able to perform normal locomotion; a functional derangement of the whole mechanism of antigravity tonus appears to take place to enable them to do so. The rats remain at below control weight and have lived for over a year and a half under these conditions. A few have been decerebrated and show striking extensor tonus. They also show some abnormal types of movement when placed under normal conditions. Growth in an environment where the normal ratio of mass to weight is altered by a factor of three shows that functional adaptation can occur within the nervous system to meet these conditions, this adptation is achieved without great macroscopic distortion, but some microscopic changes seen are thought to relate to the changed environment.

3,532

Matthews, B. H. C. 1956 SOME FREE FALL EXPERIMENTS.
(Paper, 20th International Physiological Congress, 20 July-4 Aug. 1956)
In Proceedings of the Twentieth International Physiological Congress, (Brussels, 1956).

3,533

Matthews, B. H. C. 1956 TENDON REFLEXES IN FREE FALL.
(Paper, Meeting of the Physiological Society, University Laboratory of Physiology, Oxford. 2 June 1956.)

ABSTRACT: Free fall leads to vigorous reflex responses in animals. Some of these have been analysed by cinema records (McDondld, 1955). Conditions approaching those of free fall are met with by man for short periods in some aircraft manoeuvres and in parachute drop with delayed opening, but little exact analysis of reflex responses is possible under such conditions.

A drop platform has been constructed for human subjects giving up to 500 msec of free fall with facilities for automatic test and recording of tendon reflexes during fall. The muscle action potential in response to a tap on the tendo Achillis at various times after the start of free fall is greatly altered. In unhabituated subjects tested the reflex is absent after 140 msec free fall; in some subjects it disappears earlier than this. This does not appear to be due to any change in the state of stretch of the muscle concerned, but to change in excitability of the reflex, produced centrally. This could occur either via alpha or gamma neurones; present evidence does not make it possible to decide which.

This suppression of the tendon jerk appears to be a necessary precursor for a safe landing to allow the muscles to extend during a suddenly applied stretch.
(J. of Physiology 133:31P. 1956)

3,534

Matthews, B., & T.C.D. Whiteside 1960 TENDON REFLEXES IN FREE FALL
Proc. Roy. Soc. B. 153(951):195-204

ABSTRACT: A falling chair has been used to study the neurological state of human subjects who are suddenly dropped. The sudden transition from 1 to 0 g produces changes in shape of all soft tissues, and elongation of the trunk. Complex voluntary activity becomes impossible immediately after the start of falling, coarse voluntary control is retained. The ankle jerk is temporarily suppressed and analysis suggests this is due to changes of shape of the muscle consequent on weightlessness. The experiments here are concerned with reactions of human subjects to the abrupt change from 1 to 0 g when a subject is suddenly allowed to fall. Much work has already been done in aircraft and rockets to investigate the effects of weightlessness on human beings and animals but under these conditions the onset of 0 g usually occurs slowly.

3,535

Matthews, B.H.C. c.1962 [EFFECTS OF PROLONGED ACCELERATORY STRESS ON RATS] and [EFFECTS ON MAN OF ABRUPT TRANSITION FROM 1 TO 0 G.] Unpublished.

ABSTRACT: Since Matthews is interested primarily in problems of applied physiology especially pertinent to certain requirements of military importance, it might appear desirable for him to publish more often. He has maintained a colony of rats under an acceleratory stress of 3 g for several years. The only published account of this work is an abstract published in 1953. The experiment is still under way and we may look forward to a comprehensive paper on the problem within the next few months. The animals have adapted very well indeed to their new environment. It is considered worth while at this time to paraphrase the earlier abstract (Proceedings of the Physiological Society, 24-25 July, 1953) in this report.

Mathews is also studying righting reflexes in man subjected to free fall. A falling chair has been used to study the neurological state of human subjects who are suddenly dropped. The sudden transition from 1 to 0 g produces changes in shape of all soft tissues, and elongation of the trunk. Complex voluntary activity becomes impossible immediately after the start of falling; coarse voluntary control is retained. The ankle jerk is temporarily suppressed, and analysis suggests this is due to changes of shape of the muscle consequent to weightlessness. The experiments here are concerned with reactions of human subjects to the abrupt change from 1 to 0 g when a subject is suddenly allowed to fall. Much work has already been done in aircraft and rockets to investigate the effects of weightlessness on human beings and animals, but under these conditions the onset of 0 g usually occurs slowly.

3,536

Maurer, Martin 1961 A STUDY OF COMPENSATION METHODS FOR INERTIAL ACCELEROMETERS. (Kearfott Div., General Precision, Inc., Little Falls, N.J.); ASTIA AD 274 158.

ABSTRACT: The characteristics and limitations of the force-mass, spring-restrained, the force-balance inverted pendulum, and the torque-balance gyroscopic accelerometers are investigated. Various static and dynamic errors of each type of accelerometer are mathematically analyzed and examined from the viewpoint of applying electronic compensation to reduce these errors. Results show the difficulty of singling out a particular error for electronic compensation. The advantages of improving an accelerometer's dynamic performance are minimized by the fact that the included errors were negligible when considered from the viewpoint of the navigational system. Results of the accelerometer's static errors are included. (Author)

3,537

Maurizi, M. & F. Dittrich 1962 ON SOME NYSTAGMOGRAPHIC RESULTS OBTAINED WITH SUPRALIMINAL ACCELERATIONS AND DECELERATIONS OF MARKED INTENSITY AND SHORT DURATION.
Valsalva 38:281-287, Dec. 1962 (It)

3,538

Maxwell, S. S., V. L. Burke, & C. Reston 1922 THE EFFECT OF REPEATED ROTATION ON THE DURATION OF AFTER-NYSTAGMUS IN THE RABBIT. Amer. J. Physiol. 58:432-438.

3,539

Maycock, R. & G.M. Morant 1951 TRIALS OF DRAMIMINE AS A PREVENTATIVE FOR AIRSICKNESS. (RAF Institute of Aviation Medicine, Farnborough) FPRC Memo 20, Feb. 1951. ASTIA AD 110 142

ABSTRACT: The trials relate to a total of 118 paratroops made up by six subgroups. Each of these formed a party of passengers in a towed glider. Half an hour before each flight the men were given either a tablet of dramamine, or a similar tablet used as a placebo or nothing, and the three sets were approximately equal in size. For all the flights taken together there was little distinction between the three series of men as far as previous flying experience and previous motion sickness are concerned. The incidence of sickness (nausea, dizziness or vomiting) during the flights was least for the men given dramamine (17 per cent) and greater with marked statistical significance for the men given the placebo (55 per cent), or nothing (46 per cent). The series are not clearly distinguished from one another on account of side effects during flight, or the conditions of the men shortly after landing.

3,540

Mayerson, H. S., & L. A. Toth 1939 THE INFLUENCE OF POSTURE ON SKIN AND SUBCUTANEOUS TEMPERATURES. Amer. J. Physiol. 125:474-480

3,541

Mayerson, H. S., H. M. Sweeney, & L. A. Toth 1939 THE INFLUENCE OF POSTURE ON CIRCULATION TIME. Amer. J. Physiol. 125:481-485

3,542

Mayerson, H. S., & G. E. Burch 1940 RELATIONSHIPS OF TISSUE (SUBCUTANEOUS AND INTRAMUSCULAR) AND VENOUS PRESSURES TO SYNCOPE INDUCED IN MAN BY GRAVITY. Amer. J. Physiol. 128:258-269

3,543

Mayerson, H. S. 1942 THE INFLUENCE OF POSTURE ON BLOOD FLOW IN THE DOG. Amer. J. Physiol. 136:381-385

3,544

Mayerson, H.S. 1944 A CARDIOVASCULAR "BLACKOUT" TEST. J. Aviation Med. 15:304-315.

ABSTRACT: This report deals with a procedure designed to improve the tilting test for use in determining the physiologic aptitude for flying. A modified Martin bicycle ergometer was used.

Of the 50 subjects tested, 23 made good responses, 17 fainted and 10 made poor responses. Of the 10 who fainted transient blurring of vision was noted in 2.

Gross inspection of the available material leaves no doubt but that the subjective and objective syncopal manifestations in the post-exercise period are the result of the lowering of the systolic pressure to a level which is no longer adequate to provide for the proper blood flow to the eyes and brain.

Because of the suggested correlation between susceptibility to fainting and ease of "blacking out" when pulling out of a dive, the test described is proposed as a particularly suitable method of selecting pilots for combat flying.

3,545

Maynard, A. de L., E.A. Naclerio, and J.W.V. Cordice 1955 TRAUMATIC INJURY TO LUNG. Amer. J. Surg. 90:458-468.

3,546

Mayne, R. 1950 THE DYNAMIC CHARACTERISTICS OF THE SEMI-CIRCULAR CANALS. J. Comp. Physiol. Psychol. 43:309-319

3,547

Mayne, R. 1951 THE AUDIOGYRAL ILLUSION AND THE MECHANISM OF SPATIAL REPRESENTATION.
Goodyear Aircraft Corp. Bull., GER-2863, 1-15, Akron, Ohio.

3,548

Mayo, A. M. 1951 BASIC ENVIRONMENTAL PROBLEMS RELATING TO MAN IN THE "AEROPAUSE" AS SEEN BY AN AERONAUTICAL ENGINEER. (Douglas Aircraft Co., Inc., El Segundo, Calif.) ASTIA AD-87 435; 6 Nov. 1951

ABSTRACT: While many new factors and principles must be considered in design for flight in the AEROPAUSE, emphasis on the cardinal principles of working toward the optimum pilot-airplane combination, will probably pay the greatest total dividend in operational efficiency. This principle can best be approached by making use of the best available aeromedical and engineering data, in order to arrive at workable compromises in each. Some of the new problems will radically affect some of the equipment associated with the airplane.

New problems include those of fit and arrangement of the aircraft cabin, time-distance factor, temperature of the aircraft, pressure environment in the cabin, acceleration, noise and vibration and the escape problem.

3,549

Mayo, A.M. 1952 BASIC ENVIRONEMNTAL PROBLEMS RELATING MAN AND THE AEROPAUSE AS VISUALIZED BY THE AERONAUTICAL ENGINEER

In: White, C.S. & O.O. Benson, Jr., eds., Physics and Medicine of the Upper Atmosphere, A Study of the Aeropause (Albuquerque, New Mexico: University of New Mexico Press, 1952) Pp. 6-22

ABSTRACT: Flight in the aeropause will impose great physiological and psychological demands on pilot and crew. The rapid advances in aircraft construction call for a corresponding step-up in education and training. The human factor should, on the other hand, be considered in the design of equipment and instrumentation. The latter should be reduced to the absolute eseentials. Further clarification of the visual effects of reduced light dispersion is required. The reduction of the time-distance factor in high-speed flight will put more reliance on automatic control mechanisms, confining the human element to slow-rate monitoring operations. Temperature regulation systems will have to be adapted to the increasing speeds (a chart indicating various cooling systems practicable at the various speed ranges is presented). Problems concerning pressurization, physiological effects of acceleration, of noise, and vibration are discussed. Brief sections are dedicated to radiation and meteor hazards. General principles of escape mechanisms are analyzed. In conclusion it is recognized that a compromising formula is to be worked out to balance all factors involved and keep the resulting costs at a minimum.

3,550

Mayo, A. M. 1956 ENVIRONMENTAL CONSIDERATIONS OF SPACE TRAVEL FROM THE ENGINEERING VIEWPOINT.
Interavia 11(6):435-438.

ABSTRACT: The basic medical, physical and engineering data for manned flight in free space, while still inadequate, are rapidly being assembled. Progress

to date has been made possible by the combined effort of people in practically every branch of science. As the day of manned space flight is more closely approached, a drastic increase in the amount of effort will be needed to answer the increasingly detailed questions incident to actual design fabrications and operation of the manned space craft.

3,551

Mayo, A.M. 1956 ENVIRONMENTAL CONSIDERATIONS OF SPACE TRAVEL FROM THE ENGINEERING VIEWPOINT.
J. Aviation Med. 27(4):379-389.

ABSTRACT: The basic medical, physical and engineering data for manned flight in free space, while still inadequate, are rapidly being assembled. Progress to date has been made possible by the combined effort of workers in almost every branch of science. As the day of manned space flight is more closely approached, a drastic increase in the amount of effort will be needed to answer the increasingly detailed questions incident to actual design fabrications and operation of the manned space craft.

3,552

Mayo, A.M. 1957 SOME SURVIVAL ASPECTS OF SPACE TRAVEL
Journal of Aviation Medicine 28(5): 498-503

ABSTRACT: In a space craft as in aircraft the over-all objectives must command first attention. Survival problems resulting from space environment will be so severe however, that a larger percentage of total space craft design time is likely to be spent in their solution than in airborne craft. The design of crew compartments will be dictated by the requirements of human operators not significantly different in basic physical and mental capabilities from those of the pilots of present aircaaft. Automatic controls will be needed as greatly for actuation of safety equipment and environmental control of the crew quarters as in control of the craft and its propulsion and power systems. A major problem will be that of suitably linking the human operator to his "automatic" systems. Hermetically sealed crew quarters to provide a livable earth environment in space will be a prime survival requirement. The reconversion of liquid and food waste products to useful nutrients that are psychologically satisfactory might be approached by the use of secondary living organisms in the same manner as in nature. Temperature control will undoubtedly require specialized attention. The possibly dangerous stresses to be encountered during space flight include weightlessness and acceleration. The problems of surviving the effects of a wide variety of solar and cosmic radiation are other dangers. Careful consideration must be given to a proper balance of the fundamental moral, morale and economic factors to provide escape equipment justifiably on the basis of the total purpose of the craft involved.

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Mayo, A.M. 1962 REVIEW OF NASA IMPACT WORK AND PLANS
In Impact Acceleration Stress: Proceedings of a Symposium With a Comprehensive Chronological Bibliography, National Academy of Sciences, National Research Council, Publication #977, Pp. 5-16

ABSTRACT: To meet its statutory responsibilities, the National Aeronautics and Space Administration's interest in human impact acceleration must include: (1) A search for knowledge from and in support of space exploration. (2) Research and development to answer specific problems related to manned space flight. (3) The stimulation of industrial and military application of information available from past research.

The NASA is now sponsoring research and is prepared to sponsor or conduct additional research and development which can result in improvements to manned space flight. The need for limited research efforts on human tolerance to impact along axes other than horizontal and vertical is presently identified.

It is considered particularly important that the people involved in acceleration research work be continually alert to identify possible efforts which can result in large versus marginal gains.

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Mayou, D. 1942 VISUAL PROBLEMS IN CONNECTION WITH AIRSICKNESS (RAF, Institute of Aviation Medicine, Farnborough) FPRC Report no. 464; May 1942, ASTIA ATI-206 853

ABSTRACT: Investigations on visual tests were conducted using 201 people divided into three groups. From the results of the tests, the following conclusions were reached: visual acuity does not decrease as a result of swinging or gliding tests; adduction power tends to decrease after swinging and gliding, but not to a degree that would affect the efficiency of personnel; and depth perception remains stable after swinging and gliding, and there is no deterioration after nausea or vomiting, but there is an interesting feature arising which indicates that esopheria becomes converted into relative exophoria. The results of the Bishop Harman Diaphragm test are of little importance, as readings considered to be defective must be greater than 5. The average increase in error for all groups fell wit in these limits. It may be concluded that there is no deterioration in night visual capacity after swinging or gliding. Nausea or vomiting has no adverse effect..

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Mayskii, I. 1961 KOSMOS I BIOLOGIYA (Space and Biology)
(Trans. of Meditsinskii Rabotnik (USSR) 24(30)(1986):3, 1961)
(Office of Technical Services, Washington, D.C.) 61-27228

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Mazelsky, B. 1950 CHARTS OF AIRPLANE ACCELERATION RATIO FOR GUSTS OF ARBITRARY SHAPE.
(National Advisory Committee for Aeronautics, Washington, D.C.)
Technical Note 2036, Feb. 1950. ASTIA ATI 68 639.

SUMMARY: The equation of vertical motion for an airplane flying in gusty air is simplified in order that its solution is a function of only two parameters, namely, the mass parameter of the airplane and the shape of the gust the airplane is penetrating. The solutions of the quation are presented in the form of charts that can be used for estimating rapidly and easily the acceleration ratios encountered by airplanes with different mass parameters penetrating a sharp-edge gust, a gust of arbitrary shape, or a triangular gust. (Author)

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Mazer, M. 1945 THE G SUIT IN COMBAT.
Air Surg. Bull., 2:236-238

ABSTRACT: Presents data on the occurence of grayout and blackout and the highest G force ever experienced as recorded by the Kollsman accelerometer in 35 pilots who wore the G suits on all missions. Ten of the pilots had had grayout but not blackout. Of these, 9 had been exposed to 5 G or more. Of the 4 who had blacked out, 3 had been exposed to 6 G or more. Of the 21 who had never grayed out, 17 had experienced 5 G or more and 14, 6 G or more. Of the 31 who had never blacked out, 20 had experienced a force of 6 G or more. Six pilots had experienced 7 to 7.9 G and 5.8 to 9 G without blacking out.

It is concluded that the G suit is an important factor in increasing the combat efficiency of the P-51 pilot-aircraft combination.

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Mazza, G. 1963 NEW ACQUISITIONS ON VESTIBULAR PHYSIOLOGY AND PHYSIOPATHOLOGY DURING SPACE FLIGHT.
Riv. Med. Aero. 26:99-136, Jan.-Mar. 1963 (Italy)

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Mazza, V. 1947 PNEUMATIC CATAPULTS FOR SIMULATED SEAT EJECTION TESTS.
(Engineering Division, Air Materiel Command) Sept. 1947.
ASTIA ATI 49510

ABSTRACT: Preliminary tests were conducted of two types of pneumatic catapults which were developed for use on the ejection seat test tower to

determine the most tolerable acceleration-time diagrams on human subjects. In one catapult type, acceleration is controlled by metering compressed air through a series of orifices in the cylinder which are uncovered successively by movement of the piston. The other pneumatic catapult is accelerated by air metered by a mechanically actuated air valve which is positioned through a cam arrangement by the upward displacement of the ejection seat. The two methods were shown to be feasible, with the former method recommended for work with human subjects from the standpoint of safety and simplicity.

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Mazza, V., R.W. Briggs, C.E. Caroll, & R.V. Wheeler 1950 HIGH ALTITUDE BAILOUTS. (USAF, AMC, Wright-Patterson AFB, Ohio) Memo Rept. No. MCREXD-695-66M.

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Mazza, V. 1951 HIGH ALTITUDE BAILOUTS. J. Aviation Med. 22(5):403-407. Oct. 1951.

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Mazzei, J.H. 1961 A COMPARISON STUDY. CONFINED VS UNCONFINED TEST DATA. A CHECK STUDY. INSTRUMENTATION RESPONSE AT HIGH FREQUENCIES. (Feltman Research Labs., Picatinny Arsenal, Dover, N.J.) Technical rept. no. FRL-TR-45, ASTIA AD-263 564L, September 1961

ABSTRACT: Confined and unconfined dynamic drop tests were conducted on like specimens of cushioning material of known density, size, and under comparable environmental conditions. The data collected from these tests were employed to plot, on the same graph, a static load-vs-peak acceleration curve, one for confined and one for unconfined data. A comparison of these curves shows conclusively that there is considerable difference in the dynamic behavior of the cushion in the confined, or as-packaged, condition. Beyond the optimum loading range, the peak accelerations transmitted by the unconfined cushion, continue to rise sharply, while peak accelerations for the confined cushion show a secondary decrease beyond the optimum loading range, the peak accelerations transmitted by the unconfined cushion, continue to rise sharply while peak accelerations for the confined cushion show a secondary decrease beyond the optimum loading range, before starting a secondary increase beyond bottoming-out. (Author)

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Meda, E. July-Sept. 1951 [VALUES OF THRESHOLD OF ANGULAR VELOCITY FOR PHENOMENON OF CORIOLIS AND OF PURKINJE IN MAN.] Riv. Med. Aeronaut. 14:453-456

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Meda, E., tr. E.R. Hope 1952 A RESEARCH ON THE THRESHOLD FOR THE CORIOLIS AND PURKINJE PHENOMENA OF EXCITATION OF THE SEMICIRCULAR CANALS. Arch. di Fisiol. 52:116-134. (Defence Scientific Information Service, DRB, Canada) Translation T 17 I, 15 Sept. 1954. ASTIA AD 50 280.

ABSTRACT: "The uniform angular velocity, proportional to the threshold acceleration for the development of the Coriolis and Purkinje vertigos, has been determined in six normal subjects. The angular velocities found were 14.7°/sec ± 1.39° for the Purkinje phenomenon, when the forward bending of the head took place in about 1/5 of a second. In the text of the paper we have discussed the application of the Coriolis theorem, and have demonstrated that all the ampullary receptors participate in the Coriolis and Purkinje phenomena. A mathematical foundation is laid for determining the threshold acceleration."

3,565

Meehan, J.P. 1959 RENAL PLASMA FLOW UNDER POSITIVE ACCELERATION (Paper, Meeting of Aero Medical Association, Statler Hilton Hotel, Los Angeles, April 27-29, 1959)

ABSTRACT: Exposure to positive acceleration elicits a pressor response that may reasonable produce a change in the over-all vascular resistance of the kidney. A study of PAH and creatinine clearances has been undertaken in an effort to determine the extent to which the renal circulation is involved in this pressor response. Subjects were exposed to an acceleration of 3 G for 10 minutes on the human centrifuge. By means of a constant infusion technique, PAH and creatinine clearances were determined for a 20 minute period that included the 10 minute G exposure. Automatic blood sampling permitted proper timing for the blood samples. Renal plasma flow during acceleration is below resting control values. Because of changes in renal arterial and venous pressures under positive accelerations, renal vasoconstriction is indicated.

3,566

Meehan, J. P., & E. Jacobs 1959 PHYSIOLOGIC PRODUCTION OF CATECHOL AMINES IN RESPONSE TO SEVERAL PHYSICAL STRESSES. (Wright Air Development Division, Wright-Patterson AFB, Ohio) WADD TR 59-534; Sept. 1959

ABSTRACT: Measurements of tne physiologic production of adrenaline and noradrenaline in response to four standardized physical stresses were undertaken on young

adult male subjects. Plasma levels of noradrenaline were found to increase significantly in exercise and the increase appears to bear a positive relationship to the physiologic severity of the exercise. Plasma levels of noradrenaline did not change as the result of the cold pressor test or as the result of exposure to positive accelerations of 3 g for 5 minutes. Renal plasma flow was not altered as the result of similar exposure to acceleration lasting for 10 minutes.

3,567

Meehan, J.P. & H.I. Jacobs 1959 RELATION OF SEVERAL PHYSIOLOGICAL PARAMETERS TO POSITIVE G TOLERANCE.
(Wright Air Development Division, Wright-Patterson AFB, Ohio)
WADC-TR-58-665, Jan. 1959. ASTIA AD 209 387.

ABSTRACT: A series of experiments was undertaken in an attempt to relate several physiologic parameters to positive g tolerance. Blood pressure, blood volume, and physical condition as measured by both the Harvard Step Test and a modified physical fitness test were the parameters studied. Subjects were studied at the end of one month of enforced rest and again at the end of one month of supervised physical training. It can be concluded that considerable change in the physical condition of an individual does not affect his tolerance to positive acceleration. (Author)

3,568

Meehan, J. P. and Edith Jacobs 1960 VENOUS PLASMA LEVELS OF CATECHOL AMINES IN SEVERAL PHYSICAL STRESSES
Aerospace Medicine 31(9):733-738 September 1960

ABSTRACT: The venous plasma levels of adrenaline and noradrenaline have been studied in relation to the physiologic responses seen in several physical stresses. The stresses studied were the Harvard Step Test, a treadmill exercise, the Cold Pressor Test, and positive acceleration. Exercise consistently produced elevations of plasma noradrenaline concentrations. The Cold Pressor Test yielded negative results, while the acceleration studies showed markedly variable responses. The data indicate that anticipation of the experiment may significantly raise control or resting plasma levels of noradrenaline. Plasma levels of adrenaline did not show consistent variations in these experiments.

3,569

Meehan, J.P. & W. Brandt 1960 PARA-AMINO HIPPURATE AND ENDOGENOUS CREATININE CLEARANCES IN POSITIVE ACCELERATION.
Aerospace Med. 31(3):220-223, March 1960.

ABSTRACT: In eight experiments conducted on three subjects, exposure to a positive acceleration of 3G for ten minutes did not demonstrate any consistent changes in PAH clearances or creatinine clearances from control values.

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Meehan, J. P. 1960 RENAL RESPONSES TO POSITIVE ACCELERATION. (Wright Air Development Division, Wright-Patterson AFB, Ohio) WADD TR 60-637; ASTIA AD-247 461

ABSTRACT: The para-amino hippurate (PAH) clearances, creatinine clearances and urine flows of young male subjects exposed to positive acceleration have been studied. Exposures at 3 g for 10 min produced no consistent changes in the above parameters from control values. Longer exposures at 3 g produced a reduction of the para-amino hippurate (PAH) clearance in some subjects, no consistent changes in creatinine clearances, and significant reductions in urine flow following centrifugation. It is concluded that positive acceleration as used in the present experiments affects the kidney primarily through mechanisms involving a reduction of the thoracic blood volume. (AUTHOR)

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Meehan, J. P., & T. J. McNey 1961 THE ELECTROENCEPHALOGRAM DURING POSITIVE ACCELERATION. (Paper, 32nd Annual Meeting, Aerospace Medical Assoc., 24-27 Apr. 1961, Chicago, Ill.)

ABSTRACT: Studies were made of the electroencephalogram as a physiologic indicator of blackout and early unconsciousness in man induced by positive acceleration. Fifteen-second exposures at constant acceleration and exposure to gradual onset acceleration of 1.5 g/min. were programmed. Needle electrodes were used. A simple adjustable helmet provided good mechanical support. Results indicated that no alterations in the electroencephalogram occurred during blackout. The ones occurring with loss or recovery of consciousness might have been significant if like changes had not sometimes been noted without such clinical events present. Conscious muscular effort frequently produced motor activity in the electroencepha logram similar to that observed during unconsciousness. The conclusion seems to be, therefore, that the electroencephalogram has doubtful reliability as a sole measure of consciousness in subjects exposed to positive acceleration. (Aerospace Medicine 32(3):240, Mar. 1961)

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Meek, J.C., A. Graybiel, et al. 1961 OBSERVATIONS OF CANAL SICKNESS AND ADAPTATION IN CHIMPANZEES AND SQUIRREL MONKEYS IN A SLOW ROTATION ROOM. Proj. MR005.13-6001; May 1961. ASTIA AD 261 695.
See also Aerospace Med. 33:571-578, May 1962.

ABSTRACT: Chimpanzees and squirrel monkeys, with both normal and disturbed vestibular function, were subjected to varying degrees of rotation in the Pensacola Slow Rotation Room. The normal animals showed a form of canal sick-

ness similar to that observed in normal humans, and adaptation could be observed after exposure of the animals to subcritical stimulation for several days. The manifestations of canal sickness were correlated with labyrinthine function. It was found that canal sickness failed to develop in those animals which exhibited no nystagmus in bilateral caloric tests. These experiments point to the conclusion that in these animals as in man, the canal sickness experienced in a slow rotation room depends upon normal vestibular function. Thus the chimpanzee and the squirrel monkey may contribute considerably to the clarification of the etiology and final control of canal sickness. (Author)

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Meek, J.C., A. Graybiel, D.E. Beischer and A.J. Riopelle 1961 OBSERVATIONS OF CANAL SICKNESS AND ADAPTATION IN CHIMPANZEE AND SQUIRREL MONKEYS IN A "SLOW ROTATING ROOM."
(Paper, 32nd Annual Meeting, Aerospace Medical Association, 24-27 April 1961, Chicago, Ill.)

ABSTRACT: Chimpanzees and squirrel monkeys, with both normal and disturbed vestibular function, were subjected to varying degrees of rotation in the Pensacola Slow Rotation Room. The normal animals showed a form of "canal sickness" similar to that observed in normal humans, and adaptation could be observed after exposure of the animals to subcritical stimulation for several days. The manifestations of canal sickness were correlated with labyrinthine function. It was found that canal sickness failed to develop in those animals which exhibited no nystagmus in bi-lateral caloric tests. These experiments point to the conclusion that in these animals as in man, the canal sickness experienced in a slow rotation room depends upon normal vestibular function. Thus the chimpanzee and the squirrel monkey may contribute considerably to the clarification of the etiology and final control of canal sickness.
(Aerospace Med. 32(3):341, Mar. 1961)

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Meek, J.C., A. Graybiel, D.E. Beischer and A.J. Riopelle 1961 OBSERVATIONS OF CANAL SICKNESS AND ADAPTATION IN CHIMPANZEES AND SQUIRREL MONKEYS IN A "SLOW ROTATION ROOM."
Aerospace Med. 33(5):571-578, May 1962.

ABSTRACT: Chimpanzees and squirrel monkeys, with both normal and disturbed vestibular function, were subjected to varying degrees of rotation in the Pensacola Slow Rotation Room. The normal animals showed a form of "canal sickness" similar to that observed in normal humans, and adaptation could be observed after exposure of the animals to subcritical stimulation for several days. The manifestations of canal sickness were correlated with labyrinthine function. It was found that canal sickness failed to develop in those animals which exhibited no nystagmus in bilateral caloric tests. These experiments point to the conclusion that in these animals as in man, the canal sickness experienced in a slow rotation room depends upon normal vestibular function. Thus the chimpanzee and the squirrel monkey may contribute considerably to the clarification of the etiology and final control of canal sickness.

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Meeks, R. B., Jr., & E. R. Wells, Jr. 1961 FEASIBILITY OF USING A TERNARY MODE FOR PULSE TORQUING A PENDULOUS ACCELEROMETER. (Master's Thesis: Massachusetts Institute of Technology, 1961) (U. S. Naval Postgraduate School, Monterey, California) Rept. No. M426

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Meineri, G. 1955 EFFETTI FISIOPATOLOGICI E SPORAVIVENAZ DEL RATTO DOPO ACCELERAZIONI SECONDO L'ASSE CORPOREO LONGITUDINALE (Physiopathologic Effects and Survival of Rat Following Acceleration According to Longitudinal Body Axis; Description of Lesion)
Rivista di Medicina Aeronautica (Rome) 18: 322-337.

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Meller, C. L. 1951 MOTION SICKNESS.
J. A. M. A., 145: 1109

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Melville-Jones, G. 1955 THE LOSS OF AIRCRAFT CONTROL DURING A SINGLE RAPID ROLLING MANOEUVRE. (RAF, Institute of Aviation Medicine, Farnborough) FPRC Rept. 933, Oct. 1955.

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Melville-Jones, G. 1957 A STUDY OF CURRENT PROBLEMS ASSOCIATED WITH DISORIENTATION IN MAN-CONTROLLED FLIGHT. (RAF, Institute of Aviation Medicine, Farnborough) FPRC Rept. No. 1021., Oct. 1957.

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Melville, Jones, G. 1958 DISORIENTATION IN FLIGHT. (RAF, Instit. of Aviation Med., Farnborough) FPRC Memo. 96 Sept 1958.

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Melville-Jones, G. 1959 SOME ASPECTS OF LABYRINTHINE INFLUENCE UPON EYE MOVEMENT DURING RAPID ROTATIONAL MANOEUVRES. (RAF, Institute of Aviation Medicine, Farnborough) FPRC Memo 110 Dec. 1959.

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Melville-Jones, G. 1959 DISORIENTATION DUE TO RAPID ROTATION IN FLIGHT. (1st European Congress of Aviation Medicine). In Medical Aspects of Flight Safety (London: Pergamon Press, 1959)

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Melville-Jones, G. 1959 DISORIENTATION IN FLIGHT (1st Internat. Cong. of Aeronautical Sci.) Advances in Aeronautical Science. (London: Pergamon Press, 1959).
See also FPRC Memo 96, Sept. 1958.

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Melville-Jones, G. 1959 VESTIBULAR INTERFERENCE WITH VISION IN FLIGHT. Proc. of the Roy. Soc. of Med. 52:185.

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Melville-Jones, G. and W. Free 1960 A METHOD FOR SIMULTANEOUS MEASUREMENTS OF EYE MOVEMENTS ABOUT THREE ORTHOGONAL AXES. (RAF Institute of Aviation Medicine, Farnborough) FPRC Rept. 1156, Nov.1960.

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Melville-Jones, G. 1960 A NOTE ON SOME HUMAN FACTORS IN HELICOPTER FLYING (RAF, Institute of Aviation Medicine, Farnborough) FPRC Memo No. 142, July 1960.

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Melville-Jones, G. & D. Drazin 1961 OSCILLATORY MOTION IN FLIGHT (RAF Institute of Aviation Medicine, Farnborough) FPRC Rept. 1168, July 1961.

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Mendes, M.F. 1952 FATORES QUE AFETAM AOS AVIADORES, DURANTE, O DESEMPHENHO DE SEUS DEVERES (Factors Which Affect Aviators During the Performance of Their Duties)
Revista Medica da aeronautica (Rio de Janeiro) 4(3): 5-18, DSG(WL RE609, v. 4)

ABSTRACT: The last decade witnessed the expansion of the literature of aviation medicine. The majority of pertinent studies centered around three physical phenomena: the density of air, the ambient temperature, and acceleration. The factors most likely to affect the pilot during flight, such as altitude, temperature, noise, light, position of the body in flight, diet, and fatigue are analyzed in some detail.

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Mentzer, W.R. 1963 ANALYSIS OF THE DYNAMIC TESTS OF THE STRETCH YO-YO DE-SPIN SYSTEM. (National Aeronautics and Space Administration, Washington, D.C.) NASA TN D-1902. Sept. 1963.

ABSTRACT: Results of the stretch yo-yo feasibility and flight qualification tests are presented. These tests were conducted to prove the concept that the stretch yo-yo is a more accurate de-spin device than the rigid yo-yo, and to verify the analytical development of the stretch yo-yo properties. Variations in the design parameters and their effects on the final spin rate of the payload are noted in the analysis of the test results. The variables include initial spin rate, moment of inertia, and spring properties. A computer solution of the test payload equations of motion is included for comparison with the experimental results to confirm the mathematical analysis of the stretch yo-yo system. As a result of the successful flight qualification tests a stretch yo-yo was flown on Ariel I (1962 α 1) in April 1962.

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Rivista di Medicina Aeronautica, (Rome) 14:457-463, July-Sept. 1951.

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Mercier, A., G. Perdriel, and P. Ganas 1959 LA VISION DANS LE VOL A BASSE ALTITUDE ET A GRANDE VITESSE. (Vision in low altitude and high speed flying) Medecine Aeronautique (Paris), 14: 15-24

ABSTRACT: From the 271 answers to a questionnaire sent to test, fighter, and reconnaissance pilots and to all-weather fighter navigators, the authors

conclude that low-altitude, high speed flying does not precipitate a noticeable visual fatigue, but generates a nervous tension which, added to the effects of turbulence could impair the visual function. Vision is impaired by the increasing speed of scanning while sensory perception remains relatively slow. Reading the instrument panel or the map is almost impossible and the fatigue of accomodation is manifested, especially among radar navigators. Low-level obstacle jumping (impossible in jets) has no influence on vision. Detection and identification of an aircraft from a distance of 4.5 km is often difficult. Goggles are easily fogged because of the elevated cabin temperature, and especially if the oxygen mask is improperly adjusted. Vibrations, although usually rare, affect vision and often cause flyers to return to higher altitudes During night flying, watching the instruments impairs retinal adaptation and increases visual fatigue.

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ABSTRACT:
Mercier, A. La Vision Dans L'Aviation D'Aujourd Hui (Vision in Aviation Today NASA N62-17143
Beckman, E.L., T.D. Duane, & K.R. Coburn Limitation Of Ocular Motility and Pupillary Dilation In Humans During Positive Acceleration NASA N62-17144
McCulloch, C. The Acceptance of Contact Lenses in Military Personnel NASA N62-17145
Culver, J.F. & A.V. Adler Protective Glasses Against Atomic Flash NASA N62-17146
Curtis, J.L Visual Problems of High Altitude Flight NASA N62-17147
Evard, E. Le Clignement Des Yeux, Cause Possible D'Accident Aerien (Blinking of Eyes, Possible Cause of Airplane Accidents NASA N62-17148
Grether, W.F. Instrument Dials, Instrument Arrangement And Cockpit Design NASA N62-17149
Howard, P. The Origin of Black-out NASA N62-17150
Mercier, A. & G.Perdriel Les Problemes Visuels Dans Le Vol A Basse Altitude (Visual Problems in Flight at Low Altitude) NASA N62-17151
Mercier, A. & G. Perdriel L'Entrainement De La Vision Nocturne (Training for Night Vision) NASA N6217152
Mercier, A. & G. Perdriel Les Problemes Ophtalmologiques Poses Par L'utilisations Des Helicopteres Et Des Apparells A Decollage Et Atterrissage Verticaux (Opthalmological Problems Posed By the Use of Helicopters and Equipment For Vertical Take-Off And Landing) NASA N62-17153
Price, T.J.G. Visual Standards In The Selection Of Flying Personnel NASA N62 17154
Turnour, N.C. & C. McCulloch Eye Protection In Aviation NASA N62-17155
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Merz, M. 1962 WPLYW WARUNKOW WSPOLCZESNEGO LOTU NA NARZED WZROKU (EFFECT OF FLIGHT IN MODERN AIRCRAFT ON THE VISUAL APPARATUS) Lekarz wojskowy (Warszawa) 38(4):311-317.

ABSTRACT: High-altitude, high speed flight affects the visual apparatus, nervous system, and circulatory system. Special consideration is given to the eye as affected by supersonic speeds, accelerations, high altitudes, hypoxia, and sensory disorders.

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Messer, J.V., H.S. Levin & J. Pines 1962 THE EFFECTS OF ACCELERATION UPON CENTRAL CARDIOVASCULAR DYNAMICS
(Paper, NATO-AGARD Meeting, Paris, France, 1962)

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Metlitskii, L.V. & I.I. Kas'yan 1962 BIOCHEMICAL ASPECTS OF THE RADIATION METHOD OF PRESERVING FOOD PRODUCTS (AND) SOME HUMAN PHYSIOLOGICAL REACTIONS UNDER CONDITIONS OF ALTERNATING OVERLOADS AND WEIGHTLESSNESS (Joint Publications Research Service, San Francisco, Calif.) JPRS 17591 12 Feb. 1963
Trans. of Akademiya Nauk SSSR. Izvestiya (Seriya Biologicheskaya), 27(6): 869-884 and 896-908, 1962.

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Meyer, J. S. and D. Denny-Brown 1955 STUDIES OF CEREBRAL CIRCULATION IN BRAIN INJURY. II. CEREBRAL CONCUSSION. Electroencephalog. & Clin. Neurophysiol. 7:529.

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ABSTRACT: High-altitude, high speed flight affects the visual apparatus, nervous system, and circulatory system. Special consideration is given the eye as affected by supersonic speeds, accelerations, high altitudes, hypoxia, and sensory disorders.

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Michel, E.M. 1955 WINDBLAST TESTS OF THE MB-2 HELMET (Wright Air Development Ctr., Wright-Patterson AFB, Ohio) WADC TN 55-287, Nov. 1955. ASTIA AD 95 755

ABSTRACT: During 1954, three phases of windblast tests were conducted on the MB-2 semi-rigid helmet. The first two series of tests were made in conjunction with the B-47 downward ejection program sponsored by the Aircraft Laboratory. The first phase was carried on at Wright-Patterson Air Force Base by using an anthropomorphic dummy ejected downward from the observer's position. The second phase, using live subjects, was made at Eglin Air Force Base, Florida. The third test was carried out at the windblast facility of the Marquardt Aircraft Company, Van Nuys, California, using an anthropomorphic dummy seated in an ejection seat installed in front of a blast nozzle. Results of the tests have proved the MB-2 semi-rigid helmet has windblast retention capabilities and might possibly be a satisfactory replacement for the standard P-3 helmet. (CARI)

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Michielsen, H.F. 1957 THE CASE FOR THE LOW ACCELERATION SPACESHIP Astronautica Acta 3:130-152

ABSTRACT: Analysis of the mechanics of the escape trajectories for low-acceleration propulsion. The method used involves inversion of the formulation of the problem, i.e., a trial-and-error procedure is used to choose a probable trajectory, which is then used to compute the corresponding thrust components; if these components are economically justified in terms of fuel consumption, the trajectory is deemed feasible.

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Mickel, J. M. 1962 THE EFFECTS OF ACCELERATION ON THE 2d DENTITION. In Oeff Gesundheitsdienst 24:281-289, July 1962 (German)

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Mickelwait, A. B. 1962 LUNAR MISSIONS-LAUNCH TO RENDEZVOUS (Space Technology Labs., Inc., Redondo Beach, Calif.) (Paper, American Rocket Society, 17-19 July) ARS 2456-62.

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Mikhailov, A. A., Ed. 1960 STATIONS IN THE COSMOS: SELECTED ARTICLES Trans. of mono. Stantii v Kosmos; Sbornik Statei Moscow, p. 413-429, 1960.
(Joint Publications Research Service, New York, New York)
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Medico-biological investigations
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Mikhaylovskiy, G. P. 1963 CERTAIN RESULTS OF THE DEVELOPMENT OF SPACE BIOLOGY (Foreign Technology Division, Wright-Patterson AFB, Ohio) FTD-TT-63-358 Vestnik Akademiy nauk SSSR, Dekabr' 1962 pp. 105-108. ASTIA AD 408 420.

ABSTRACT: Some results of the Vostok 3 and Vostok 4 flights were discussed at the session of the Section of Biological Sciences of the Academy of Sciences of the USSR on 1 and 2 October 1962. This article reports the papers presented at this second session on the problems of space biology. V. I. Yazdovskiy and O. G. Gazenko reported results of biological experiments carried out in Satelloids and of studies made during the Vostok flights. These studies suggest that the flights gave rise to no pathological reactions. V. V. Antipov et al and A. V. Lebedinskiy et al discussed the problems of radiation. I. T. Akulinichev et al reported information collection by biological telemetry. Four groups presented papers on the effects of positive and angular acceleration and weightlessness on the vestibular apparatus and on the possibility of vestibular adaptation. Three groups discussed closed ecological systems. A. I. Oparin presented a paper on the possibility of extraterrestrial organisms.

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Mikula, J. 1951 POZOROVÁNÍ NEKTERYCH EMOCIONÁLNÍCH REAKCÍ VÝSADKÁRU (Observations On Certain Emotional Reactions In Parachutists) Vojenské Zdravotnické Listy, Prague, 20:128-129, May-June 1951.

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Milch, L. J., H. D. Frankl, & A. A. Renzi 1958 THE EFFECTIVENESS OF DRUGS AGAINST MOTION SICKNESS - PERPHENAZINE AND SYSTRAL. (School of Aviation Medicine, Randolph AFB, Texas) Rept. 59 20, Dec. 1958; ASTIA AD 207 232.

ABSTRACT: To test the effectiveness of the drugs perphenazine and systral against motion sickness, groups of unselected basic airmen were tested aboard a multi-engine aircraft. The subjects were equally divided into drug and placebo groups. The four-hour flight involved simulated turbulence. The end point was vomiting. Subsequent to the flight all subjects completed a questionnaire on side effects. Data from 223 subjects were analyzed for differences between drugs and placebo. Also, dogs were swing-tested after the administration of chlorpromazine and perphenazine to test the reliability of extending results of apomorphine inhibition to the relationship of the chemoreceptive zone to motion sickness.

SECOND ABSTRACT: The observation that a drug will inhibit apomorphine-induced emesis in dogs frequently leads to the suggestion that such a compound may be useful in the prophylaxis of motion sickness. Accordingly, trilafon^{R} (perphenazine), a drug with high activity against apomorphine-induced vomiting in dogs, and systral^{R}, an antiemetic analog of benadryl^{R} with little or no activity against apomorphine-induced vomiting in dogs, were tested for anti-motion-sickness activity in humans aboard aircraft. Neither furnished any protection. Further, dogs were swing-tested after the administration of chlorpromazine and perphenazine. In spite of the significant difference in protection against apomorphine-induced vomiting afforded by the two drugs (perphenazine much greater than chlorpromazine), perphenazine failed to protect against swing-induced vomiting and chlorpromazine furnished only 25 percent protection. These data emphasize the unreliability of extending the results of apomorphine inhibition to the relationship of the chemoceptive trigger zone to motion sickness. (Author)

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Miller, C.O., & J.A. Barton 1957 ANALYSIS OF EJECTIONS FROM JET FIGHTER AIRCRAFT. (Chance Vought Aircraft, Inc., Dallas, Texas) Rept. No. 11184 7 Oct. 1957.

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Miller, C.O. 1957 EVALUATION OF TRANSVERSE ACCELERATION(REAR TO FRONT) UTILIZING CONVENTIONAL AND SPECIAL RESTRAINT GEAR. (Chance Vought Aircraft, Inc., Dallas, Tex.) Rept. no. 10816, Feb. 1957