respiration signal during the Baker flight shown continuously from the prelaunch thru the postbooster cutoff phases to demonstrate the reliability of this measuring technique. Except for the temporary 60-second loss of the respiration-rate signal on the Old Reliable flight, all devices performed as desired for the entire telemetered flight-data period. In the case of the Baker flight, the physiological and environmental measurement channels were still in operating condition when tested aboard the recovery vessel.

2,550

Hixson, W. C., & J. I. Niven 1961 APPLICATION OF THE SYSTEM TRANSFER FUNCTION CONCEPT TO A MATHEMATICAL DESCRIPTION OF THE LABYRINTH. I. STEADY-STATE NYSTAGMUS RESPONSE TO SEMICIRCULAR CANAL STIMULATION BY ANGULAR ACCELERATION. (U.S. Naval School of Aviation Medicine, Pensacola, Fla. & the National Aeronautics and Space Administration) Joint Rept. MR005.13-6001; Subtask 1; Rept. No. 57; and NASA Order No. R-1; ASTIA AD-262 787

ABSTRACT: Existing theoretical formulations for the description of vestibular function are directed toward defining the physical characteristics of the cupula-endolymph system. A more comprehensive format capable of defining the dynamic behavior or performance characteristics would be desirable. The interpretive advantages offered by the application of the system transfer function concept to the description of the human cupula-nystagmus response to angular acceleration are discussed. A specific mathematical formulation has been developed for this concept with particular emphasis being given to the damping ratio and to the undamped characteristic angular frequency parameters which have been utilized so effectively in the control and servomechanisms areas to describe the performance of complex systems. The theoretical considerations involved in the use of the frequency response technique to analyze steady-state nystagmus response to sinusoidal rotation are outlined along with a demonstration of an actual experimental procedure which can be used to quantify these relationships. (AUTHOR)

2,551

Hixson, W. C., & J. I. Niven 1962 FREQUENCY RESPONSE OF THE HUMAN SEMICIRCULAR CANALS. II. NYSTAGMUS PHASE SHIFT AS A MEASURE OF NONLINEARITIES. (Naval School of Aviation Medicine, Pensacola, Fla.) Project MR005.13-6001 Subtask 1, Rept. No. 73; NASA Order No. R-37, 26 July 1962

ABSTRACT: The existence of nonlinearities in the steady-state response of the oculovestibular system to sinusoidal angular acceleration is demonstrated by evaluation of corneo-retinal potential recordings obtained at rotation frequencies of 0.02 to 0.20 cps with peak acceleration levels ranging from 10 to 80 deg/sec^2. The experimental and theoretical considerations involved in using the nystagmus transition technique to study these nonlinearities are discussed and an illustrative application of their quantification is presented. (AUTHOR)

2,552

Hodell, C.K. & A.H. Rosner 1957 EJECTION SEAT TESTS CONDUCTED ON THE 10,000 FOOT AERODYNAMIC RESEARCH TRACK AT EDWARDS AIR FORCE BASE (Wright Air Development Ctr., Wright-Patterson AFB, Ohio) WADC TR 52-63; Nov. 1957. ASTIA AD 142 103

ABSTRACT: Eight ejection seat tests were conducted on the 10,000 ft. track from Dec. 1949 to July 1950 to analyze the resultant trajectories of the ejection seat and the acceleration forces imposed upon a dummy subject. The cockpit mockup was designed to simulate the forward cockpit opening of the XF-89 airplane with canopy removed. Instrumentation in the test carriage consisted of a complete telemetering recording system which transmitted intelligence via a mobile transmitter to receiving and recording equipment at a fixed station and a carriage motion recording system from which carriage velocity was obtained. Results indicate that ejection accelerations were not accurately determined because acceleration rocket burnout occurred at or near station of seat ejection, and the test vehicle porpoised because of clearance between vehicle slippers and railhead. The elastic structure of ejection seat and test vehicle, and stretching of harness assembly which held dummy in ejection seat also prevented accurate measurements. The deceleration forces imposed on the vehicle and seat were of such high magnitudes that in-flight seat trajectories could not be simulated. The seat should be ejected in a state of zero acceleration.

2,553

Hodge, J.D., C.C. Kraft, Jr., C.W. Mathews and S.A. Sjoberg 1962 OPERATION REQUIREMENTS AND PLANS. In Results of the First U.S. Manned Orbital Space Flight, February 20, 1962 NASA, Manned Spacecraft Ctr., Pp. 1-3

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Hodgson, V.R., L.M. Patrick & H.R. Lissner 1963 EXPERIMENTAL RESPONSE OF THE SEATED HUMAN CADAVER TO ACCELERATION AND JERK WITH AND WITHOUT SEAT CUSHIONS. (Biomechanics Research Center, Wayne State University) June 1963.

ABSTRACT: This paper describes tests conducted on three cadavers in the seated position and accelerated in the caudocephalid direction, with 18 G jerk acceleration and jerk amplitudes to 2600 G's per second. Spring seats were used to observe effect of cushions. Experiments were conducted on a 120' vertical accelerator mounted in an elevator shaft. Strain gages were mounted on various vertebrae and accelerometers attached to the seat, and on crest of ilium, sternum and head. Each cadaver was restrained with head, arm, leg, shoulder and seat belts. The objective was to determine the effect of a jerk and cushion noticed on the response of a cadaver at various levels of acceleration, on the response of the human cadaver as a spring mass system, and on strain in the vertebral column. A number of conclusions were made; among these that no cushion is better than any cushion; jerk causes overshoot of strain or acceleration of increase almost linearly up to a maximum value dependent upon the mean acceleration, the degree of overshoot of acceleration on the body increases in seventy with distance from seat, and this overshoot is most severe and critical in some locations in the posterior parts of the vertebrae due to process interference during caudocephalid loading of the vertebral column. (CARI)

2,555

Hoekje, J. W. 1957 DOFL PROGRAM CENTRIFUGE
(Diamond Ordance Fuze Labs., Washington, D. C.) DOFL rept. no. TR-420
15 Jan. 1957, ASTIA AD 119 558

ABSTRACT: The ultralow-g centrifuge, designed and built in 1952 at NBS, was modified to provide a program centrifuge capable of generating a specific series of acceleration vs time (g vs t) function. To use the centrifuge, the required demand curve (g vs t) is replotted to derive the shape of the mask for the curve follower. This replotting includes the application of such correction and scaling factors as are required to convert a g vs t function into a proper centrifuge excitation vs time function. These corrections include conversion of acceleration to rounds/minute and compensation for motor hystersis. The mask is then inserted into the curve follower which generates an electrical signal in proportion to the shape of the mask. This signal is fed into the cathode follower used to isolate the curve tracer from the dc amplifier. The signal from the cathode follower is amplified by the dc amplifier and then used to excite the generator which drives the centrifuge motor. Adequate instrumentation of the centrifuge is provided by a slip-ring assembly which provides 72 circuits. Preliminary tests indicate that a given g vs t function can be reproduced within 5% of the mask. The centrifuge is being used to test fuzes under development and is completely satisfactory.

2,556

Hoff, E. C., & J. F. Fulton 1942 BIBLIOGRAPHY OF AVIATION MEDICINE
(Menasha, Wisconsin: George Banta Publishing Co., 1942)

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Hoff, P. M., E. C. Hoff, & J. F. Fulton 1944 A BIBLIOGRAPHY OF AVIATION MEDICINE
Supplement (Menasha, Wisconsin: George Banta Publishing Co., 1944)

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Hoff, Wilhelm 1922 ANALYSIS OF STRESS IN GERMAN AIRPLANES.
(National Advisory Committee for Aeronautics, Washington, D. C.)
NACA Rept. No. 143

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Hoffman, D.H. 1961 TRI-AXIAL AIRLINE SEAT LIMITS ACCELERATION
Aviation Week July 24, 1961. Pp. 95-100.

ABSTRACT: New airline transport seat that responds like a shock absorber to ground impacts has been designed to protect passengers from injury or death in survivable accidents. The "tri-axial acceleration seat" uses controlled

movement to dampen the peak g forces imposed on a passenger during sudden stops. The rearward facing seat, contoured to furnish protection on three sides, also would distribute impact g forces over a passenger's entire body, sparing skeletal joints and vital organs from unendurable pressures.

To obtain such resistance, the new seat would: (1) Automatically place reclining passengers in a more upright position to boost their acceleration tolerance. (2) Move with respect to the fuselage so as to absorb peak accelerations. (3) Consist of a metal shell foundation suspended from the cabin ceiling and attached to the cabin floor.

2,560

Hoffman, E.L., S.M. Stubbs and J.R. McGehee 1961 EFFECT OF A LOAD-ALLEVIATING STRUCTURE ON THE LANDING BEHAVIOR OF A REENTRY-CAPSULE MODEL.
(National Aeronautics and Space Administration, Washington, D.C.)
NASA TN D-811

ABSTRACT: A 1/6-scale dynamic model of a reentry capsule, with a compliable structure of aluminum-alloy legs to reduce impact loads in a simulated parachute landing, has been tested to determine behavior and accelerations during landings on concrete, sand, and water. Several combinations of flight paths and contact attitudes were investigated. Models were also tested with 1/4.1-scale and full-scale rectangular aluminum-alloy legs to evaluate the scaling characteristics of a compliable metal structure. A method is shown for calculating the landing accelerations for the 1/4.1-scale and full-scale leg tests at a 90° (vertical) flight-path angle and 0° contact attitude.

2,561

Hogland, R., & J. Thale 1958 RECOVERY FROM A SATELLITE ORBIT.
(Presented at the ARS Semi-annual meeting, Los Angeles, June 9-12, 1958)
ARS Preprint 650-58

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Hoke, H. 1943 MEASUREMENTS OF UNDERCARRIAGE STRESSES DURING LANDING AND TAXYING
(Lilienthal Gesellschaft, Report No. 169, 1943, pp. 28-37)
R.A.E. Translation No. 278, ASTIA AD 266614

2,563

Holcomb, G. A. 1960 APPLICATION OF BASIC HUMAN ENGINEERING PRINCIPLES TO A COCKPIT DESIGN. Aerospace Medicine 31:674-677

Cockpit design has changed little since World War II, despite the existence of theoretic and experimental human engineering data which if utilized, would have provided the criteria for improved cockpit design. One of the major obstacles to achieving a satisfying cockpit organization has been the unilateral design of individual control boxes without regard to the boxes placed beside it in the cockpit. Task and link analysis techniques were extensively used to best locate the controls in the cockpit relative to each other and their operation. Use of vertical or horizontal lines of alignment made figure-ground organization easier than other alignment schemes. It tended to expose more of the panel to the viewer. Controls were grouped according to function and usage. Secondary coding concepts dealing with the size and shape of the control were established. Electroluminescence or printed circuit lighting was specified to effect the removal of all lamp housings on panels to relieve clutter.

2,564

Holcomb, G. A. 1960 HUMAN EXPERIMENTS TO DETERMINE HUMAN TOLERANCE TO LANDING IMPACT IN CAPSULE SYSTEMS. (Paper, Fifth Symposium on Ballistic Missile and Space Technology, University of Southern California, 31 August, 1960.)
(Stanley Aviation Corp., Denver, Colo.) 3 Aug. 1960.

ABSTRACT: Capsule systems in general will probably impact on a planet's surface at velocities of 25 ft/sec. to 30 ft/sec. Present human tolerance to acceleration allowables in their present form are not considered adequate to guide the designer in the design of landing impact hardware. The reasons for the inadequacy and the various areas of conflicts, ambiguities and voids in methodology are discussed. Human tests of landing systems are required in the absence of usable allowables. Experimental drop data using the B-58 Capsule are presented, but the data are considered of interest subjectively rather than quantitatively since repeatability is doubtful due to instrumentation inadequacy and positioning techniques. Correlation of these data with most human tolerance allowables are not possible. Human test data has proven the acceptability of the B-58 Capsule Landing system during vertical impact conditions.

2,565

Holcomb, Galen A., M. Huheey, et al 1960 INVESTIGATIONS TO DETERMINE HUMAN TOLERANCE TO SHORT DURATION ACCELERATIONS.
(Stanley Aviation Corp., Denver, Colo.) Rept. No. 1217, Nov. 1960

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Holcomb, Galen A. 1961 B-58 CAPSULE DROP TESTS TO DETERMINE LOAD FACTORS PRODUCED ON VARIOUS SOILS
(Stanley Aviat. Corp., Denver, Colorado) Rept. No. 1318; June 1961.

2,567

Holcomb, G.A. 1961 INVESTIGATIONS TO DETERMINE HUMAN TOLERANCE TO ABRUPT ACCELERATION IN CAPSULE SYSTEMS.
(Paper, 32nd Annual Meeting, Aerospace Medical Association, 24-27 April 1961, Chicago, Ill.)

ABSTRACT: Landing impact effects are one of the major physiological problems of capsule systems in general, whether they be atmospheric or space vehicles. Published human tolerance allowables are basically unusable when evaluating the accelerations produced by impact with the earth's surface, since the accelerations measured on a human subject, in most cases, are of shorter duration and higher rates-of-onset than the allowables describe. Approximately 150 human experiments were undertaken to determine tolerability. Subjects were dropped on concrete, dirt and sand from heights ranging from 9'9" to 12"0" at drift velocities up to 23 mph, while strapped in a production type escape capsule. Accelerations up to 83 G's were recorded on the subject's sternum. (Aerospace Medicine 32(3):234-235, Mar. 1961)

2,568

Holcomb, G.A. & M. Huheey 1961 INVESTIGATION TO DETERMINE HUMAN TOLERANCE TO ABRUPT ACCELERATION IN CAPSULE SYSTEMS.
(Stanley Aviation Corporation, Denver, Colo., April 1961)

2,569

Holcomb, G. A. and M. Huheey 1961 A MINIMAL COMPRESSION FRACTURE OF T-3 AS A RESULT OF IMPACT.
(Presented to the Symposium on Impact Acceleration Stress, San Antonio, Nov. 1961)
(Stanley Aviation Corp., Denver, Colo.) Nov. 1961

2,570

Holcomb, G. A. 1961 IMPACT STUDIES OF THE UNITED STATES AEROSPACE INDUSTRY
(Paper, Symposium On Impact Acceleration Stress, Brooks Air Force Base, San Antonio, Texas, November 27-29, 1961)
(Stanley Aviation Corp., Denver, Colo.)

ABSTRACT: Aerospace Industry has engaged extensively in analytical studies of impact acceleration stress and sparingly in experimental studies. In most cases

studies were the result of the need to evaluate a definite system rather than a desire to engage in basic research since the present published tolerance to impact acceleration allowables are limited in their use to the designer.

The most significant contributions have been the development of mathematical models and human tolerance to acceleration computers by dynamicists, and experimental data using biological specimens derived from capsule ground landing system tests. These developments are discussed in detail in this paper.

As a result of analytical and experimental studies accomplished by Aerospace Industry and industry's chronic problems in designing to present published human tolerance to acceleration allowables, the following recommendations are made: (1) new methods of determining body response be evolved based on mathematical techniques, (2) experimentations of the future be correlated to the mathematical approaches provided by dynamic studies, and (3) new experiments be accomplished to provide extremely abrupt impact acceleration data dealing with both single pulses and pulses superimposed on sustained accelerations.

2,571

Holcomb, G.A. 1962 IMPACT STUDIES OF THE UNITED STATES AEROSPACE INDUSTRY In Impact Acceleration Stress: Proceedings of a Symposium With a Comprehensive Chronological Bibliography, National Academy of Sciences, National Research Council, Publication No. 977, pp. 83-119

ABSTRACT: A survey of impact studies of the United States aerospace industry indicated the following needs: (1) Further animal studies and experiments, including a comprehensive study of comparative anatomy and tissue strength, to obtain valid endpoint data without the use of human subjects. Present human endpoint data in the impact regime is too sparse to be of statistical significance. (2) Studies to determine tolerance to complex accelerations, including abrupt pulses super-imposed on sustained acceleration. (3) Intensive analytical studies to evolve usable mathematical techniques in order to facilitate design and reduce long, costly test-programs.

2,572

Holcomb, G. A. 1962 ABRUPT IMPACT ACCELERATION STRESS - DO WE KNOW MAN'S LIMITATIONS? (Paper, 33rd Annual Meeting of the Aerospace Medical Assoc., 9-12 April 1962, Atlantic City, N. J.)

ABSTRACT: Until the advent of space and capsule systems, man has been returned to earth after egress from a prime flight vehicle by means of a personal parachute. Touchdown velocities by this means are 18-20 FPS and man is able to use

his legs to attenuate impact. However, space or atmospheric capsules, which retain man inside until impact on the earth, climinate these "shock absorbers." To assess this configuration in terms of human tolerability, over 150 biological impact tests have been performed using subjects placed in a supine position inside a capsule system and subjected to impact on various surfaces including hard dirt, water, and concrete. Human, black bear, and chimpanzee subjects were used. The implications from these experiments, together with an analysis of other data, are that man can probably tolerate impact velocities of 40 FPS or higher when in a supine position and properly harnessed. Biological experiments have also shown accelerations of over 90 G's (as recorded on the capsule) to be tolerable. Further implications are that the design of capsule landing systems may possibly be simplified to take greater advantage of man's tolerance, thus increasing the payload. (Aerospace Medicine 33(3):363, March 1962)

2,573

Holcomb, G. A. 1962 B-58 CAPSULE DROP TESTS FROM STANLEY MONORAIL (Stanley Aviation Corp., Denver, Colo.) No. 1376, 10 May 1962

2,574

Holcomb, G.A. & M. Huheey 1962 A MINIMAL COMPRESSION FRACTURE OF T-3 AS A RESULT OF IMPACT.
In Impact Acceleration Stress: Proceedings of a Symposium With a Comprehensive Chronological Bibliography, National Academy of Sciences, National Research Council, Publication No. 977, pp. 191-194

ABSTRACT: A 22-year old male subject performed four drop tests. There were two water drops and two dirt drops. The only effects from the water drops were two small non-tender bruises on the right thigh and right groin. The medical examination after the first dirt drop was negative throughout. However, x-rays of the dorsal spine AP and lateral established the fact that the subject suffered a compression fracture of the D-3 with loss in height of the centrum amounting to about 4mm. Several possibilities of the cause of the fracture are stated.

2,575

Holden, G.R., J.R. Smith, & H.A. Smedal 1961 PHYSIOLOGICAL INSTRUMENTATION SYSTEMS FOR MEASURING PILOT RESPONSE TO STRESS AT HIGH G AND ZERO G. (Paper, 32nd Annual Meeting, Aerospace Medical Assoc., 24-27 April 1961, Chicago, Ill.)

ABSTRACT: An airborne physiological instrument system reported in NASA TN D-351 has been modified and additional tests have been made in the University of Southern California and AMAL centrifuges and in an F-104B airplane. These tests covered various levels of acceleration from zero to 8 g. The measure-

ments made were, in part: ECG, blood pressure, pulse wave, respiration rate and volume, and carbon dioxide content of expired air. The data from a three-lead electrocardiograph were recorded, using a unique balance transistor amplifier. Systolic and diastolic blood pressures were measured using an automatic sequencing occluding arm cuff and microphone stethoscope. Pulse wave on the wrist was obtained with a vasochromograph and a.c. amplifier. Several methods were used to measure respiration rate, and respiration volume was measured with a wedge spirometer. The expired air was analyzed for CO_2 content with a very much modified Bechman LB-1 gas analyzer. The quanitative effects of short term periods of zero g on pilot control performance were determined by measuring the tracking accuracy, the equivalent analytical transfer function and the physiological condition of a subject in the rear seat of an F-104B airplane being flown in a 60-80 second zero g trajectory. A tracking task played back from a tape recorder was presented to the subject on an oscilloscope. The subject used a sidearm controller to attempt to wipe out his tracking error. A small airborne analog computer computed the simulated airplane's response to the control motion and changed the tracking display accordingly. The experiment was repeated and thus affords a direct comparison with a study of pilot control behavior previously conducted on ground-based simulator and centrifuge. (J. Aerospace Med. 32(3):235, March 1961)

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Holleman, E.C., N.S. Armstrong and W.H. Andrews 1960 UTILIZATION OF THE PILOT IN THE LAUNCH AND INJECTION OF A MULTISTAGE ORBITED VEHICLE. (Paper presented at IAS 28th annual meeting, 25-27 Jan 1960, New York) Preprint no. 60-16

ABSTRACT: The capacity of human pilots to control the launch of typical multistage vehicles was investigated under varying conditions of vehicle damping and stability by fixed-base and centrifuge simulators. The control task was found to be well within the capability of human pilots at accelerations up to 15 g. With a good support system the prime physiologic effect of the acceleration environment was a loss in peripheral vision. The effect was not serious below 9 g, and was confined within control limits at accelerations of 12-14 g by prebreathing of 100 per cent oxygen. Use of the pressure suit had little detrimental effect on performance. It is suggested that full pilot control of space vehicles throughout the launching procedure would provide the most advantageous condition for effective response to emergency situations.

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Holling, H.E. 1950 TRAVEL SICKNESS Practitioner, 164: 276

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Hollis, J. H., G. E. Rice, & R. D. Engstrand 1960 EFFECTS OF ACCELERATION FORCES ON MAZE BEHAVIOR OF THE WHITE RAT. Psychol. Rept. 6:185-186

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Hollister, N. R., R. Friede, et al. 1958 BIOPHYSICS OF CONCUSSION. (Wright Air Development Ctr., Wright-Patterson AFB, Ohio) WADC TR 58-193; ASTIA AD-203 385

ABSTRACT: Methods were developed for effecting a reproducible experimental concussion. Three principal factors thought to cause concussion were studied: (1) rapid deceleration, (2) total force imparted to the skull, and (3) stretch of the cervical region. A test drop rig was developed and instrumentation was used to measure the various force vectors. The following conclusions were drawn: (1) total force applied to the skull is not a factor in concussion under the test conditions; (2) acceleration concussion is not a factor under the test conditions; and (3) stretch of the cat's neck or some unknown factor, which can be altered by applying a muscle-tetanizing current, accounts for the concussion produced. Neurohistopathological studies were carried out and discussed. (AUTHOR)

2,580

Holme, T. 1961 [HORIZONTAL-ROTOR CENTRIFUGE CONSTRUCTION REPORT]

SEE Karolinska Institutet

2,581

Holmes, B. 1962 MANNED SPACE FLIGHT. AIBS Bulletin 12(5):56-59, Oct. 1962.

ABSTRACT: Four National Aeronautics and Space Administration programs, Mercury one-day missions, Gemini, and Apollo, are discussed together with expected problem areas. The final phases of the Mercury program (orbital flight of short duration) are intended to amplify and expand the basic data obtained during the Glenn and Carpenter flights. The one-day missions program will extend the time of weightlessness and allow further assessment of the physiological effects of this phenomenon. This extension is of prime importance since during the lunar mission the astronauts will be weightless for some five days. The Gemini program will extend capability to orbital flight for two men for approximately 10 days. Aims of this program are to develop rendezvous techniques and gain further insight on the effect of prolonged weightlessness. The fourth major program, Project Apollo, will be the logical culmination of the previous three programs. It is aimed at landing men on the Moon and returning them to Earth. The problems raised by these programs are not insurmountable, and many of them can be recognized far enough in advance to perform the research and development necessary to solve them.

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Holsopple, J.Q., 1923 SOME EFFECTS OF DURATION AND DIRECTION OF ROTATION ON POST-ROTATION NYSTAGMUS. J. Comp. Psychol. 3: 85-100

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Holsopple, J. Q. 1924 AN EXPLANATION FOR THE UNEQUAL REDUCTION IN POST-ROTATION NYSTAGMUS FOLLOWING ROTATION PRACTICE IN ONLY ONE DIRECTION. J. Comp. Psychol. 4:185-193

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Holsopple, J. Q. 1929 SPACE AND THE NON-AUDITORY LABYRINTH. In The Foundation of Experimental Psychology (Worchester, Mass.: Clark Univ. Press). 414-433.

ABSTRACT: There is a perception of space which cannot be explained in terms of sensory data without using the vestibule. In normal life vestibular experience seems dependent upon spatial factors, but it is not necessarily any more so than any other experience. The characteristics of the perceptions which follow vestibular stimulation are practically unknown. The stimulus for the receptor is an angular acceleration around any one of the bodily axes. The receptor mechanism consists of the vestibule and the semi-circular canals. Their stimulation results in changes of tonicity of antagonistic muscles, which shows itself especially in connection with nystagmus and past-pointing, but is general as shown by nausea and inability to balance oneself. Practice will modify the vestibular response. Some of the difficulties and possibilities in vestibular research are enumerated.

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Holt, J.P. 1942 THE EFFECT OF CENTRIFUGAL FORCE ON THE CAROTID BLOOD PRESSURE OF DOGS AND THE USE OF A WATER SUIT IN MODIFYING THIS EFFECT. (National Research Council, Committee on Aviation Medicine, Washington, D.C.) CAM No. 63, 11 Aug. 1942.

ABSTRACT: Normal healthy dogs with a resting blood pressure of 150-160 mm Hg were placed under sodium barbital anaesthesia, their tracheas cannulated, the carotid arteries exposed and blood pressure recorded directly. They were placed on a 7.15 ft. radius centrifuge and subjected to various values of "g" of from 30 seconds to 10 minutes.

Between 4.28 and 5.63 "g", if the dogs were centrifuged unprotected, in an empty plethysmograph, or in a loose canvas suit, blood pressure fell 98% of its original value. If the dogs were protected by a water filled plethysmograph or a canvas suit containing a water filled abdominal bladder and tubes down the hind legs, blood pressure fell only 44% at the same value of "g".

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Holtermann, H. 1956 GEDANKEN ZUR SEEKRANKHEIT UND ERFAHRUNGEN MIT EINIGEN NEUEREN BEHANDLUNGSMETHODEN. (REFLECTIONS ON SEA-SICKNESS AND EXPERIENCES WITH SOME NEW THREATMENT METHODS) Münchener medizinische Wochenschrift (München) 98(7):229-231, 17 Feb. 1956

ABSTRACT: A report is given on susceptibility to seasickness, the incidence of which is estimated at 90%. Habituation to the conditions at sea does not develop in 5-10% of the subjects. The symptoms generally occur in a certain sequence. There appear to be two different kinds of seasickness: (1) the well-known form with nausea and vomiting, and (2) instead of these symptoms a severe headache. Both kinds are attributed to differential irritability of the cerebral nuclei. The etiological causes of seasickness are outlined and fear is considered an important factor. Several therapeutic measures are discussed. Administration of Nestargel was tried as a supplementary medication. Its effects are based on its thickening action on the stomach contents. After its administration vomiting was reduced. Megaphen has been effective in cases confined to bed. The beneficial effect of Benadon (vitamin B_6) was confirmed, particularly when administered by suppositories. Its harmlessness and lack of side-effects are emphasized. (AUTHOR)

2,587

Hood, J.D., & C.R. Pfaltz 1954 OBSERVATIONS UPON THE EFFECTS OF REPEATED STIMULATION UPON ROTATIONAL AND CALORIC NYSTAGMUS.
J. Physiol. 124:130-144

ABSTRACT: Nystagmic responses in rabbits subjected to repeated angular accelerations of low intensity ($5^o/sec.^2$ for a period of 10 sec. followed by a period of rotation at constant velocity for 60 sec.) underwent a marked decline which was dependent upon the number of stimuli applied. This response decline (R.D.) phenomenon was unaccomparied by any change in the latent period of the nystagmic response. The mechanism of the R.D. phenomenon is thought to be allied with habituation, wherein innate responses of the central nervous system to certain relatively simple stimuli, especially those of potential value as warnings of danger, wane as the stimuli continue for a long period without unfavorable results. The nystagmic responses to repeated monaural caloric stimuli (a flow of water at temperature of 25^o C. for 10 sec. into the ear) did not undergo any significant decline, and the physiological independence of responses to rotational and caloric stimuli is discussed.

2,588

Hook, R.E., A.M. Adair and J.W. Spretnak 1960 AN INVESTIGATION OF THE CENTRIFUGAL FORCE LOADING METHOD OF CREEP TESTING
(Wright Air Development Center, Wright-Patterson Air Force Base, Ohio)
WADC TR-59-779, Proj. 7021, Task 70627, March 1960, ASTIA AD 236657

ABSTRACT: A centrifugal force loading creep testing machine was designed, constructed, and tested. Creep data were obtained for electrolytic tough-pitch copper and evaluated. Binary Ni-Al alloys demonstrate the usefulness of

this machine for obtaining relative creep strength data.

The data on copper reveals that the specimen grain size has a bearing on the degree of dispersion. A smaller degree of dispersion was associated with a smaller grain size. Heat-treated and prepared identically, specimens from different rods exhibited a significant variation in creep behavior. This variation was attributed to small differences in metallurgical structure, probably due to prior thermal and mechanical history.

Tests on binary Ni-Al alloys revealed significant creep strength differences. Considerable scatter of the data for each alloy did not affect the determination of the relative creep strengths.

The centrifugal force loading method of creep testing provides an inexpensive evaluation of relative creep strengths of materials.

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Hooker, D.R. 1924 THE PHYSIOLOGICAL EFFECTS OF AIR CONCUSSION Amer. J. Physiol. 67:219-274.

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Hooker, G.V., M.H. Duffner, A.S. Dann & D.C. Yates 1961 AIR FORCE SCIENTIFIC RESEARCH BIBLIOGRAPHY 1950 - 1956. VOLUME I.
(USAF Office of Scientific Research, Washington, D.C.)
AFOSR 700, ASTIA AD 265 450.

ABSTRACT: This bibliography includes abstracts of technical notes, technical reports, journal articles, books, symposium proceedings, and monographs produced and published by scientists supported in whole or in part by the Air Force Office of Scientific Research for the period 1954 through 1956, plus earlier reports back through 1950. These abstracts are multidisciplinary covering physics, chemistry, engineering sciences (subserving mechanics and propulsion), life sciences (biological, behavioral), and mathematics. The arrangement provides a rough subject grouping with the detailed subject index leading into clusters of like reports. Several indices are included. (Tufts)

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Hoover, G.N. & F.R. Johanson 1960 PROBLEMS IN INSTRUMENTATION FOR DYNAMIC SUBJECTS
Proc. National Electronics Conf. 16: 659-671, 1960

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Horak, J. 1960 RECENT DEVELOPMENTS IN AVIATION MEDICINE
Abstract: South African Medical J. (Cape Town) 34(28):582, 9 July 1960

ABSTRACT: A summary is given of a paper presented at the Staff Scientific Meeting of the South African Institute for Medical Research, held at Johannesburg, on March 8, 1960. The paper dealt with three important factors affecting space flight: (1) the physical environment of space, (2) speed and space vehicles in relation to linear, angular, and radial acceleration; and (3) distances space ships will travel over and away from the earth. The medical problems of space flight were discussed, including weightlessness, spatial disorientation, and the "break-off" phenomenon, and devices to preserve the normal physiological environment were outlined. (South African Medical J. (Cape Town) 34(28):582, 9 July 1960)

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Horak, J. 1960 SPACE MEDICINE.
South African Med. J. (Cape Town) 34(53):1117-1122, 31 Dec. 1960

ABSTRACT: Current space travel may be classified as being in a phase of global space-equivalent flight, as defined by the combined factors of the physiological and mechanical properties of the space environment, the speeds attained in space flight, and the distances rockets travel over and away from the earth. The attendant medical problems are basically those of high altitude flight as we know it today, and most of the problems involved in true space flight are encountered in the stage of global space-equivalent flight.

2,594

Horn, 1818 BESCHREIBUNG DER IN DER IRRENANSTALT DES KÖNIGLICHEN CHARITEKRANKENHAUSES ZU BERLIN GEBRÄUCHLICHEN DREHMASCHINEN, IHRER WIRKUND UND ANWENDUNG BEI GEISTESKRANKEN (DESCRIPTION OF THE ROTATION MACHINE USED IN THE INSANE ASSYLUM OF THE ROYAL CHARITY HOSPITAL IN BERLIN, ITS WORKING AND USE WITH MENTALLY ILL.
Nasses Z. Psych. Aertze 1:219-230

ABSTRACT: At the beginning of the 19th century, in the psychiatric clinic of the Charite Hospital in Berlin, a centrifuge of quite large dimensions and efficiency was used in the treatment of patients suffering from mental disease. Its diameter was aprox. 13.12 ft. and at 40-50 rpm it produced up to 5 g at the periphery. Patients being tested on this machine were observed and physcians recorded for the first time the marked effects of centrifugal forces on circulation and respiration (changes in respir ation, heart rate, and blood distribution).

2,595

Horowitz, N.H. 1962 BIOLOGY IN SPACE
Federation Proceedings, 21(4, part I): 687-691. July-Aug. 1962

ABSTRACT: Biology is involved in the national space program in three principal areas: (1) in the man-in-space effort; (2) in the investigation of the biological effects of the space environment; and (3) in the search for extraterrestrial life. Mars, and possibly Venus, is sufficiently similar to the Earth to provide a test of the idea that life arises wherever conditions exist for the synthesis and evolution of organic compounds. Experiments (ultraviolet and infrared spectroscopy of surface atmospheres, landing vehicle experiments with television photography, microscopy, etc.) currently considered for investigating the biology of Mars are discussed. Sterilization of all spacecraft landing on the Moon or planets and the possibility of back-contamination are reviewed, along with the evidence for possible life in meteorites.

2,596

Horvath, S.M. and W.B. Shelley 1946 EXPERIMENTAL STUDY OF AIR BLAST INJURIES
Bull. U.S. Army Med. Dept. 6:761-770

2,597

Hosken, Bobbie 1959 ENGINEERING PSYCHOLOGY BRANCH BIBLIOGRAPHY
(U.S. Naval Research Laboratory, Washington, D.C.)August 1959. ASTIA AD 226398

ABSTRACT: This bibliography is a revision to date of the bibliography compiled by Daniel Fallon, July 1957. All unclassified reports issued by the Engineering Psychology Branch between its founding on October 1, 1945, and the present are listed in chronological order.

2,598

Houbolt, J.C. & S.A. Batterson 1960 SOME LANDING STUDIES PERTINENT TO GLIDER-REENTRY VEHICLES (Langley Research Center, Langley Station,Va.)
NASA Technical Note D-448, Aug. 1960, N62-71022. ASTIA AD 241 615

ABSTRACT: The results presented may serve as guidelines for consideration of landing problems of glider-reentry configurations. The effect of the initial conditions of sinking velocity, angle of attack, and pitch rate on impact severity and the effect of locating the rear gear in various positions are discussed. Some information in included regarding the influence of landing-gear location on effective masses. Preliminary experimental results on the slide-out phase of landing include sliding and rolling friction coefficients that have been determined from tests of various skids and all-metal wheels.

2,599

Howard, L.P. 1962 THE ORIGIN OF BLACK-OUT.
In Armand Mercier, ed. Visual Problems In Aviation Medicine
(New York: The Macmillan Company, 1962) Pp. 71-77

ABSTRACT: This paper presents the results of a number of approaches to the problem of the origin and site of black-out. During tests it was found that subjects undergoing accelerations well above their black-out thresholds can perceive light if the stimulus is sufficiently strong. The apparent brightless of successive stimuli decreases, and vision is finally lost. The time-course of the phenomena, the conditions under which they occur, point to a reserve of function in the anaemic retina. The decrement and final loss of vision under these conditions is due to a failure of transmission of nervous impulses. The direct pupillary reflex may outlast vision. There is no detectable difference between pressure blindness and the black-out of acceleration. The site of the disturbance of function is within the retina but beyond the point where visual and reflex pathways diverge.

2,600

Howard, P., & G. H. Byford 1956 THRESHOLD DETERMINATION TECHNIQUES ON THE HUMAN CENTRIFUGE. (RAF Institute of Aviation Medicine, Farnborough, England) FPRC Memo 75, Sept. 1956

ABSTRACT: In an endeavour to find a more satisfactory solution to the problem of determining g thresholds, experiments with several visual methods have been carried out in this laboratory; e.g. colour vision, and brightness or contrast discrimination, and one which appears to offer considerable promise is briefly described in this interim report.

In the experiments carried out so far, it appears that the loss of a central target lamp, at an intensity of between 0.2 and 0.8 log. units above the visual threshold, provides a more satisfactory measurement of g threshold than any other system so far tried.

The two important practical differences between the peripheral lights system and that suggested here are (a) the end-point is considerably more clear-cut, and (b) the threshold determined is some 0.5 to 1.5 g below that obtained by other methods, resulting in increased safety and in decreased strain on the subject. The lamp intensity can be so chosen that if, after the disappearance of the target, the goggles are lifted, vision is normal - a convincing demonstration that loss of central vision can be employed with safety.

2,601

Howard, P. 1957 THE TECHNIQUE OF THRESHOLD DETERMINATION ON THE HUMAN CENTRIFUGE. (Communication to the Second European Congress of Aviation Medicine, Stockholm.)

2,602

Howard, P. and J.S. Garrow 1958 CHANGE IN VASCULAR RESISTANCE OF THE FOREARM AND HAND DURING RADIAL ACCELERATION.
J. Physiol. 143:83P-84P

ABSTRACT: Measurements of blood flow in the forearm have been made on the human centrifuge using the mercury-in-rubber strain gauge method or Whitney (1949). Vascular resistance has been estimated by the arterial 'run-off' method recently reported (Hayter & Sharpey-Schafer, 1958). During radial acceleration, blood flow through the forearm segment diminishes out of proportion to the fall in arterial blood pressure, and the 'run-off' index rises. The vascular resistance in the hand also increases.

2,603

Howard, P. 1959 CHANGES IN THE CARDIAC OUTPUT DURING POSITIVE RADIAL ACCELERATION.
(Paper, Proceedings of the Physiological Society, Physiology Institute, Newport Road, Cardiff, 17-18 April 1959).

ABSTRACT: It is known that positive radial acceleration (centrifugal force acting in the head-to-foot direction) produces profound changes in the dynamics of the circulation. The output of the heart is likely to be affected by these changes but hitherto no experimental confirmation of this assumption has been presented.

The direct Fick method was used to determine the cardiac output in two subjects. A polythene catheter was inserted into the right atrium via an antecubital vein; its position being confirmed by examination of the pressure wave form. The subject lay supine on the end of the human centrifuge, with the legs extended. Gas and blood samples were analysed by the Haldane and Van Slyke methods, respectively, and from the results the oxygen consumption and cardiac output were calculated.

At 2 g the output was reduced to approximately 68% of the resting value, and at 2.4 g it fell to about 60%. Because of the concomitant increase in heart rate the changes in stroke volume were greater still. In both cases the oxygen consumption rose by about one-third during the exposure.

These results may be compared with those obtained after tipping from the horizontal to the erect posture (equivalent to a radial acceleration of 1 g) which produces an average decrease of cardiac output of 25%. (J. Physiol. (London) 147(Pt. 2): 49-50P, 2 Sept. 1959)

2,604

Howard, P. 1959 CHANGES IN PERIPHERAL VASCULAR RESISTANCE DURING RADIAL ACCELERATION. (Paper, Meeting of Aero Medical Association, Statler Hilton Hotel, Los Angeles, April 27-29, 1959)

ABSTRACT: Simultaneous measurements of arterial blood pressure and of blood flow through a forearm segment have been used to calculate the peripheral vascular resistance during exposure to 2G and 3G on the human centrifuge. Vasoconstriction has been demonstrated with subsequent vasodilation when the stress is removed. The method used has some disadvantages. It requires a long exposure to the acceleration (5-10 minutes), and cannot be employed in studies of negative G. A simple method of assessing changes in vasomotor tone, depending upon the rate of decline of pressure in an occluded artery, has been used to extend the work. It has been found that the vasoconstriction increases progressively up to 8 G, which was the highest value employed. With negative G, a decrease in vascular resistance occurs, which is likewise proportional to the level of acceleration. (J. Aviation Med. 30(3):188, March 1959)

2,605

Howard, P. 1959 PHYSIOLOGICAL RESEARCH ON THE HUMAN CENTRIFUGE. (RAF, Institute of Aviation Medicine, Farnborough, England; North Atlantic Treaty Organization, Advisory Group for Aeronautical Research & Development; Aero-Medical Panel, Aachen, Germany) Sept. 1959

2,606

Howard, P. and M. K. Browne 1959 SOME OBSERVATIONS ON THE EEG DURING CENTRIFUGAL ACCELERATION.
(International EEG Congress, Marseilles, 1959)

2,607

Howard, P. and F. Latham 1959 MECHANISMS OF INJURY DURING WHOLE BODY DECELERATION.
(RAF Institute of Aviation Medicine, Farnborough) FPRC Memo. 100

2,608

Howard, P. and C. P. McEvedy 1959 THE EEG AND BLACKOUT.
(IVth European Congress of Aviation Med., Rome, 1959)

2,609

Howard, P. and M. K. Browne 1960 A STUDY OF UNCONSCIOUSNESS ON THE HUMAN CENTRIFUGE.
Proc. Roy. Soc. Med. 53:99-100, Feb. 1960.

2,610

Howard, P. 1961 PHYSIOLOGICAL PROBLEMS OF SPACE FLIGHT.
New Scientist (London) 10(231):106-108. April 1961.

ABSTRACT: This is a presentation of the problems of acceleration, deceleration, and weightlessness during space flight. Centrifuge studies have been the source of most acceleration studies. Controlled parabolic flight studies in which the weightless state was sustained for about forty seconds have yielded information on feeding, drinking and excreting waste products during weightlessness and the effects of the weightless state on the nervous system. Because deceleration and acceleration have the same properties, the same precautions must be taken to avoid exceeding the limits of tolerance. Deceleration limits during re-entry is discussed.

2,611

Howard, P. 1963 ACCELERATION RESEARCH AND AEROSPACE MEDICINE.
Med. J. Aust. 1:425-427, 23 March 1963.

2,612

Howard, I. P. & W. P. Templeton 1963 A CRITICAL NOTE ON THE USE OF THE HUMAN CENTRIFUGE.
Amer. J. Physiol. 76:150-152, March 1963.

2,613

Howarth, C. I. 1956 THE TIME COURSE OF PRESSURE BLINDNESS.
(RAF, Institute of Aviation Medicine, Farnborough) FPRC No. 968;
ASTIA AD-112 721

ABSTRACT: When pressure is applied to the eyeball in excess of 120 mm. Hg, vision decreases progressively from the periphery of the visual field until finally the eye becomes blind. Three possible causes of the restriction of peripheral vision during retinal ischaemia are suggested: the higher sensitivity of the fovea; a possible storeage of oxygen in the macular pigment; and the greater effectiveness of a minimal blood flow around the optic disc and along the course of the main retinal arteries. It has been shown that the last area of the retina to remain active during ischaemia lies between the fovea and the optic disc so that no one of these can be the single explanation of the form of the restricted visual field. Since foveal vision is not so insensitive to ischaemia as has been assumed, it is suggested that it may provide the most sensitive tests of aircrew g thresholds. (AUTHOR)

2,614

Howe, J. T. 1962 THEORY OF HIGH-SPEED-IMPACT ATTENUATION BY GAS BAGS. (National Aeronautics and Space Administration, Washington, D. C.) Technical note D-1298, April 1962. ASTIA AD 274 588.

ABSTRACT: A theory is developed for the one-dimensional motion of a cylindrical gas bag used as an impact cushion. The effect of shock waves in the gas as well as stress in the bag skin is considered. The applicability of the theory to landings both in an atmosphere and on the moon is discussed and the regime of validity of the theory is presented. The use of a series expansion for computing shock-wave properties in the analysis, the strong shock approximation, and the exact shock relations are compared and discussed. The regime of physical parameters for which both the wave model and the series expansion are valid is presented. The method of application of the theory to impact problems is outlined. (Author)

2,615

Howlett, J.G. 1942 SWING TEST FOLLOW-UPS. (National Research Council, Canada) Report #C-2879, 27 August 1942

ABSTRACT: A preliminary report is made of the follow-up between incidence of airsickness and incidence of swing sickness in aircrew.

2,616

Howlett, J.G., T.E.M. Wardill and J.R. Brett 1943 THE EFFECT OF POSITION ON THE INCIDENCE OF SWING SICKNESS. (National Research Council, Canada) Report #C-2507, 5 April 1943

ABSTRACT: Under the conditions of these experiments, regardless of position of the body, if the head is placed so that the G changes occur in a direction perpendicular to the plane of the lines joining each external auditory meatus to the lateral canthus of the eye on the same side the sickness incidence is considerable. When the G changes occur in a direction parallel to this plane the sickness incidence is greatly reduced. When the G changes occur in a direction parallel to this plane the sickness incidence is greatly reduced. When the G changes act parallel to this plane and when the head rests on the middle of the occiput, or is rotated forty-five or ninety degrees from this position, the sickness incidence is even lower than when the head rests on the middle of the forehead or is rotated forty-five degrees to either side.

2,617

Howlett, J.G., T.E.M. Wardill and J.R. Brett 1943 THE EFFECT OF POSITION ON THE INCIDENCE OF SWING SICKNESS. (National Research Council, Canada) Report #C-2508, 7 May 1943

ABSTRACT: The incidence of sickness on the swing was low when subjects were swung through an angle of 60°, in the supine position with the head resting on the middle of the occiput and with the reference plane perpendicular to the swing base. When the resultant force was perpendicular to the reference plane but through the head in an inferior superior direction the incidence of sickness was significantly lower than when acting in the superior inferior direction.

2,618

Howlett, J.G. and J.R. Brett 1943 A SPECULATION ON THE MECHANISM OF UTRICULAR RESPONSE TO STIMULATION IN MOTION SICKNESS. (National Research Council, Canada) Report C-2509, 7 May 1943

ABSTRACT: Reference is made to MacNally and Stuart who attributed motion sickness to vertical linear acceleration and their effect on the utricle on basis of the anatomy of this organ described by Quix. The speculation is advanced that only the vertical position will allow acceleration to act on the otolith to stimulate the macula in the utricle.

2,619

Howlett, J.G., et al., 1945 THE EFFECT OF POSITION ON THE INCIDENCE OF SWING SICKNESS. (National Research Council, Canada) Report for No. 6 Medical Selection Board, April 1945.

2,620

Howlett, J.G. 1957 MOTION SICKNESS. Canadian Med. Assoc. Jour. (Toronto), 76(10): 871-873. May 15, 1957

ABSTRACT: Different types of motion sickness are reviewed with suggestion that susceptibility may be specific to the type of motion. Although adaptation usually occurs, it will not protect against another type of motion. The mechanism for production of motion sickness seems to be a central nervous system response to linear acceleration stimulating the semicircular canals. Evidence from ablation studies in dogs are concerned in the genesis of motion sickness. Treatment is largely prophylactic by means of Benadryl, Dramamine, Phenergan, Artane (benzhexol), hyoscine hydrobromide, or Mosidol (thiobarbituric acid compound)

2,621

Hoyer, S. 1959 THE ANALYTICAL MECHANICS OF RATE OF ONSET, (Air Research & Development Command, Holloman AFB, N.Mex.) AFMDC-TN-59-26, October, 1959

ABSTRACT: The system consists of a mass connected by a linear spring to a moving frame. It also includes the effect of a Newtonian dashpot connected to; oppose relative motion between the mass and the frame. The force in the coupling spring is determined as a function of the motion of the frame and depends on the acceleration of the frame, and on higher derivatives of the position of the frame with respect to time. We are particularly interested in the effect on spring force of the rate of onset of acceleration of the frame.

2,622

Hubach, J.C. 1932 GEVAREN VAN HET VLIEGEN MET SNELLE VLIEGTUIGEN (Dangers of Flying in Fast Airplanes from Medical Viewpoint) Geneesk. Tijdschr. Ned. -Ind. (Jakarta) 72: 98-105

2,623

Huber, J., & P. Garsaux 1956 LES PROBLEMES MÉDICAUX CAUSÉS PAR LA NAVIGATION AÉRIENNE (MEDICAL PROBLEMS CAUSED BY FLIGHT) Bulletin de l'Académie nationale de médecine (Paris) 140(3-4):37-38, 24 Jan. 1956

ABSTRACT: Mention is made of French and international associations, composed of physicians, physiologists and hygienists, concerned with the study and control of the problems arising from flight. Major problems deal with the effects of accelerations, the effects of altitude, climate and time changes, and flight disorders. Formulation of regulations for the required physical aptitudes of flight candidates, and determination of the maximum flying time for flight personnel are also considered.

2,624

Huckabay, James D. 1960 A STUDY OF THE PLASTIC DEFORMATION OF A SINGLE-DEGREE-OF-FREEDOM SYSTEM SUBJECTED TO IMPULSIVE LOADING (The University of Texas, Structural Mechanics Research Laboratory, for Quartermaster Research and Engineering Command) Contract DA 19-129-QM-1383

ABSTRACT: As a third step in an effort to establish criteria of damage susceptibility for complex systems subjected to impact loading, the effects of the individual parameters influencing the final permanent deformation of a single-degree-of-freedom system are studied.

An extensive dimensional analysis of the problem was made, and the insight thus provided was used as a guide in making the experimental study. Final permanent deformations resulting from impacts having a range of pulse durations

and peak accelerations were observed. The results are presented in graphical form.

Peak acceleration appears to have an important influence on the permanent deformation. The individual effects of time ratio and impulse could not be isolated experimentally, and the effect produced by combined changes in these two factors is not clear.

2,625

Huelke, D. F. 1961 MECHANISMS INVOLVED IN THE PRODUCTION OF MANDIBULAR FRACTURES. A Study with the "Stresscoat" Technique. I.--Symphyseal Impacts. Jr. Dent. Resch. 40:1042-1056.

2,626

Huelke, Donald F. 1962 BIOMECHANICAL STUDIES ON THE BONES OF THE FACE (Panel Discussion)
(In: Impact Acceleration Stress: Proceedings of a Symposium With a Comprehensive Chronological Bibliography, National Academy of Sciences, National Research Council, Publication No. 977, pp. 131-134)

ABSTRACT: Until recently no serious investigations on the facial bones, with regard to their mode of fracturing, has been carried out. Our preliminary investigations reveal that the bones of the face, like those elsewhere in the body, fracture due to tensile failure and in specific, fractures of the lower jaw usually occur in the area of impact and at the narrow, neck of the mandible. In our studies we are using non-destructive testing methods -- Stresscoat and strain gages, and destructive testings involving fracture producing impacts, strain gages, and high speed cinematography on individual bones and intact heads.

Further research into the problem of mid-face fractures needs to be carried out and a program into the biomechanics of skin and soft itssue should be initiated. The fracturing characteristics of skin, soft tissue, and bones, their level of energy absorption and dissipation need to be studied. Only these data can give the needed information for design specifications for protection of the individual exposed to a variety of impacts.

2,627

Hughes, Gordon & Clive D. Leedham 1962 NOTES ON TEST SLED MEASUREMENTS AT THE HOLLOMAN TRACK
(Air Force Office of Scientific Research, United States Air Force)
AFOSR/DRA-62-1, January 1962, ASTIA AD 276108

ABSTRACT: The quality of seeing at the Holloman track, being basic to all optical measurement methods to be described, has been measured. An analysis of possible optical systems for yaw, pitch, and roll measurement is reported. Based on this analysis, one optical measurement method is proposed for each

attitude component. The analysis of space time data for test package vibrations is discussed in terms of the spacing of velocity measuring points along the track. A method is proposed to measure test package velocity rather than sled velocity relative to the track.

2,628

Huheey, M., & C. F. Simmons 1960 INVESTIGATIONS TO DETERMINE HUMAN TOLERANCE TO SHORT DURATION ACCELERATIONS. (Stanley Aviation Corp., Denver, Colo.) Doc. No. 1217; Contract No. AF 33(600)36200; 2 Nov. 1960

2,629

Huizinga, E., & P. van der Meulen 1951 VESTIBULAR ROTATORY AND OPTOKINETIC REACTIONS IN THE PIGEON. Ann. Otol. Rhinol. Laryngol. 60:927-947

2,630

Hulk, J., & L. B. W. Jongkees 1948 TURNING TEST WITH SMALL REGULABLE STIMULI. II. THE NORMAL CUPULOGRAM. J. Laryng. and Otol. 62:70-75

2,631

Human Factors Research, Inc., Los Angeles, Calif. 1956 A STUDY OF THE CRASHES DURING LANDING OF TWO INSTRUMENTED F6F DRONE AIRCRAFT. (Human Factors Research, Inc., Los Angeles, Calif.) Technical Rept. No. 2 on "Measurement of Forces Affecting Human Bodies in Aircraft Accidents"; Subcontract to Management & Marketing Research Corp., Contract Nonr-152700; ASTIA AD-93 352;

ABSTRACT: Research was undertaken for developing a method of recording deceleration forces in airplane crashes. Self-actuating accelerometers were mounted in the seats of two F6F drone aircraft prior to take off. Upon stimulation with a force of 8 g or more, the accelerometer starts and records the force patterns for 8 sec. Two airplanes which were crashed during landing struck the runway nose down at approximately the same angle. Results indicated that the method was feasible. Records showed that the application of g force varied with respect to time; successive peak g's occurred at a frequency of 35 to 45 c. Although both crashes were survivable crashes (cockpit area remained intact), the g forces were of such a magnitude that a pilot would have been injured. The g forces which were recorded in the vertical and horizontal body axes were approximately equal (55.5 and 52 g and 32.1 and 48 g, respectively). Seats and protective devices should be designed for absorbing repeated shocks and for withstanding high, short-duration peak loads rather than only static loads. (ASTIA)

2,632

Human Factors Research, Inc., Los Angeles, Calif. 1956 A STUDY OF THE CRASHES OF FOUR INSTRUMENTED F6F DRONE AIRCRAFT. (Human Factors Research, Inc., Los Angeles, Calif.) Technical Rept. No. 3 on "Measurement of Forces Affecting Human Bodies in Aircraft Accidents"; Subcontract to Management & Marketing Research Corp., Contract Nonr-152700; ASTIA AD-93 351

ABSTRACT: Accelerometer recordings were analyzed for 4 crashes. In 2 cases, the aircraft ran out of fuel and were crash landed on the desert, one with wheels up (no.3) and the other with wheels down (no. 4). Of the other 2 crashes, one nonsurvivable crash into a mountain ridge (no.5) occurred when aircraft control was lost, and one (no. 6) occurred on takeoff. Results of crashes 3, 4, and 6 showed that the forces in the vertical body axes exceeded those in the longitudinal axes; in crash 6, these forces approached human tolerance limits. The records of crash 3 indicated some evidence of an oscillatory application of crash forces. The records of crashes 3 and 4 showed that both the g forces which were developed and the damage to the aircraft were greater in the wheels-down crash. (ASTIA)

2,633

Hume, Robert, ed. 1962 IMPACT ACCELERATION STRESS: PROCEEDINGS OF A SYMPOSIUM WITH A COMPREHENSIVE CHRONOLOGICAL BIBLIOGRAPHY. (National Academy of Sciences, Washington, D.C.) NAS-NRC/Pub-977

ABSTRACT: This publication contains thirty-two papers presented at the Symposium on Impact Acceleration Stress held at Brooks Air Force Base, San Antonio, Texas, November 27-29, 1961.

2,634

Humphries, J. 1957 SOME IDEAS IN ASTRONAUTICS
Aeronautics, 35:41-42, Jan. 1957.

ABSTRACT: Summaries of papers presented at the 1956 Congress of the IAF in Rome. The papers were concerned with solar power for propulsion, biological hazards of space flight, and effects of weightlessness.

2,635

Hunter, H. N., R. W. Lawton, R. Crosbie, & M. Lipkin 1952 HUMAN TOLERANCE TO COMBINED ACCELERATIONS; INVESTIGATION OF PHASE I. (Naval Air Development Ctr., Johnsville, Pa.) NADC-MA-L5207; 3 Dec. 1952

2,636

Hunter, H. N., R. W. Lawton, R. Crosbie, & M. Lipkin 1953 HUMAN TOLERANCE TO COMBINED ACCELERATIONS; INVESTIGATION OF PHASE II - PRELIMINARY STUDIES ON PRIMATES SUBJECTED TO MAXIMUM SIMPLE ACCELERATIVE LOADS. (Naval Air Development Ctr., Johnsville, Pa.) NADC-MA-5301; 22 May 1953

2,637

Hunter, H. N., R. W. Lawton, R. Crosbie, & M. Lipkin 1953 SOME OBSERVATIONS ON HUMAN TOLERANCE TO EXPOSURES TO 15 TRANSVERSE G. (Naval Air Development Ctr., Johnsville, Pa.) NADC-MA-5305; 30 July 1953
See also J. Avia. Med. 26:298-303, 1955

2,638

Hunter, H.N. & M. Weiss 1953 PILOT'S ABILITY TO SIMULATE AN EMERGENCY ESCAPE WITH VARIOUS TYPES OF EJECTION SEATS WHILE SUBJECTED TO A FLUCTUATING ACCELERATION
(U.S. Naval Air Development Center, Johnsville, Pa.) NADC-MA-LR1, Nov. 3, 1953. Proj. No. TED ADC AE 6303. ASTIA AD 54 281

ABSTRACT: To determine some of the difficulties a pilot experiences in operating an ejection seat under emergency conditions, three types of ejection seats, i.e., Air Force "arm rest" upward, Air Force "D-Ring" downward, and Navy "face curtain" upward were installed, respectively, in the AMAL centrifuge and tests were conducted wherein pilots were requested to execute ejection procedures under fluctuating G conditions. To simulate an aircraft in an uncontrolled condition, positive G was varied from 1.5 to 6.5 G at a rate of 8 G per second while the subject pitched and/or rolled through a maximum angle of 36°. One of the major faults found in all seats was the difficulty subjects had in retracting their feet into the stirrups. Other problems encountered were the failure to properly operate the face curtain, fouling of the arm rest, and the straining to reach the "D-Ring". Factors affecting the efficient use of the equipment were the clothing worn and training and practice effects.

2,639

Hunter, H. N., R. W. Lawton, R. Crosbie, & M. Lipkin 1954 HUMAN TOLERANCE TO HIGH POSITIVE G APPLIED AT A RATE OF 5 TO 10 G PER SECOND; PHASE IV - HUMAN TOLERANCE TO 15 POSITIVE G. (Naval Air Development Ctr., Johnsville, Pa.) NADC-MA-5302
See also J. Avia. Med. 28:50-66, 1954

2,640

Hunter, H. N., R. W. Lawton, R. Crosbie, & M. Lipkin 1954 SOME EFFECTS OF CYCLIC ACCELERATION IN RHESUS MONKEYS. (Naval Air Development Ctr., Johnsville, Pa.) NADC-MA-5404
See also J. Avia. Med. 25:594-599, 1954

2,641

Hunter, H.N., R.W. Lawton, R. Crosbie, & M. Lipkin 1954 SOME EFFECTS OF CYCLIC ACCELERATION IN RHESUS MONKEYS. J. Aviation Med. 25(6):594-599
See also (Naval Air Development Center, Johnsville, Pa.) NADC-MA5404, 1954.

ABSTRACT: In this study, eighteen rhesus monkeys (Macaca mulatta) were subjected to acceleration forces of either 25 G or 35 G, which were combined with 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 Nembutal 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 thre 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. (Author)

2,642

Hunter, H.N. & H.S. Weiss 1954 PILOT'S ABILITY TO ACTUATE F9F-6 EJECTION SEAT CONTROLS UNDER FLUCTUATING G CONDITIONS
(U.S. Naval Air Development Center, Johnsville, Pa.) NADC-MA-LR3, Sept. 16, 1954
ASTIA AD 70 757

ABSTRACT: The pilots were requested to execute the maneuvers required in an F9F-6 ejection sequence upon receipt of a signal during an acceleration stress pattern. All parts of the seat that were involved with the ejection sequence and the pre-ejection lever were fitted with microswitches and wired to recoders so that the time required to complete all maneuvers could be determined. The acceleration pattern fluctuated the positive G from 1.5 to 7.0 at 5 G/sec while the subject pitched or rolled to a maximum of 70°. The maximum acceleration rate of change of roll was 5.8 rad/sec^2 and the maximum acceleration rate of change of pitch was 4.5 rad/sec^2. The average time for each maneuver under conditions which included all test conditions of an emergency escape were: 3.22 sec-feet retraction; 1.77 sec pre-ejection movement, and 1.71 sec face curtain actuation.

2,643

Hunter, H.N. 1955 DEVELOPMENT OF SUPINE SEAT AND RELATED COMPONENTS
(U.S. Naval Air Development Center, Johnsville, Pa.) NADC-MA-LR13; 30 Nov. 1955

ABSTRACT: It had previously been reported that pilots could control an F7F-2N aircraft through turns and dives while supinated 85° from the vertical. The

supine position of 65° was investigated using the human centrifuge with the head upright to increase forward visibility. With 65° supination, straining and a Z-2 anti-blackout suit, the tolerance for all pilots tested (regardless of unprotected G tolerance) can be raised to acceleration stress conditions up to 7 G for 30 seconds.

2,644

Hunter, H. 1955 EFFECTS OF G-FORCES ON AIRCRAFT OXYGEN SYSTEMS; EVALUATION OF (Naval Air Development Ctr., Johnsville, Pa.) Project TED ADC AE-5100; 31 Dec. 1955

ABSTRACT: Equipment was exposed to maximums of 15 G for extended periods in each direction and had no effect on the oxygen system. The entire oxygen system was exposed to acceleration stress for a period of four months on the centrifuge and still performed satisfactorily.

2,645

Hunter, H. 1955 EFFECTS OF G-FORCES ON AIRCRAFT OXYGEN SYSTEMS; FINAL REPORT ON EVALUATION OF. (Naval Air Development Ctr., Johnsville, Pa.) Letter NADC-MA-3 ser 9686 of 1 Sept. 1955

2,646

Hunter, H. 1955 PILOT'S ABILITY TO ACTUATE COCKPIT CONTROLS UNDER G CONDITIONS (U.S. Naval Air Development Center, Johnsville, Pa.) NADC-MA-LR11 August 24, 1955

ABSTRACT: Tests were conducted at AMAL to ascertain the relative accessability of controls in a fighter plane's cockpit when the pilot is under acceleration stress. As a result of these tests, the ejection seat controls of the F9F-6 were found to be easily accessable to the pilot wearing full flight gear and under fluctuating acceleration stress (1.5 to 7 G). Flight clothing required for operation over cold water increases the time of actuation of controls from 10 to 99 percent, depending on the type of maneuver executed.

2,647

Hunter, H. 1955 PILOT'S ABILITY TO ACTUATE F9F-6 EJECTION SEAT CONTROLS UNDER FLUCTUATING G CONDITIONS
(Naval Air Development Center, Johnsville, Pa.) PROJECT TED ADC AE-6303.1, 31 Dec. 1955

ABSTRACT: All available ejection systems (Navy, face curtain, upward; Air Force, arm rest, upward; and Air Force, "D" ring, downward) were evaluated by exposing

Air and Navy pilots in full flight gear to fluctuating G. For upward ejections both the arm rests and face curtains were accessible to the pilot and the time required to actuate each under simulated uncontrolled flight conditions was approximately the same. In each system the most time-consuming maneuver was placing the feet on the stirrups. For downward ejections the "D" ring was easily accessible. However, the supports to hold the feet down during ejection never operated properly.

2,648

Hunter, H., & C. F. Gell 1955 INFLIGHT PHYSIOLOGICAL AND PSYCHOLOGICAL REACTIONS TO THE SUPINE POSITION. PHASE II. (Naval Air Development Ctr., Johnsville, Pa.) Project NM 001 100 300; TED ADC AE-6300; 31 December 1955

ABSTRACT: It was determined that 65 degrees supination is the maximum angle which can be provided in a fighter cockpit without sacrificing the single control system, pilot vision and escape possibility. At this angle, all subjects tested requiring protection withstood 7 G for 30 seconds with the aid of a Z-2 anti-blackout suit plus straining. This acceleration stress was withstood without peripheral light loss and with little or no discomfort.

2,649

Hunter, H., A. Greco, E. Kephart, & J. W. Taylor 1955 EFFECTS OF SUDDEN AND DYNAMIC LOADS APPLIED TO RIGID AND ELASTIC TEST SPECIMENS AND ANIMALS. (Naval Air Development Ctr., Johnsville, Pa.) Project NM 001 106 300; 31 Dec. 1955

ABSTRACT: A device for measuring deflections or deformations under sudden loads is a Statham Accelerometer. It is a mass suspended between two springs, and, as the load increases, the mass is displaced and the displacement can be recorded on an oscilloscope. The limitation of the rate at which the magnitude of the applied load can be measured is dependent upon the natural frequency of the accelerometer. However, our data indicate that when a sudden load is delivered to the accelerometer by releasing the latter suddenly into a G field, the natural frequency of the gage is not the same under load as it is under one G.

2,650

Hunter, H.N. 1956 ANTI-BLACKOUT EQUIPMENT, DETERMINATION OF LIMITATIONS OF EQUIPMENT AND PERSONNEL
(U.S. Naval Air Development Ctr., Johnsville, Pa.) NADC-MA-LR14; 3 Feb. 1956

ABSTRACT: Investigations were carried out using the AMAL centrifuge to determine the maximum anti-blackout protection provided by the Z-2, Z-3, and AF-N anti-blackout suits, the full pressure half suit, and the supine positions with the

upper limit of acceleration stress being 6 G for 30 seconds. The results indicated that the Z-2 and Z-3 suits and proposed AF-N suits are approximately equal in efficiency. The full pressure half suit caused such discomfort in the range of 5 to 7 psi that the subjects ended the runs even though peripheral lights were still visible. The supine position alone does not offer any more protection than that of either the Z-2 suit plus straining or the full pressure half suit until the angle of supination is at least 77°.

2,651

Hunter, P.A. and M.W. Fetner 1963 MANEUVER ACCELERATIONS EXPERIENCED DURING ROUTINE OPERATIONS OF A COMMERCIAL TURBOJET TRANSPORT AIRPLANE. (National Aeronautics and Space Administration, Washington) Technical Note D-1801, May 1963

ABSTRACT: The incremental maneuver normal accelerations collected during routine commercial operations of a four-engine turbojet transport have been evaluated. Frequency distributions of positive and negative accelerations by flight condition are presented.

2,652

Hunter, S. 1958 CORRELATION OF HEART-BRAIN DISTANCE AND OF SITTING HEIGHT AGAINST POSITIVE ACCELERATION THRESHOLDS
(Institute of Aviation Medicine, RAF, Farnborough) FPRC No. 1048; April 1958; ASTIA AD 201 165

ABSTRACT: It is generally accepted that the hydrostatic pressure exerted by the arterial column of blood between the heart and the brain is proportional to its length measured in the direction of the applied force. For brevity, this length has been called the heart-brain distance. The purpose of this pilot experiment was to find out if any simple relationship existed under positive acceleration (g) between (1) the heart-brain distance and the black-out threshold, and (2) the sitting height and the black-out threshold. Accordingly, 10 unprotected experienced subjects from the Institute of Aviation Medicine carried out a total of 674 runs on the human centrifuge at Farnborough. The correlation coefficient for the heart-brain distance against the positive g threshold value was found to be -0.77. This leads to the deduction that, with a 99 percentage of certainty, the heart-brain distance is inversely related to the threshold. When the sitting height was correlated against positive threshold, the coefficient was +0.01. No simple functional relationship seems to exist between these two variables. (Author)

2,653

Hurt, G.J., Jr. 1963 ROUGH-AIR EFFECT ON CREW PERFORMANCE DURING A SIMULATED LOW-ALTITUDE HIGH-SPEED SURVEILLANCE MISSION. (NASA, Wash., D.C.) NASA TN D-1924, August 1963

ABSTRACT: Test subjects were exposed to several levels of simulated gust intensity. The root mean square of the normal acceleration ranged from 0.16g for the lowest level to 0.95g for the highest level of response simulated. The simulated gust intensities and vehicle response levels were in excess of the accepted human comfort level. It was found that the observer would be disrupted but not stopped in the performance of the assigned tasks.

2,654

Hyde, A. S. 1961 THE EFFECT OF BACK ANGLE AND MOLDED SUPPORT UPON INTRA-PULMONARY PRESSURE DURING FORWARD ($+G_x$) ACCELERATIONS. (Paper, 32nd Annual Meeting, Aerospace Medical Assoc., 24-27 April 1961, Chicago, Ill.)

ABSTRACT: Static intra-pulmonary pressures were recorded at accelerations from 2 to 16 G_x in live (curarized and dead dogs and monkeys during forward inclinations of 5 degrees increments from 0 degrees to 45 degrees. The pressures primarily reflect shifts of the diaphragm due to acceleratory forces. The influence of staged evisceration and staged molded support systems were studied. Essentially null displacement occurred between 10 degrees and 15 degrees of forward inclination. Above and below these angles diaphragmatic displacement was proportional to acceleration and relatively uninfluenced by molded support systems. Staged evisceration clearly established the literal dependency of diaphragmatic movement upon the presence of the liver. (Aerospace Med. 32(3):235, March 1961)

2,655

Hyde, A.S. 1961 THE PHYSIOLOGICAL EFFECTS OF ACCELERATION ON RESPIRATION AND PROTECTIVE MEASURES
In Bergeret, P., ed., Bio-Assay Techniques for Human Centrifuges and Physiological Effects of Acceleration. (London, New York, Paris: Pergamon Press, 1961) AGARDograph 48. Pp. 101-106.

ABSTRACT: Recent, current, and near future experiments defining respiratory physiology during forward ($+a_x$) acceleration are presented and reviewed. Areas where more work is needed have been noted.

2,656

Hyde, A.S. 1962 THE EFFECT OF BACK ANGLE, MOLDED SUPPORTS, AND STAGED EVISCERATION UPON INTRAPULMONARY PRESSURES IN DOGS AND A MONKEY DURING FORWARD ($+G_x$) ACCELERATION. (6570th Aerospace Medical Research Labs., Aerospace Medical Div., Air Force Systems Command, Wright-Patterson AFB, Ohio) Report No. AMRL-TDR-62-106, Sept. 1962. ASTIA AD 289 337.

ABSTRACT: Static intrapulmonary pressures were recorded at accelerations from +2 to 16 G_x in live (curarized) and dead dogs and a monkey during forward inclinations of 5^o increments from 0^o to 45^o. The pressures primarily reflect shifts of the diaphragm due to acceleratory forces. The influence of staged evisceration and staged molded support systems were also studied. Essentially null displacement occurred between 10^o and 15^o of forward inclination. Above and below these angles, diaphragmatic displacement was proportional to acceleration and relatively uninfluenced by molded support systems. Staged evisceration clearly established the literal dependency of diaphragmatic movement upon the presence of the liver.

2,657

Hyde, A.S., N.S. Cherniack, E.F. Lindberg & D. Whately 1962 SOME CARDIORESPIRATORY RESPONSES OF FLYING AND NON-FLYING PERSONNEL TO DIFFERENT VECTORS OF ACCELERATION WITH CORRELATION OF THESE RESPONSES TO OTHER VARIABLES. (Biomedical Lab., Aerospace Medical Div., Wright-Patterson AFB, Ohio) AMRL TDR 62 151, Dec. 1962. ASTIA AD 410 162.

ABSTRACT: The cardiovascular and respiratory responses of test pilots are compared with the AMRL centrifuge panel members during headward (+GZ) and forward (+Gx) accelerations. Vital capacity decreased in all subjects with increasing forward acceleration. No significant difference existed between the cardiorespiratory performance of test pilots and that of the nonrated personnel that constitute the AMRL centrifuge panel. No correlation was noted between blackout and pulse rate, but correlation did exist between resting control and + 5Gz pulse rates. An extensive number of anthropometric measurements, indices of physical fitness, and measurements made during other stress did not correlate with tolerance to headward (+ Gz) acceleration or with respiratory performance during + Gz and +Gx acceleration. (Author)

2,658

Hyde, A. S., J. Pines & I. Saito 1962 THE EFFECTS OF GAS COMPOSITION AND ACCELERATION VECTOR UPON LUNG VOLUMES.
(Paper, 33rd Annual Meeting of the Aerospace Medical Association, 9-12 April 1962, Atlantic City, N.J.)

ABSTRACT: The effect on lung volumes of breathing air versus breathing 100% O_2 was investigated at ambient pressures on the human centrifuge facility of the Aerospace Medical Laboratory. The vecotrs of acceleration of interest were

"positive G" (+3.0 -3.5 G_z) and "forward acceleration" (+6.0 G_x), each for three minutes. The combinations of these events and of the use of anti-G suits upon lung volumes are discussed in terms of weighted casuality with regard to the severe (greater than 50%) reductions in vital capacity noted after accelerations when anti-G suits, 100% O_2 and acceleration were present. (Aerospace Med. 33(3): 339, March 1962)

2,659

Hyde, A. S. 1963 MAN-RATED CENTRIFUGES: A NATIONAL SURVEY WITH DESIGN CONSIDERATIONS AND RECOMMENDATIONS FOR FUTURE DEVICES. (6570th Aerospace Medical Research Laboratories, Aerospace Medical Division, Wright-Patterson AFB, Ohio)
September 1963 AMRL Memorandum B-55

SUMMARY:

A. It has been the thesis of this memorandum-report that the need for man-rated centrifuges will continue to increase, that more devices of this type will be proposed and built within the next decade, and that performance (and cost) of these devices will also continue to increase.

B. Categories of use of man-rated centrifuges have been presented and compared to our national capabilities; our capabilities were found to be less than our needs.

C. In order to transmit experience gained by the author in establishing specifications for man-rated centrifuges, information was offered relating to major trade-offs that influence final design configuration, cost and usefulness of these devices.

2,660

Hyde, A., J. Pines and I. Saito 1963 ATELECTASIS FOLLOWING ACCELERATION: A STUDY OF CAUSALITY.
Aerospace Medicine 32(2):150-157, February 1963.

ABSTRACT: The effect on lung volumes (VC, TVC, IC, ER, TV) was determined for various combinations of G vector, gas composition, wearing of anti-G suit, and simulation of restrictive aspects of ventilation during acceleration.

Following +6 G_x for three minutes, severe decrease in vital capacity (-40 per cent) was found only after 100 per cent O_2 was breathed. This decrease occurred primarily because the inspiratory capacity diminished. There was no change in the post-run expiratory capacity.

Simulation of the accelerative force "loading" the chest and abdomen, as reproduced by lead-shot weights, did not alter lung volumes even when 100 per cent O_2 was breathed.

Positive pressure breathing (2 mm Hg per G) during +6 G_x accelerations for three minutes while breathing 100 per cent O_2 did not prevent any of the post-run loss of vital capacity.

For the condition of +3.0 to 3.5 G_z acceleration of three minutes duration, significant post-run loss of vital capacity occurred only when the anti-G suit was used and 100 per cent O_2 was breathed. Anti-G suit inflation while breathing 100 per cent O_2 at +1 G_z was without effect on post-run lung volumes.

Loss of vital capacity following the conditions cited in 5 above occurred even when pre-run (control) and post-run vital capacities were measured with the anti-G suit inflated to 3.0 to 3.5 p.s.i.g. This infers that the post +3 G_z and 100 per cent O_2 loss was not limited to lung tissue directly compressed by inflation of the anti-G suit, but was in addition to it.

Suggested mechanisms which may be responsible for these phenomena are discussed.

ACCELERATION

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2,661

IGY Satellite Panel 1958 IGY SATELLITE PANEL PROPOSES NATIONAL SPACE FLIGHT PROGRAM. Astronautics, 3:132, May 1958.

ABSTRACT: Recommendations for a five-year program costing about $150 million annually include projects "centering on biological experiments crucial to the eventual attainment of space flight; investigations of lunar gravity or mass, magnetic field and atmosphere; planetary and interplanetary probes; determination of the astronomical unit (A.U.) now estimination of planetary masses and their effects of the path of nearby space vehicles; and observation of an instrumented re-entry body as it plunged into the planet's atmosphere."

2,662

Il'in, N. 1960 THE SHIP-SATELLITE SPEAKS
Krasnaya zvezda P. 3; 18 May 1960

2,663

Iljin, N.A. & K.F. Levitzkaja 1940 INVESTIGATION OF THE INFLUENCE OF THE INCREASED GRAVITATION UPON THE ORGANISM I. CHANGE OF WEIGHT OF THE BODY
Bull. Biol. exp. U.R.S.S. (Moscow) 9: 200-203

2,664

Ingram, W.T. 1957 ENVIRONMENTAL PROBLEMS CONNECTED WITH SPACE SHIP OCCUPANCY. In The Proceedings of the 3rd Annual Meeting of The Society of the American Astronautical Society, New York.

2,665

Inman, V. T., and J. B. de C.M. Saunders 1947 ANATOMICROPHYSIOLOGICAL ASPECTS OF INJURIES TO THE INTERVERTEBRAL DISC.
Journ. Bone Joint Surg. 29:461, 1947.

2,666

Institute of the Aerospace Sciences 1961 PROCEEDINGS OF THE IAS AEROSPACE SUPPORT AND OPERATIONS MEETING. (Unclassified Papers.) (Sponsored by the Instit. of Aerospace Sciences, Inc., New York; Assisted by OAS Aerospace Technology on Support, Orlando, Fla., 4-6 Dec. 1961.)

2,667

Institute of Environmental Sciences 1961 1961 PROCEEDINGS OF THE INSTITUTE OF ENVIRONMENTAL SCIENCES NATIONAL MEETING, APRIL 5, 6, 7, 1961, WASHINGTON, D. C. (Mt. Prospect, Illinois: Institute of Environmental Sciences, P. O. Box 191)

ABSTRACT: The 1961 Proceedings of the Institute of Environmental Sciences include the 84 technical presentations given during the eighteen sessions of the 1961 National Meeting. These papers represent a big area in advancement of the state of the art of the environmental sciences. The following subjects were discussed: Philosophy of Environmental Testing; Environmental Criteria and Specifications; Simulation Methods for Normal Environments; Environmental Measurements; Ground Environment Effects; Marine Environments; Mobility; The Thermal Environment; Special Test Facility Problems; Environments of Space; Space Environments Simulation; Life Sciences and Space; Special Space Problems; Spacecraft Problems; Space Facilities; Shock and Vibration Problems; Vibration Excitation Problems; Acoustics and Dynamics; Supplemental Papers.

2,668

MOTION PICTURE

Institute of Transportation and Traffic Engineering 1958 IMPACT. (16 mm documentary film, Department of Visual Communication, Univ. Extension, Univ. of California, Los Angeles 24, California) 1958

2,669

International Astronautical Federation 1954 *SPACE FLIGHT PROBLEMS: BEING A COMPLETE COLLECTION OF ALL LECTURES HELD AT THE 4TH ASTRONAUTICAL CONGRESS, ZURICH 1953* (Biel, Switzerland: Switzerland, Laubscher & Cie., 1954)

2,670

Ioan, C.S. 1963 PARACHUTING AT SUPERSONIC SPEEDS
(Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio) Trans. No. FTD-TT-6201307; 20 February 1963; ASTIA AD 298 777
Original Source: Stiinta Si Technica (Rumania) 1:14-16, 1962

ABSTRACT: Under conditions encountered while traveling at supersonic speeds, the need to ensure that the pilot and the entire crew will be rescued if an

accident should occur during a flight at supersonic speed, i.e., the development of new methods and devices for ejection and parachuting at high speeds and altitudes, has become one of the most important problems to be solved by the builders of new supersonic airplanes. The main obstacles which had to be surmounted in designing ejection devices were acceleration, shock waves, and aerodynamic heating. The newest ejection methods and devices used at supersonic speeds are the "encapsulated seats" or ejectable "hermetically-sealed cabins." Another new type of ejection method is the sectional plane.

2,671

Isakov, P. K. 1956 SKOROSTI, USKORENIYA PEREGRUZKI (VELOCITIES, ACCELERATIONS, OVERLOADS) (Voyenizdat, 1956)

2,672

Isakov, P.K. 1957 FIZIOLOGICHESKIE REAKSII CHELOVEKA PRI DEISTVII RADIAL'NYKH USKORENII (Physiological Reactions of Man Under the Influence of Radial Accelerations)
Voyenno-meditsinskiy Zhurnal (Moscow) 6: 65-72. June 1957.

ABSTRACT: Certain physiological effects of radial acceleration are discussed which are of a practical significance in aviation. The phenomenon of grayout and blackout under positive acceleration is well known; it is caused by a reduction of the retinal and cerebral circulations due to the redistribution of the blood in the body. Repeated exposure to acceleration may result in a certain degree of adaptation which manifests itself in increased tolerance of the intensity or duration of acceleration. Compensatory mechanisms, which tend to counteract the shifting of the blood, are chiefly of a muscular nature (increased tonus) and may be demonstrated in the electromyogram. Such reactions occur even in anticipation of acceleration. The duration and accuracy of hand movements during acceleration was also studied, as well as the oxygen consumption before, during, and after acceleration with and without the use of anit-g devices.

2,673

Isakov, P. K. 1957 PHYSIOLOGICAL REACTIONS OF MAN DURING RADIAL ACCELERATION (Trans. of Voyenno-Meditsinkiy Zhurnal (USSR) (6):65-72, 1957) (SLA Translations Center, Chicago, Ill.) 59-11118 (Air Technical Intelligence Ctr., Wright-Patterson AFB, Ohio, Rept. No. ATIC-IR-1606-58, 1957)

ABSTRACT: Findings are presented in regard to various physical reactions in the organism under the effect of acceleration, with and without anti-g devices.

2,674

Isakov, P. K. 1958 LIFE IN SPUTNIK.
Astronautics, 3(2):38-39, 49-50

ABSTRACT: Problems involved in keeping living organisms in space-examined by Soviet biologist, preventing escape of gases from liquids in organisms by combination of two methods-namely maintaining necessary barometric pressure in chamber and use of specially designed clothing or space suits. Solar and cosmic radiation studied; effects of acceleration on organisms of animals and humans.

2,675

Isakov, P. K. 1958 ON LAUNCHING A SINGLE-STAGE GEOPHYSICAL ROCKET TO AN ALTITUDE OF 450 KM ON AUGUST 27, 1958.
Kr. Zvezda (USSR) 2 Sept. 1958.
(Air Technical Intelligence Ctr., Wright-Patterson AFB, Ohio)
Rept. No. IR-1612-58, 1958.

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.

2,676

Isakov, P.K. 1958 PROBLEMS OF RETURN TO EARTH FROM SPACE OF SATELLITE CREWS, Krasnaya Zvezda (USSR) p.3, July 1958

ABSTRACT: The work of Soviet scientists has shown that up to altitudes of about 200 km above sea level it is possible to ensure viability. Living beings after the containers in which they are placed, become detached from the rocket. The problems of reducing the speed of re-entry, overcoming the heat barrier, and overcoming acceleration and deceleration harmful to the living being are touched on briefly.

2,677

Isakov, P. K., & V. B. Malkin 1958 VOPROSY MEDITSINY PRI MEZHPLANETNYKH POLETAKH (MEDICAL PROBLEMS IN INTERPLANETARY FLIGHTS). Med. rabot. No. 7, p. 4; 24 Jan. 1958

SUMMARY: A review of a volume of 23 translations into Russian from the foreign literature. Articles translated are by Armstrong, Haber, Strughold, von Beckh, Gaspa, Ballinger, Schaeffer, etc.

2,678

Isakov, P. K. 1960 ASSAULT ON SPACE
Trud. p. 4; 21 May 1960.

2,679

Istvan, K., & C. Endre 1957 KISERLETI GYORSULASOS AGYRAZKODASHAN LETREJOTT EKG-ELTERESEK (ELECTROCARDIOGRAPHIC CHANGES IN ACCELERATION INDUCED BRAIN CONCUSSIONS) Ideggyogyaszati Szemle (Hungary) 10(3):87-96, July 1957

2,680

Iuganov, E. M., I. I. Kasian & V. I. Iazdovskii 1960 O MYSCHECHNOM TONUSE V USLOVIIAKH NEVESOMOSIT (Muscle Tone During Conditions of Weightlessness) Izvest. Akad. Nauk SSSR, Ser. Biol. (Moscow) 25(4):601-606, July-Aug. 1960. (In Russian, with English summary).

ABSTRACT: The nature and degree of change in the eye muscle tone of a rabbit was investigated during various gravitational conditions, rocket flights (with acceleration up to 6.5 g and a state of weightlessness for 5 minutes), and laboratory conditions using a centrifuge. During weightlessness in the rocket flight the vertical displacement of the eyeball suggested a decrease of the tonic tension of the eye muscles. During various gravitational states, the oculogravic and agravic illusion is apparently caused by vertical displacement of the eyes, brought about by reflex stimuli from the otolith apparatus.

2,681

Ivanov, D. 1959 VYSOTNYY POLET (High Altitude Flight)
(Trans. of Bol'shaya Meditsinskaya Entsiklopediya (USSR) 6:137-142, 1958).
(SLA Translation Center, Chicago, Ill.) 59-18449

2,682

Ivanov, K. V., M. V. Zhukov & M. G. Molchanova 1962 EFFECT OF THE EXERTION OF ACCELERATION SIMULTANEOUSLY WITH IRRADIATION ON THE COURSE OF RADIATION SICKNESS IN ANIMALS.
Pat. Fiziol. Eksp. Ter. 6:74-75, Sep.-Oct. 1962 (Russian)

2,683

Ivanov, K. V., M. V. Zhukov & M. G. Molchanova 1963 THE EFFECT OF ACCELERATIONS CREATED AT THE MOMENT OF IRRADIATION OF ANIMALS ON THE COURSE OF ACUTE RADIATION SICKNESS.
(Joint Publications Research Service, Washington, D.C.)
Transl. from Patol. Fiziol. i Eksperim. Terapiya (Moscow) 6(5):74-75, Sept.-Oct. 1962.

ABSTRACT: The characteristics of the general reaction of an organism to the combined action of radial accelerations, produced by rotating animals in a centrifuge and irradiation by penetrating radiations, were investigated. The experiments were performed on 44 male rats weighing 110-grams to 120 grams. Results indicated that acceleration produced at the moment of irradiation did not aggrevate radiation sickness. The experimental animals died no earlier than those irradiated without rotation.

2,684

Izosimov, G. V. and A. N. Razumeev 1962 STUDIES ON CHANGES IN THE BIO-ELECTRICAL ACTIVITY OF THE CEREBRAL CORTEX UNDER THE INFLUENCE OF PROLONGED TRANSVERSE OVERLOAD.
In Izv. Akad. Nauk. SSSR (Biol) 4:621-626, July-August, 1962 (Russian).

ACCELERATION

J

2,685

Jackson, C. B., Jr., W. K. Douglas, et al 1961 RESULTS OF PREFLIGHT AND POST FLIGHT MEDICAL EXAMINATIONS. (Proc. Conf. on Results of the First U. S. Manned Suborbital Space Flight, NASA, Nat. Inst. Health, and Nat. Acad. Sci.) Pp. 31-36. 6 June 1961.

2,686

Jacobius, A. J. & M. J. Wilkins 1956 AVIATION MEDICINE: AN ANNOTATED BIBLIOGRAPHY, VOL. I, 1952 LITERATURE.
(Technical Information Division, Library of Congress, Washington, D.C.) Nov. 1956. Library of Congress Cat. Card No. 56-60078. PB No. 121543. ASTIA AD 108 861

ABSTRACT: The first annual cumulation of the bibliography on the subject prepared at the Library of Congress under plans to include all available published book and periodical literature and unclassified reports issued from 1951 to 1956. Author and subject indexes are provided.

2,687

Jacobius, A.J., R. Kenk, L.D. Davis, E.G. Koines, K. Pappajohn et. al 1957 AEROSPACE MEDICINE AND BIOLOGY: AN ANNOTATED BIBLIOGRAPHY. VOLUME VI, 1957 LITERATURE. (Library of Congress. Science and Technology Div., Washington, D.C.)

ABSTRACT: This sixth volume of the series contains 1567 abstracts and follows the preceding volume in all aspects, including format and type of indexes. Only minor modifications were made in the subject-category breakdown which was initiated in Volume V. New areas of interest that emerged while work was in progress received special consideration. The project is sponsored by the National Aeronautics and Space Administration, the Air Force, and the Federal Aviation Agency. (Aerospace Medicine 34(8):769, Aug. 1963)

2,688

Jacobius, A. J. 1959 BIBLIOGRAPHIC CONTROL OF AVIATION AND SPACE MEDICAL LITERATURE.
Aerospace Med. 30(7):507-512.

SUMMARY: This paper discusses briefly the scope, purpose, and organization of aviation and space medicine bibliographies, outlines their historic development, and lists their most representative products. Enough has been said recently about the urgent need for intensification of this country's research efforts, particularly in the astronautical sciences, that to belabor this point further would be tantamount to expressing a truism. The paper attempts to show at what tremendous rate aerospace medicine and its literature have grown throughout the last decades. There is little doubt that this trend will persist for some time to come. While the maze of scientific source materials is deepening daily, the need for bibliographic guidance becomes increasingly compelling. Bibliographers and researches alike should accept the challenge and spare no efforts to promote and improve methods and techniques of bibliographic coverage and documentation.

2,689

Jacobius, A. J., M. J. Wilkins, L. Kassianoff, R. B. Slie & S. L. Whitehead 1959 AVIATION MEDICINE: AN ANNOTATED BIBLIOGRAPHY, VOL. II, 1953 LITERATURE.
(Aerospace Medical Association, St. Paul, Minn.) Library of Congress Cat. Card No. 56-60078; ASTIA AD 297 740.

ABSTRACT: The second volume on the subject, considerably increased in size. Subject coverage: (1) history and general aspects of aviation medicine, (2) aviation physiology, (3) pathology and pharmacology of aviation, (4) aviation psychology, (5) preventive medicine and sanitation, (6) special problems in high altitude and space flight, and (7) miscellaneous problems.

2,690

Jacobius, A. J. et.al. 1960 AEROSPACE MEDICINE AND BIOLOGY: AN ANNOTATED BIBLIOGRAPHY, VOLUME III, 1954 LITERATURE.
(Library of Congress, Science and Technol. Div., Washington, D.C.) Library of Congress Cat. Card No. 56-60078; PB 171 029. ASTIA AD 248 102

ABSTRACT: This bibliography, which was prepared under the sponsorship of the National Aeronautics and Space Administration, of the Advanced Research Project Agency, and of the Defence Research Board of Canada, is the third in a series which is scheduled to be brought up to date under an accelerated program within two and one half years. It comprises comprehensively the monographic, periodical, and report literatures, both domestic and foreign, of the year 1954. The bibliography is arranged alphabetically by authors and contains 1368 abstracts. It includes a secondary author, a corporate author, and a detailed and thoroughly cross-referenced subject index. The indexes, cumulated for Volumes I-III, contain close to 4000 entries. The bibliography covers all subject fields pertinent to

aviation and space medicine, particularly the following: physiology, biology, psychology, pathology, pharmacology, toxicology, sanitation, human and operational aspects, engineering, extraterrestrial environments, nutrition, survival and rescue, personnel problems, and accident prevention.

2,691

Jacobius, A. J., R. Kenk, et al 1961 AEROSPACE MEDICINE AND BIOLOGY, AN ANNOTATED BIBLIOGRAPHY, (FORMERLY AVIATION MEDICINE), VOL. IV, 1955 LITERATURE.
(Technical Information Div., Library of Congress, Washington, D. C., 1961)
Library of Congress Cat. Card No. 56-60078. ASTIA AD 258 191

ABSTRACT: This volume continues the effort made in earlier volumes. The series appears indispensable for literature search in the field of aerospace medicine.

2,692

Jacobius, A. S. et al 1962 AEROSPACE MEDICINE AND BIOLOGY: AN ANNOTATED BIBLIOGRAPHY, VOLUME V, 1956 LITERATURE.
(Library of Congress, Science and Technology Div., Washington, D.C.)
Library of Congress Cat. Card No. 56-60078. ASTIA AD 274 064

ABSTRACT: Abstracts are arranged by subject catagories for greater convenience to the reader desirous to gaing information on broad subject matters by quick direct perusal.

2,693

Jacobius, A.J. 1962 INTERNATIONAL EXCHANGE OF BIOASTRONAUTICS INFORMATION.
(Library of Congress, Science and Technology Division, Washington, D.C., presented at the Symposium on Bioastronautics Information Exchange, 12th International Astronautical Congress, October 1-7, 1961)
See also Aerospace Med. 33(2):131-137, Feb. 1962.

ABSTRACT: The spectacular development of the life sciences in space during the last decade as part of the overall space research effort is reflected in an equally dramatic expansion of bioastronautics literature. Because the trend is worldwide, the individual scientist, harassed by the increasing complexity and growth of his subject field, finds himself faced by added linguistic obstacles and dismayed by alien disciplines and practices. The dilemma does certainly not stem from a lack of services intended to control the explosive influx of bioastronautics information and to bridge language barriers. Quite to the contrary, the problem we face today is not one of "too little," it is one of "too much." This paper is intended to survey and evaluate briefly the situation in terms of existing domestic and international information facilities, with the view of identifying and formulating possible ways of improvement.

2,694

Jacobius, A. J., R. Kenk, L. D. Davis et al 1963 AEROSPACE MEDICINE AND BIOLOGY (FORMERLY AVIATION MEDICINE): AN ANNOTATED BIBLIOGRAPHY, VOL. VI, 1957 LITERATURE.
(Science & Technology Division, The Library of Congress, Washington, D. C.)
Congress Catalog Card No. 56-60078. ASTIA AD 402 638

2,695

Jacobs, H. I. 1959 STUDY OF HUMAN TOLERANCE TO COMPLEX TRANSVERSE G.
(Convair Division of General Dynamics Corp., San Diego, Calif.)
Convair Rept. ZG-003, June 1959.

2,696

Jacobs, H. L. and E. Burgess, Ed. 1960 ADVANCES IN THE ASTRONAUTICAL SCIENCES, VOLUME 6 (AAS Sixth Annual Meeting, New York, Proceedings, 18-21 Jan. 1960.)
(New York: Macmillan, 1961)

CONTENTS include:
White, S., D. D. Flickinger, T. V. Helvey, A. Mayo and B. Rowen, "Panel Discussion: Man in Space, When?", pp. 37-69, 22 figs,. 5 tbls.

2,697

Jäger, M. 1956 BEI 2400 KM/ST: AUSSTEIGEN ...? (AT 2400 KM./HR.: EXIT...?)
Flug-Revue (Stuttgart) 1956(12):18-20, Dec. 22, 1956

ABSTRACT: American research and experiences with ejection at high altitudes and supersonic speeds are briefly described. It is recognized that the progressively increasing speeds and higher altitudes exceed the protection offered by further development of the ejection seat. Instead, the new safety design concept consists of a completely enclosed ejection capsule encompassing the pilot and the cockpit.

2,698

Jager, M. 1959 DAS GEFAHRLICHE G (THE DANGEROUS G)
Flug-Revue (Stuttgart), (2): 22-25, Feb. 1959 (In German)

ABSTRACT: The physiologic effects of G forces, and human G-tolerance limits are reviewed, and protective measures and current experiments, such as tests in water immersion chambers, are discussed. Complete enclosure of the pilot in water in a pressurized chamber has been suggested for future space flights.

Centrifugal experiments showed that, although the subject had full freedom of arm and leg motion, the physiologic effects of gravity in water resembled those observed when pressure suits were worn. Since the heart and lungs were still in an air environment, they did not receive the full protection given to the rest of the body. Within a short period of time, the subject experienced pain in the thoracic region. It has been suggested to fill the lungs with water in which oxygen has been dissolved.

2,699

Jasper, H. H., A. Cipriani & E. Lotspeich 1942 STUDIES ON THE MECHANISM OF BLACK-OUT.
(National Research Council, Canada) C-2085, 26 Jan. 1942.

ABSTRACT: Studies were made on cats and macasus Rhesus monkeys and this preliminary report describes the technique of operating the animal centrifuge, observations on the effects of positive "G" on the spontaneous electrical activity of the cortex, its extinction by positive "G", the effect of the position of the animal relative to the direction of "G". The effect of positive "G" on the electrical response of the occipital cortex to light stimulation.

2,700

Jasper, H. H. & A. Cipriani 1942 DESCRIPTION OF ANIMAL CENTRIFUGE MONTREAL NEUROLOGICAL INSTITUTE.
(National Research Council, Canada) C-2086, Jan. 1942.

ABSTRACT: This report describes the animal centrifuge used at Montreal Neurological Institute for studying the physiological effects of acceleration on animals.

2,701

Jasper, H. 1942 NRC REPORT ON PROJECT A.M. 14 ON SUBJECTING ANIMALS TO CENTRIFUGAL FORCE
(National Research Council, Canada) C-2168, May 16, 1942.

ABSTRACT: This is a preliminary report discussing the results obtained on experiments on cats and Macacus. Rhesus monkeys subjected to forces between 3 and 12 G and studying the electroencephalogram, retinal potentials, electrocardiograms, intercranial pressure and moving pictures of cerebral vessels as viewed through a glass window screwed in the skull.

2,702

Jasper, H.H. 1942 REPORT TO THE NATIONAL RESEARCH COUNCIL ON PROJECT A.M. 14. RESEARCH ON POSITIVE FORCES OF ACCELERATION. Proc. Assoc. Comm. Aviation Med. Research, NRCC, Appendix I. 16 May 1942

2,703

Jasper, H., A. Cipriani & E. Lotspeich 1942 PHYSIOLOGICAL STUDIES ON THE EFFECT OF POSITIVE ACCELERATION IN CATS AND MONKEYS. (National Research Council, Canada) Rept. C-2225; 28 Sept. 1942.

ABSTRACT: The effect of acceleration on blood pressure was studied by means of a T cannula in the carotid artery and its fall in relation to time of onset of acceleration has been described. The intracranial pressure was noted to fall with the onset of positive "G" down to a negative pressure of 150 mm of mercury. Complete extinction of the b wave in the electroretinogram was noted to precede the extinction of the electrical activity of the cortex at low levels of acceleration while at higher levels the electrical activity of the brain is extinguished first. Changes in occipital cortical response to light stimulation were also noted in relation to electroretinogram and electroencephalogram. The electroencephalograms showed an excitatory phase followed by depression with delta waves and finally extinction of all activity. Hydraulic suit protection was found to protect monkeys up to 10 "G". Moving pictures of cerebral vessels during positive acceleration showed blanching of the cortical surface but never complete emptying of the larger vessels. No difference in G tolerance could be seen in animals acclimatized to high altitude, and no effect of adrenal cortical extract and of pretreatment with desoxycorticosterone upon G tolerance could be found.

2,704

Jasper, H. H., B. F. Jones, F. D. Chapman, A. Cipriani & R. E. Mitchell 1942 THE EFFECT OF REPEATED EXPOSURE TO LOW ATMOSPHERIC PRESSURE UPON TOLERANCE TO POSITIVE ACCELERATION IN MONKEYS. (National Research Council, Canada) C-2237, 17 Nov. 1942.

ABSTRACT: Macaca mulatta monkeys acclimatized to high altitude in decompression chambers were tested on the animals centrifuge and their tolerance to G recorded by means of electro-encephalograms, retinograms and clinical observations. Animals acclimatized to high altitudes were found to have a greater G tolerance than the controlled animal as measured by these criteria. The results of administration of desoxycorticosterone were equivocal.

2,705

Jasper, H. H., M. Clinton, Jr., A Cipriani & G. W. Thorn 1942 THE EFFECT OF DESOXYCORTICOSTERONE ACETATE AND ADRENAL CORTICAL EXTRACT UPON G TOLERANCE IN MONKEYS.
(National Research Council, Canada) Rept. C-2244, 10 Dec. 1942.

ABSTRACT: In eleven Macaca mulatta monkeys, tolerance to positive acceleration between 3.0 and 6.9 "g" was not appreciably altered by adrenal cortical extract or by pretreatment with desoxycorticosterone acetate as measured by threshold of extinction of the EEG.

Recovery time of brain potentials was accelerated 21% by adrenal cortical extract administered the night before exposure and 48% by four days pretreatment with desoxycorticosterone acetate.

2,706

Jasper, H. H. & A. Cipriani 1943 PHYSIOLOGICAL STUDIES OF ACCELERATION.
(National Research Council, Canada) C-2348.

ABSTRACT: The work accomplished during the fiscal year 1942-1943 under N.R.C. grand A M 14 is the subject of this paper. The work is divided into five principal headings: (a) Improvements in Instrumentation and Technique; (b) Fundamental Investigations of Basic Physiology of Acceleration; (c) Accessory Studies which took Precedence because of Apparent Promise or Urgency; (d) Motion Picture Presentation of the Physiology of Acceleration from Animal Studied: (e) Additional Activities of Research Fellow.

2,707

Jasper, H. H., & A. J. Cipriana April 1943 PHYSIOLOGICAL AND PATHOLOGICAL CHANGES IN UNANESTHETIZED MONKEYS SUBJECTED TO POSITIVE ACCELERATION WITH AND WITHOUT HYDRAULIC PROTECTION. (Executive of the Associate Committee on Aviation Medical Research, Nat'l. Research Council of Canada, Twenty-first meeting, 8 April 1943) Rept. No. CAM 26:49

2,708

Jasper, H. H., A. Battista, & R. H. Noble 1943 RELIABILITY OF THE SWING TEST OF MOTION SICKNESS. (National Research Council, Canada) Rept. No. C4038

2,709

Jaulmes, C., & A. Benitte 1956 LE MAL DES TRANSPORTS (TRAVEL SICKNESS) Revue medicale francaise (Paris) 37(6):321-330, June 1956

ABSTRACT: A brief review is presented of motion sickness, its clinical aspects, frequency, susceptibility of persons, and etiology. The etiological factor necessary for motion sickness is stimulation of the non-auditory labyrinth (caused by angular movements and change of head position around a vertical axis in an airplane). Consideration is given to nervous centers (vomiting center, chemoreceptor zone) and to psychological and visual factors related to motion sickness. Breathing exercises, oxygen inhalation, cotton ear plugs, and nutritional factors are mentioned as preventive measures. Drug treatment is advocated using belladonna alkaloids, barbiturates, synthetic antihistaminics, and pheonothiazine and derivatives.

2,710

Jefferson, G. DISCUSSION OF SPINAL INJURIES. Proc. Roy. Soc. Med. 21:21, 1928.

2,711

Jensen, L.K. 1961 EVALUATION OF ACCELEROMETER SERVOS WITH UNKNOWN NONLINEAR ELEMENTS. (Space Technology Labs., Inc., Los Angeles) Rept no. STL/TN-61-0000- 19004, ASTIA AD- 256 907, January 1961

ABSTRACT: Only two general methods of obtaining accelerations greater than one g are available in the laboratory, namely, by centrifuge and by vibration. This paper discusses the response of accelerometers containing feedback servos to vibrational input acceleration. It is shown that under certain conditions, the linearity of the steady-state accelerometer response can be determined by measuring the rectification error observed during vibration. (Author)

2,712

Jensen, R.E. & R.D. Squires 1959 NADC BIOLOGICAL INSTRUMENTATION SYMPOSIUM OF 10 DEC. 1958; THIRD LETTER REPORT CONCERNING (U.S. Naval Air Development Center, Johnsville, Pa.) NADC-MA-LR95 Oct. 7, 1959

ABSTRACT: This report gives details concerning the assemblage of a prototype airborne instrumentation package and a supporting ground installation for the monitoring, recording, and analysis of the cabin environmental conditions and physiological status of the pilot in high performance aircraft, space vehicles, and their ground simulation counterparts, e.g., centrifuges, angular accelerators, ejection seat towers, etc. Equipment will conform to IRIG standards to assure compatibility of readout with existing equipment at other installations.

2,713

Jensen, R., J.J. Gordon, et al. 1960 NADC BIOLOGICAL INSTRUMENTATION SYMPOSIUM OF 10 DECEMBER 1958; SEVENTH LETTER REPORT CONCERNING (U.S. Naval Air Development Center, Johnsville, Pa.) NADC-MA-L6021 July 12, 1960 ASTIA AD 242 449

ABSTRACT: This is a preliminary report of tests carried out on the AMAL bioinstrumentation package during which six channels were transmitted on an assigned frequency of 232.4 megacycles from the package mounted in the AMAL centrifuge gondola to the AMAL monitoring and recording system.

2,714

Jensen, R., J. J. Gordon, et al. 1960 NADC BIOLOGICAL INSTRUMENTATION SYMPOSIUM OF 10 DECEMBER 1958 (Naval Air Development Ctr., Johnsville, Pa.) NADC-MA-L6018; ASTIA AD-242 448

ABSTRACT: A summary is given of the investigations carried out on three types of respiration sensor systems which have been developed and evaluated at the Aviation Medical Acceleration Laboratory (AMAL). A classical method for measuring respiratory excursions was a chest strap for measurement of changes in chest circumference. The measurement of a pressure differential across a pilot's mask with a constant resistance to flow has been used as a measurement of respiratory gas flow. In order to study respiration when a mask is not used, in particular when a full pressure suit is worn, a thermistor device was mounted on a standard boom microphone to measure temperature at that point. (AUTHOR)

2,715

Jensen, R. E., J. J. Gordon, R. D. Squires, & W. Sipple 1961 CHANGES IN THE HUMAN ELECTROENCEPHALOGRAPH (EEG) DURING POSITIVE ACCELERATION. (Paper, 32nd Annual Meeting, Aerospace Medical Association, 24-27 April 1961, Chicago, Ill.)

ABSTRACT: The occipital EEG was recorded on magnetic tape during 75 centrifuge runs on fifteen human subjects while exposed to positive acceleration sufficient to produce blackout lasting from 2 to 22 seconds. A performance task and change in EEG electrode impedance were also recorded. Motion pictures were made of subject's face during runs. The EEG was separated into 18 continuously recorded component frequencies using sharply tuned filters. The data thus obtained showed increase in amplitude of beta frequencies so long as the subject was able to resist cerebral hypertension. As he failed to compensate there were varying degrees of shift toward increased amplitude in the lower frequencies. A marked beta-delta shift during acceleration with appearance of high amplitude delta and loss of beta indicated imminent loss of consciousness. (Aerospace Medicine 32(3):235, March 1961)

2,716

Jessen, Richard H. 1963 A METHOD OF NUMERICALLY EVALUATING THE ERRORS RESULTING FROM MEASUREMENT OF SPECIFIC SHOCK IMPULSES BY ACCELEROMETERS DUE TO THE FREQUENCY RESPONSE CHARACTERISTICS OF THE ACCELEROMETER (University of Wyoming, Laramie, Wyoming) ASTIA AD 401 818

ABSTRACT: Vibration and shock have become important fields of mechanical engineering with the advent of high speed aircraft and missiles. Vibration can be defined in terms of displacement, velocity, and acceleration while shock is generally defined as a change in velocity which gives rise to high accelerations. Factors such as mounting techniques, temperature effects, acoustical effects, calibration errors, and frequency response all affect the accuracy of the recorded environmental data. The effect of the frequency response upon the accuracy of the acceleration data will be the main factor discussed in this paper. The input to be considered in this paper will be a shock rather than a vibration input. This paper will present a method of calculating the error of a crystal accelerometer due to its frequency response being less than unity in the low frequency range. The inputs considered will be the three types of shock pulses.

2,717

Jez, J. 1960 PRZYCZYNY I MECHANISM URAZÓW W CZASIE SKOKÓW ZE SPADOCHRONEM (CAUSES AND MECHANISM OF INJURIES DURING PARACHUTE JUMPING) Lekarz Wojskowy (Warszawa) 36(10): 992-999. (In Polish, with French summary)

2,718

Jilek L, & S. Trojan 1960 [EFFECT OF THE RESISTANCE TO POSITIVE ACCELERATION IN RATS] Cesk Fysiol. 9:20-1, January 1960

2,719

Jilek, L., J. Fischer and S. Trojan 1962 HIGHER NERVOUS ACTIVITY CHANGES UNDER THE INFLUENCE OF POSITIVE ACCELERATION IN RATS OF VARIOUS AGES. In Activ. Nerv. Sup. (Praha) 4:128-129, 1962 (Cz).

2,720

Jilek, L. and S. Trojan 1962 CHANGES IN THE RESISTANCE AGAINST ACCELERATION STRESS AFTER INTERVENTION ON THE CENTRAL NERVOUS SYSTEM IN ONTOGENESIS IN RATS.
In Sborn. Lek. 64:57-60, Feb. 1962 (Cz).

2,721

Jobes, H. W. 1942 HUMAN CENTRIFUGE OF THE AERO MEDICAL UNIT AT THE MAYO CLINIC'S AERO MEDICAL LABORATORY.
(USAF, Wright-Patterson AFB, Ohio) Memo Report EXP-M-49-698-5. 24 Aug. 1942.

ABSTRACT: The superstructure and driving mechanism of the inertia-type centrifuge at Mayo Clinic is described. The superstructure is judged to be quite satisfactory in operation but the clutching and braking mechanism gives a somewhat non-linear acceleration to the centrifuge, partly because of manual control.

2,722

Joekes, A. M. 1947 AIRSICKNESS
(RAF, Institute of Aviation Medicine, Farnborough) FPRC Rept. No. 475; Oct. 1947. ASTIA ATI 206 860.

ABSTRACT: (1) 254 air-gunners in training have been subjected to the swing test. The incidence of swing sickness was 19.7%, corresponding closely to the incidence in other populations of the R.A.F. The subsequent flying experience of these air-gunners is being followed. (2) A comparison of the results of the swing test with the incidence of airsickness and with past flying experience suggests that the single swing test is of little help in pre-selecting air crew to prevent wastage due to airsickness. (3) A number of those that were swing sick have been tested for adaptation on the swing. Of the original number of air-gunners tested 1.7% failed to adapt; a further 1.1% showed only slight adaptation. (4) The percentage figure for failure to adapt swing sickness approximates to the higher figure for failure to adapt to airsickness. Whether these two manifestations run a parallel course can only be decided by following the subsequent flying experience of these air-gunners. It is suggested that a group of men suspended from flying duries on account of persistent sickness, not primarily due to psychological causes, should be tested for adaptation to swing sickness.

2,723

Joffe, M. and F. A. Hitchcock 1948 STUDIES ON DECELERATION.
Federation Proc., 7:62.

In order to investigate the physiological effects of rapid, severe decceleration it is first necessary to know the strength of the structural components affected and their resistance to deceleration forces. The literature on the subject is nil. Thoraces of normal human individuals were obtained and the physical properties of the ribs investigated by means of the Olsen Universal Lever Type Testing machine which applied an anterior posterior compression to the rib to the point of destruction. All ribs tested broke in the anterior third at an average value of about 15 lbs. Curves of load vs distortion were drawn, and calculations of total energy absorbed were made.. All ribs absorbed energy in the range of 10-100 inch pounds. Obviously the thorax can absorb more energy, up to 1000 foot lbs. or more, and we conclude that

the bony structures contribute little to the total strength. Bone ash determinations made on fat free, dry bone showed no variation correlating with strength. The strength of the intact human thorax by means of simulated decelerations is being observed by means of the fluoroscope. Changes in the viscera are also observed and animal experiments to determine changes in cardiology (pressure and E.K.G.) with similar constriction of the thorax and abdomen are under way.

2,724

Joffe, M and F. A. Hitchock 1949 CAUSE OF INJURY IN RAPID DECELERATION
Federation Proceedings 8:1.

ABSTRACT: Experiments have been carried out on cadavers and anesthetized dogs to determine the effects of rapid deceleration. Accelerations was accomplished by falling weights attached by a steel cable to the lower extremity of the test body. Rapid deceleration was produced by a safety harness attached around the waist and connected by means of a tail line to the cross member of a T-shaped channel iron frame. The G forces produced were recorded photographically from vacuum tube type accelerometers. The decelerative forces were less than those expected from calculation, which was probably due to the lack of rigidity in the tube attachments. It was observed that there was no damping effect of tissues on the transmission of forces from the belt to the heart.

Seven dogs were subjected to multiple decelerations. Serial electrocardiograms were made on all dogs over a period ranging up to 9 days or until death. Autopsies were performed at death. Results of serial electrocardiograms on dogs showed inversions or other abnormalities of the T-wave in one or more of the 3 standard leads. X-ray heart shadow in one case, autopsy in all 7 cases, showed a dilatation of the heart with thinning of the right ventricular wall. Four of 7 dogs also showed pulmonary, hepatic or renal vascular engorgement. The findings pointed to a condition of right heart failure—the traumatic heart injury syndrome.

2,725

Joffe, M. H. 1949 ANATOMICAL AND PHYSIOLOGICAL FACTORS INVOLVED IN TOLERANCE TO RAPID DECELERATION.
(PhD Diss., University of Ohio, Columbus, Ohio, 1949)

SUMMARY: 1. Human ribs tested as isolated units have been shown to be relatively weak structures (average strength 21.8 lbs.—range 7 to 40 lbs.) but capable of undergoing a considerable amount of distortion before breaking (22.6% average—range 12.9 to 34.9%). The total energy absorbed before breakage was also quite small (average of 22.1 inch-pounds — range 0.5 to 58 inch-pounds).

2. Two experiments on halves of thoraxes with ribs and intercostal muscles intact but with the extrinxic musculature removed were subjected to forces causing an average distrotion of 36% (34 and 38%). Since with this degree of

distortion the sternum and vertebral column were in contact, the limit of bending was not reached and no breakage occurred.

3. Application of forces to thoraxes by means of a constricting belt went as high as 1540 pounds or 12.65 lbs/sq. in with no evident damage to the structure. Changes in diameters were evident but accurate measurement of them was not possible.

4. Under no conditions was the costal arch damaged — either when isolated or in situ. Distortion greater than 90^{o} was seen in all cases without damage.

5. Electronic registration of the forces of acceleration and deceleration were unsatisfactory because of the inadequate instrumentation available. Calculation showed tremendously higher forces evolved than were readable on the oscillographic tracing. Calculation gave about 17.5 g (5593 lbs.) while the electronic tubes in this instance showed almost no change.

6. Serial electrocardiographic tracings associated with periods up to nine days after the experiment showed marked changes in the T-wave diagnostic of myocardial damage. Voltage changes in the Q-wave and QRS complex were also evident. Deviation from the preexperimental electrical axis was as much as -30^{o} (from a normal of $+75^{o}$).

7. All autopsies, and one case of pre- and postexperimental x-ray heart shadows, showed a marked dilatation of the right ventricle associated with the signs of congestive heart failure. Venous congestion in the lungs, liver and kidneys was present. Myocardial hyperemia and torn fibers were evident at the microscopic examination of the material.

8. We have reproduced all the findings reported in the literature relative to the syndrome of cardiac trauma, but with a different experimental basis and a specific traumatizing factor in mind — the injury resulting from the use of the industrial safety belt. (Author)

2,726

Johnson, B.H. 1961 WIND TUNNEL TESTING EXPERIENCE WITH SEVERAL MODELS OF HIGH-SPEED ROCKET TESTS SLED (Arnold Engineering Development Center, Arnold AFB, Tenn.) AEDC TN 61-28, Contract AF 40(600)800, Proj. 6876; March 1961; ASTIA AD-253 458

ABSTRACT: A series of wind tunnel tests of a number of rocket sled models and representative generalized bodies in the presence of ground planes was conducted at the Arnold Center. The purpose of these tests was to determine the design parameters which are of importance in the aerodynamic design of high-speed rocket sleds. The tests were performed mostly in the Mach number range from 0.6 to 1.4, but some data were obtained at Mach numbers as high as 4.0. Three-component force data are presented for all models. Test results indicated that the major portions of aerodynamic loads acting on a high-speed rocket sled are generated by the undercarriage components. The Mach number range in which the greatest loads occurred was from 0.8 to as high as 3.0 depending on the sled configuration. (Author)

2,727

Johnson, C. C. 1953 PROJECT PHYSIOLOGY OF ROCKET FLIGHT MX NO. 1450-R (Holloman Air Development Ctr., Holloman AFB, N. Mex.) Rept. No. HDT 319.1/27; ASTIA AD-5981; 24 Mar. 1953

2,728

Johnson, C., & G. R. Wendt 1955 STUDIES OF MOTION SICKNESS. XVII. The Effects of Temperature, Posture, and Wave Frequency upon Sickness Rate. J. Psychol. 39:423-433

2,729

Johnson, G.E., J. Serrano, & E.Z. Levy 1959 APPLICATION OF SKIN RESISTANCE IN PSYCHOPHYSIOLOGICAL STUDIES. (Wright Air Development Center, Aerospace Medical Lab., Wright-Patterson AFB, Ohio) WADC TR 59-688, Dec. 1959.

ABSTRACT: The usefulness of measuring changes in skin resistance as a device to detect the impairment of consciousness in personnel whose work requires maximum alertness was investigated during isolation, in flight, under acceleration, under the influence of drugs, and other conditions. These experiments have determined that the use of skin resistance for monitoring of consciousness is promising, however, further studies are necessary before this method may be used as an operational tool. The effects of temperature and environmental changes must be eliminated, and the patterns of skin resistance must have better quantification.

2,730

Johnson, L. L. 1959 STUDY TO DETERMINE METHODS OF SIMULATING G EFFECTS. (Wright Air Development Ctr., Wright-Patterson AFB, Ohio) WADC TN 58-314; ASTIA AD 233 045; Supplement 1; Aug. 1959

ABSTRACT: An experimental variable-area inflatable seat and shoulder harness with the necessary pneumatic actuators for the simulation of G force was fabricated. A special pneumatic controller was developed. The fabrication of the system and the subsequent testing is briefly outlined. The seat is described and illustrated by 9 photographs. It is concluded that the system concept is feasible and that the simulated reactions and effects are quite accurate and realistic. (AUTHOR)

on, L.L. 1959 STUDY TO DETERMINE METHODS OF SIMULATING g EFFECTS, SUPPLEMENT 1. (Armour Research Foundation, Chicago, Ill.)
Suppl. 1 to WADC TN 58-314, ASTIA AD-211 849.
Aug. 1959. ASTIA AD 233 045.

ACT: An experimental variable-area inflatable seat and shoulder harwith the necessary pneumatic actuators for the simulation of g force fabricated. A special pneumatic controller was developed. The fabrion of the system and the subsequent testing is briefly outlined. The is described and illustrated by 9 photographs. It is concluded that system concept is feasible and that the simulated reaction and effects quite accurate and realistic. (Author)

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nson, Philip 1954 AN EVALUATION OF THE CHARACTERISTICS OF THE HIGH IMPACT SHOCK MACHINE FOR ELECTRONIC DEVICES (Evans Signal Lab., Belmar, N.J.)
20 January 1954

TRACT: The impact time duration varies with angle of hammer fall with a five nd load on the shock table; the time duration varies between 0.4 and 0.6 lliseconds. Therefore, the response (transmission) of any fixed mechanical tem will change with the hammer angle. Low frequency systems convert a larger rtion of the impact energy into vibratory energy than high frequency systems exted by the same impact. A calibration procedure has been formulated.

733

hnson, R.A. 1959 MODEL 16 AUTOMATIC BLOOD PRESSURE MEASURING INSTRUMENT. (Systems Research Labs., Inc., Dayton, Ohio)
Research rept. no. 16-4F, WADC TR 59-429, ASTIA AD-235 421

ABSTRACT: An Automatic Blood Pressure Measuring System for detecting and measuring the arterial diastolic and systolic pressures of a human has been developed. The purpose of this system is to provide physiological information about an individual while he is being subjected to varying conditions of environment and stress. The system is unique in that it uses transistor logic for performing the program functions. It is housed in a compact, portable case and is equipped with a carrying handle. The range of operation is from 10 to 200 mm, of mercury and the measurement can be automatically repeated at intervals varying from 1 to 15 minutes. (Author)

2,731

Johnson, L.L. 1959 STUDY TO DETERMINE METHODS OF SIMULATING g EFFECTS, SUPPLEMENT 1. (Armour Research Foundation, Chicago, Ill.)
Suppl. 1 to WADC TN 58-314, ASTIA AD-211 849.
Aug. 1959. ASTIA AD 233 045.

ABSTRACT: An experimental variable-area inflatable seat and shoulder harness with the necessary pneumatic actuators for the simulation of g force was fabricated. A special pneumatic controller was developed. The fabrication of the system and the subsequent testing is briefly outlined. The seat is described and illustrated by 9 photographs. It is concluded that the system concept is feasible and that the simulated reaction and effects are quite accurate and realistic. (Author)

2,732

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20 January 1954

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2,733

Johnson, R.A. 1959 MODEL 16 AUTOMATIC BLOOD PRESSURE MEASURING INSTRUMENT. (Systems Research Labs., Inc., Dayton, Ohio)
Research rept. no. 16-4F, WADC TR 59-429, ASTIA AD-235 421

ABSTRACT: An Automatic Blood Pressure Measuring System for detecting and measuring the arterial diastolic and systolic pressures of a human has been developed. The purpose of this system is to provide physiological information about an individual while he is being subjected to varying conditions of environment and stress. The system is unique in that it uses transistor logic for performing the program functions. It is housed in a compact, portable case and is equipped with a carrying handle. The range of operation is from 10 to 200 mm, of mercury and the measurement can be automatically repeated at intervals varying from 1 to 15 minutes. (Author)

2,734

Johnson, R.M. 1960 EFFECTS OF ENVIRONMENTAL STRESS ON ADRENAL-THYROID RELATIONSHIPS
(Colorado A. and M. College, Fort Collins, Colorado) Contract AF 33(616)-7258; Project 7163(805); WADD, MD.

ABSTRACT: In establishing parameters and criteria for a habitable atmosphere or personal protective equipment for use in orbital flight, fundamental knowledge concerning the functional activity and mechanism of action of bodily systems is essential. This is especially true in endocrine gland interrelationships. There is, however, much controversy regarding their mode of action, especially in adrenal-thyroid relationship. This investigation will undertake to clarify some of this confusion.

2,735

Johnson, W. H. 1946 MOTION SICKNESS.
(National Research Council, Canada) Proj. Rept. NM 20

2,736

Johnson, W.H., W.R. Franks, G.F. Kelk, J.E. Loree, et al. 1950 STUDIES TO DEFINE QUANTITATIVELY THE STIMULUS REQUIRED TO PRODUCE MOTION SICKNESS. (RCAF Institute of Aviation Medicine, Toronto, & Defence Research Board of Canada) Paper No. 12, March 1950, ASTIA ATI 103 891

SUMMARY AND CONCLUSION: 1) In studies involving the types of motion which induces sickness, it is necessary to measure the movements of the head as these show considerable variation from one individual to another even though the subjects be exposed to identical types of motion. 2) Individual susceptability to swing sickness shows a significant correlation with the degree of head movement of the subject being swung. Swing sickness can be prevented by preventing this independent head movement, possibly the result of preventing any gyroscopic precussion. 3) The results suggest a promising subject for further research. (Author)

2,737

Johnson, W.H. 1951 SUGGESTIONS FOR IMPROVEMENTS OF OPERATIONAL EFFICIENCY (ESPECIALLY IN REGARD TO AIR SICKNESS) OF RCAF AIRCREW FLYING LANCASTER AIRCRAFT. (Defence Research Board, Working paper.)

2,738

Johnson, W.H. 1951 THE IMPORTANCE OF HEAD MOVEMENTS IN THE PRODUCTION OF MOTION SICKNESS (Def. Res. Med. Labs., Canada) April, 1951 ASTIA ATI 153 905

ABSTRACT: An investigation is being undertaken to determine the effectiveness of various motions of the head relative to the body in inducing motion sickness. The results indicate that individual differences in susceptibility to motion sickness on the swing are dependent upon the degree of movement of the head relative to the rest of the body. Sickness was abolished in susceptible individuals by preventing these independent head movements. In order to resolve the forces acting on the head, an electronic head movement recorder has been devised which measures the movements of the head in response to the motions imposed on the body by the vehicle (whether swing, aircraft, ship or other vehicle) It is expected that these studies will have practical application to the armed services.

2,739

Johnson, W. H., R. A. Stubbs, G. F. Kelk and W. F. Franks 1951 STIMULUS REQUIRED TO PRODUCE MOTION SICKNESS: I. PRELIMINARY REPORT DEALING WITH IMPORTANCE OF HEAD MOVEMENTS.
J. of Aviation Med. 22(5):365-374.

SUMMARY: In studies involving the types of motion which induce sickness, it is necessary to measure the movements of the head as these show great individual variation even when the subjects are exposed to identical types of over-all motion.

Individual susceptibility to motion sickness produced by a simple harmonic swing shows a significant correlation with the degree of concomitant head movement. Swing sickness can be almost totally overcome by preventing this head movement, thereby preventing any gyroscopic precession. It is probable that these findings are of importance to motion sickness in the air or in motor cars, trains or ships, where the imposed angular motion is much more complex. (Author)

2,740

Johnson, W.H. 1952 AIR SICKNESS
Air Facts 15(8):61-63, August 1, 1952

ABSTRACT: Johnson has found that head motion is the basic cause of motion sickness. Nausea results when violent motion affects the fluid in the labyrinthine channels of the inner ear. This, in turn, depends on the way in which a person "carries his head." The likelihood of sickness is reduced when head motion is reduced. Head rests have proven useful; iar travellers should rest the head firmly against the back of the seats, lessening forward and backward motion. Staring straight ahead prevents sideways movement.

Several devices have been developed to help determine individual susceptibility to motion sickness. One is an electronic machine which includes a fifteen-foot swing, electrically rocked, and a special helmet for the subject's head. A cage-like apparatus is overhead, and when the swing is set in motion head movement is charted on a nearby recording machine. From the amount of head movement shown, the scientists can forecast whether or not a subject should be acceptable as an aircrew member of the RCAF. (Journal of Aviation Medicine 23(6):630, December 1952)

2,741

Johnson, W.H. 1953 A PRELIMINARY REPORT OF A NEW METHOD FOR THE EXAMINATION OF NYSTAGMUS THROUGH TELEVISION.
The Laryngoscope, 63(12):1193-1196, December 1953

2,742

Johnson, W. H. and J. W. Mayne 1953 STIMULUS REQUIRED TO PRODUCE MOTION SICKNESS: RESTRICTION OF HEAD MOVEMENT AS A PREVENTIVE OF AIR-SICKNESS—FIELD STUDIES ON AIRBORNE TROOPS.
J. of Aviation Medicine 24:400-411, 452, October.

ABSTRACT: The conclusions of approximately 700 tests using over 500 subjects indicate that:

1. The headrest devices have a consistent effect in preventing air motion sickness and that they are significantly effective under fairly rough conditions of turbulence.

2. It is possible to predict that in approximately ninety-five out of every 100 flights made under this turbulence condition, the percentage of susceptible paratroop trainees who would be prevented from becoming airsick by the headrest device would vary between a minimum of 60 per cent and a maximum of 83 per cent.

3. The proportion of subjects becoming sick was independent of past flying experience.

4. There is some indication that the incidence of air motion sickness in soldiers similar in relevant characteristics to those tested decreases as the time since last meal increases but no general conclusions on this relationship can be made with confidence

5. The percentage of test subjects who are susceptible to air motion sickness varies with the type of turbulence but for any given turbulence condition there is no real difference between the susceptibility rates for Gliders and for Dakotas (DC-3) aircraft.

6. On the basis of these trials the estimated 95 per cent confidence intervals for the true percentage of paratroop trainees susceptible to air motion sickness varies from approximately 30 per cent to 41 per cent for "normal" turbulence to 42 per cent to 74 per cent for very rough turbulence (including violent evasive action.)

2,743

Johnson, W. H. 1954 HEAD MOVEMENTS AND MOTION SICKNESS. International Record of Med. and G. P. Clinics Pp. 638-640, Dec. 1954 Def. Res. Med. Lab. (Canada) Rept. No. 20-41-1-1

ABSTRACT: Although it is apparent that different physiologic and psychologic factors are important in the etiology of motion sickness, recent experimental evidence has established that the nonauditory membranous labyrinth in the head is an extremely important sensory receptor in this regard. Furthermore, it has been noted by several investigators that an acute vertigo often associated with marked motion sickness follows movement of the head in one plane of space when the body is already rotating in another plane.

Controlled laboratory experiments were recently carried out by Johnson ET AL, when it was demonstrated that individual differences in susceptibility to motion sickness are to large extent dependent upon concomitant movements of the subject's head in response to movements imposed on the body as a whole. Restriction of head movement is a therapeutic measure in the prevention of all forms of motion sickness. This may be accomplished either with or without the aid of special head-rests.

2,744

Johnson, W.H. 1956 STIMULATION OF THE LABYRINTH BY ANGULAR ACCELERATION. 20th International Physiological Congress, Communications (Brussels) p. 1035, August 4, 1956

2,745

Johnson, W. H. 1956 HEAD MOVEMENT MEASUREMENTS IN RELATION TO SPATIAL DISORIENTATION AND VESTIBULAR STIMULATION. J. Avia. Med. 27(2):148-152

ABSTRACT: By exposing several hundred Royal Canadian Air Force flight cadets to the motion of a simple swing, it was demonstrated that laboratory-induced motion sickness is directly correlated with vestibular sensitivity. A high correlation exists between the overall magnitude of the head movements and the incidence of motion sickness. Studies of susceptible individuals revealed much precessional head movement when exposed to complex movement. By fixing the head of the subject, swing sickness was prevented. This paper is concerned with evidence obtained by forcing head movements; one of the experiments consisted of placing the subject in a supine position upon a stretcher, mounted upon a turntable; the subject was rotated at a rate of 30 r.p.m. about a vertical axis. At the time of rotation, the subject rotated his head from side to side; a sickness rate of 95% is possible under these conditions, sometimes developing in 15 seconds. Gyroscopes rotating in three planes were fixed to helmets worn by the subjects; a precessional tumbling occurs in the affected gyroscope when there is any head rotation. The "cross product" of two angular accelerations applied simultaneously in any two orthogonal planes indicates the magnitude and the direction of the resulting subjective sensations of disorientation in the subject.

2,746

Johnson, W. H. 1957 DISORIENTATION IN FLIGHT. PART I. VERTIGO. (Defense Research Medical Laboratories, Toronto) Flight Comment 1957.

ABSTRACT: Vertigo - "the sensation of rotation or whirling around". This implies a subjective sensation either of the subject rotating with respect to his surroundings, or of the surroundings rotating with respect to the subject. Spatial disorientation - differs from vertigo in that it causes the pilot to put the aircraft in a relatively steady "off course" attitude (eg, nose down), although he continues to think he is flying straight and level. Vertigo causes the pilot to correct for a rotation, or turn, which is not actually occurring. In either case if the pilot fails to recognize the true attitude and correct it strictly by using instruments, a critical situation results.

2,747

Johnson, W.H. 1957 DISORIENTATION IN FLIGHT - PART II - SPATIAL DISORIENTATION. Flight Comment, September-October 1958

2,748

Johnson, W.H. 1958 DISORIENTATION. Institute of Aviation Medicine Aeromedical Reports (Toronto) p. 41-49 Winter 1958.

2,749

Johnson, W. H. 1958 PROCEEDINGS OF THE FIRST CONFERENCE ON VESTIBULAR PHYSIOLOGY AND SPACIAL DISORIENTATION. (School of Aviation Medicine, Air University, U.S.A.F., Randolph Air Force Base, Texas, June 1958.)

2,750

Johnson, W. H. 1959 THE IMPORTANCE OF THE UTRICLE IN ORIENTATION Paper, 1959 Meeting of the Aero Medical Assoc., 27-29 April 1959, Los Angeles, Calif.

ABSTRACT: The role played by the different components of the nonauditory membreaneous labyrinth in spatial orientation merits attention in the field of aviation medicine. Most attention in this regard has been concerned with the activity of the semi-circular canals. The otolithic receptors merits special attention because of their apparent stimulation by other types of accelerations which occur during certain types of aircraft maneuvers. The importance of these receptors during the weightless state involving high performance aircraft, rocket flight and orbiting satellites requires elucidation.

Difficulty in interpreting the importance of the utricle has been mainly due to lack of confirming experimental evidence. This can be decided most reliably by inactivation of the appropriate branch of the vestibular nerve concerned while leaving the semicircular canals in a functional state. A program designed to enable this type of investigation will be described together with movies showing the reactions of the operated animals when exposed to the gravity free state involving jet aircraft. Control animals were similarly exposed to zero-gravity and differences were noted in the responses of the two types, thus indicating the significance of the otoliths in the perception of gravity.

2,751

Johnson, W. H. and S. Brydon 1959 FUNCTIONS OF THE UTRICULAR MACULA. A PRELIMINARY REPORT. Can. J. Biochem. Physiol. 37:605-606.

2,752

Johnson, W.H. 1960 SYMPOSIUM OF MOTION SICKNESS.
(Panel discussion, USAF Advisory Panel on Motion Sickness and Weightlessness) Report March 1960

2,753

Johnson, W. H., J. B. Smith, & J. A. Sullivan 1960 ACCELERATION AS A MEANS OF DETERMINING THE SENSITIVITY OF THE COMPONENTS OF THE NON-AUDITORY MEMBRANOUS LABYRINTH. Ann. Otol. Rhinol. Laryngol. 69(2):610-621, June 1960

ABSTRACT: A procedure is described for comparing the responses of normal and diseased labyrinths to controlled accelerations. The comparisons are facilitated by a newly-devised apparatus which enables humans to be exposed to various magnitudes and types of motion, thereby making it possible selectively to stimulate otoliths and semicircular canals. By simultaneously exposing the head to angular motion in any of two planes of space at right angles to each other, a resultant acceleration is produced in the third remaining orthogonal plane. Proper orientation of the head under these conditions allows determination of the threshold of excitation to angular motion of the various semicircular canals individually. Furthermore, by the proper positioning of the subject with the head fixed relative to the trunk, rotation of the body at various speeds enables a determination of the threshold of excitation of the otolith to be made. In both of these arrangements, both subjective and objective vestibular responses can be accurately recorded during rotation, the latter by means of a closed-circuit television which enables all type of eye responses to be recorded with relative ease. (AUTHOR)

2,754

Johnson, W.H. & N.B.G. Taylor 1960 SOME EXPERIMENTS ON THE RELATIVE EFFECTIVENESS OF VARIOUS TYPES OF ACCELERATIONS ON MOTION SICKNESS
Paper: 31st Annual Meeting of the Aerospace Medical Association, Americana Hotel, Bal Harbour, Miami Beach, Fla., May 9-11, 1960

ABSTRACT: The nausea which is readily induced by the motions of vehicles moving by land, sea or air has long defied attempts to clearly understand its precise etiology because of the complex interrelationship and differing importance of linear and angular accelerations and other concomitant factors such as vision. An understanding of these factors has become urgent in relation to space travel because of the complex accelerations to which the travelers will undoubtedly be exposed during rocket flight and in the subsequent artificial gravity situation during orbit. The present status of our knowledge will be reviewed and will be followed by a description of some controlled experiments in which over 600 human subjects have been exposed to various types of simple and compound accelerations in the laboratory.

2,755

Johnson, W.H. 1960 ETIOLOGY OF MOTION SICKNESS (THE SIGNIFICANCE OF MOTION IN MOTION SICKNESS). (USAF Advisory Panel of Motion Sickness and Weightlessness) April 1960

2,756

Johnson, W. H. and N. B. Taylor 1961 A REVIEW OF THE PHYSIOLOGICAL EFFECTS OF ANGULAR ACCELERATIONS. In Bergeret, P., ed., Bio-Assay Techniques for Human Centrifuges and Physiological Effects of Acceleration. (London, New York, Paris: Pergamon Press, 1961). Pp. 23-34.

ABSTRACT: This paper reviews the known and possible physiological effects of angular (rotational) accelerations in relation to the production of motion-sickness, spatial disorientation and "blackout" by centrifugal acceleration. The characteristic accelerations of physiological significance produced by swings, turntables, centrifuges and a linear vertical accelerator are described. The significance of these accelerations to present flying conditions and to some proposals for future operations are discussed. A preliminary report is given on some experiments in cats which helped clarify the function of the utricle and the saccule.

2,757

Johnson, W. H. 1961 SOME VESTIBULAR PROBLEMS IN SPACE FLIGHT
Ann. Otol. Rhinol. Laryngol. 70(3):777-784, September 1961.

ABSTRACT: The present knowledge of the effects of space flight on the

nonauditory labyrinth is reviewed. Motion sickness is primarily caused by motion, although there are contributing factors. Whether or not angular acceleration or linear acceleration is the causative motion is debated. The relation of nausea and vomiting to motion sickness is discussed. It is suggested that weightlessness by itself is not nauseating, but that angular acceleration of the head will produce nausea during the weightless state. Vertigo will be a constant hazard during preweightlessness and weightlessness due to rotation of the rocket, tumbling movements of the capsule, and nodding of the head when the trunk rotates in the plane of vehicular rotation.

2,758

Johnson, W. H. & N. B. G. Taylor 1961 THE IMPORTANCE OF HEAD MOVEMENTS IN STUDIES INVOLVING STIMULATION OF THE ORGAN OF BALANCE. (Defence Research Medical Labs, Canada) Acta Oto-Laryngologica 53:213-218, Apr-May 61 , ASTIA Doc. No. AD-261 252

ABSTRACT: Certain findings and procedures have been described which enable precise determinations of the sensitivity of the various components of the non-auditory membranous labyrinth. We wish to emphasize very strongly one point which applies to motion sickness induced by various devices. The angular and linear accelerations that have been described as characteristic of various pieces of apparatus refer to the apparatus alone. If valid conclusions on the effects of these accelerations are to be drawn, care must be taken to ensure that the motion of the subject's head conforms as closely as possible to that of the apparatus. If the head is allowed to move freely, either voluntarily or involuntarily, it will be subject to additional accelerations due to these motions, and, in particular, to angular accelerations because of the short radii involved in the head movement with respect to the body (rotation of the head in the horizontal plane or swinging anterposteriorly or laterally on the neck). It is hoped that the procedure outlined will be of use to those interested in vestibular threshold determinations both from the point of view of basic physiology and in the diagnosis of vestibular disease. (Author)

2,759

Johnson, W. H. and N. B. G. Taylor 1961 SOME EXPERIMENTS ON RELATIVE EFFECTIVENESS OF VARIOUS TYPES OF ACCELERATIONS ON MOTION SICKNESS. Aerospace Medicine 32(3):205-208, March 1961.

ABSTRACT: To compare the relative importance of linear and angular accelerations in causing motion sickness, 800 Ss were exposed to simple harmonic motion on a two-pole and four-pole swing. The conditions were varied as follows: 1) with the head secured to the back of the seat so the labyrinths were subjected to same accelerations as the seat, 2) with the head unrestrained, 3) with eyes open, and 4) with eyes blindfolded. The incidence of motion sickness under these conditions was observed and interpreted in regard to the primary stimulus for motion sickness. Implications of the findings for space flight were indicated. (Tufts)

2,760

Johnson, W. H. and N. B. G. Taylor 1961 THE IMPORTANCE OF THE OTOLITHS IN DISORIENTATION.
(Paper, 32nd Annual Meeting, Aerospace Medical Assoc., 24-27 April 1961, Chicago, Illinois)

ABSTRACT: Other than the oculogravic illusion, little is known of the effects of stimulating the otoliths. It is possible, even probable, that the stimulation of these organs particularly during and subsequent to weightlessness, and during changes in linear acceleration, could produce effects of importance in flight. The lack of knowledge results mainly from the difficulty in the laboratory of stimulating the otoliths without at the same time stimulating the semicircular canals; there is also a scarcity of objective signs of otolithic stimulation. A new laboratory procedure will be described with the aid of moving pictures. Human subjects are exposed to "revolution without rotation," i.e., to a linear acceleration that is continuously changing direction clockwise or counterclockwise. Evidence will be presented that suggests this is an otolithic stimulus causing measureable effects. (Aerospace Medicine 32(3):236, March 1961)

2,761

Johnson, W., J. Meek and A. Graybiel 1961 THE EFFECTS OF UNILATERAL AND BILATERAL LABYRINTHECTOMY ON CANAL SICKNESS IN THE SQUIRREL MONKEY.
(Naval School of Aviation Medicine, Pensacola, Fla.) NASA Order R-37; NASA N62-15687

ABSTRACT: Six squirrel monkeys which readily developed canal sickness when exposed to slow rotation were divided into two groups and subjected either to a unilateral left labyrinthectomy or a bilateral labyrinthectomy. Following surgery both groups of animals demonstrated vestibular dysfunction in unsteadiness of gait and absence of response to caloric testing of the operated ears. After bilateral labyrinthectomy all three monkeys developed a complete insensitivity to canal sickness. A similar lack of symptoms was seen initially in the monkeys subjected to unilateral labyrinthectomy; however, this behavior proved to be termporary, and by six months the animals had nearly returned to the presurgical level of sensitivity to canal sickness. (Author)

2,762

Johnson, W. H., A. Graybiel and J. C. Meek 1962 OBJECTIVE AND SUBJECTIVE MANIFESTATIONS OF CORIOLIS ACCELERATION ON A SLOWLY ROTATING ROOM
(Paper, 33rd annual meeting of the Aerospace Medical Assoc., 9-12 April 1962, Atlantic City, New Jersey.)

ABSTRACT: The Slow Rotation Room at Pensacola (Aerospace Med., 32:321-327, 1961) has been used to determine reactions associated with stimulation of the human non-auditory labyrinth. A head-mounted camera has been used to obtain records of eye movements during the vestibular stimulation. These records will be discussed together with other techniques for determining changes in thresholds of vertibular sensitivity. Application to aerospace medicine will be discussed. (Aerospace Med., 33(3):340, March 1962.)

2,763

Johnson, W. H., J. C. Meek, & A. Graybiel 1962 EFFECTS OF LABYRINTHECTOMY ON CANAL SICKNESS IN SQUIRREL MONKEY. Annals of Otology, Rhinology & Laryngology 71(2):289-298, June 1962
NOTE: Reel 7, Flash 7, Item 20

SUMMARY: The syndrome of canal sickness as produced by slow rotation has been well defined and occurs in both man and animals. Previous studies with humans have offered indirect evidence that this disorder has its genesis in the semicircular canals. The squirrel monkey is particularly susceptible to canal sickness and provides an opportunity to obtain basic information regarding the pathogenesis of canal sickness. One such method of approach is to study the animals' response to rotation following unilateral and bilateral labyrinthectomy.
Six healthy squirrel monkeys which readily developed canal sickness when exposed to slow rotation were divided into two groups. One group was subjected to a unilateral left labyrinthectomy, the other group to a bilateral labyrinthectomy. Following surgery both groups of animals demonstrated evidence of vestibular dysfunction in unsteadiness of gait. This unbalance disappeared within six weeks following unilateral labyrinthectomy but persisted with gradual improvement in the bilateral labyrinthectomized animals.
Following bilateral labyrinthectomy all three monkeys developed a complete insensitivity to canal sickness which remained throughout the four month period of observation. A similar lack of symptoms from rotation was seen initially in the three monkeys subjected to a unilateral labyrinthectomy; however, this behavior proved to be temporary, and by six months the animals had nearly returned to the pre-surgical level of sensitivity to canal sickness. Caloric tests done before and after surgery indicated complete loss of canal function in the operated ears; there was a slight rise in sensitivity in the non-operated cars. (AUTHOR)

2,764

Johnston, A.R. 1960 MINIATURE ACCELEROMETER WITH A FUSED QUARTZ SUSPENSION (Jet Propulsion Laboratory, California Inst. of Technol.) Tech Release 34-81.
ASTIA AD 237 054

ABSTRACT: Describes a miniature accelerometer constructed as a supporting research project. The specific purpose was to investigate the capability of fused quartz in this application and to demonstrate an unusually small instrument which still maintains the high level of accuracy necessary for inertial guidance. Exceptional dimensional stability, ideal elastic properties, and high strength in small cross sections are qualities which make fused quartz an attractive material for this application.

2,765

Johnston, A.R. and S. Szirmay 1961 INVESTIGATION OF A PULSE-TORQUED SYSTEM (Jet Propulsion Laboratory, California Institute of Technology, Pasadena, Calif.) Technical Report No. 32-136, April 19, 1961. ASTIA AD 274 662.

ABSTRACT: An application of the pulse-torquing principle to acceleration measurement has been investigated. The circuitry was evaluated while functioning in an acceleration-measuring system. The dynamics of the digital force-rebalance loop, which included the accelerometer pendulum, were investigated. The use of derived-rate feedback was found to provide stable operation over the complete input range, even though the pickoff response time might be several times the pulse repetition period.

Although primarily tested with an accelerometer, the electronics could also be used to pulse-torque a gyro. An analog-digital converter using the pulse-torquing circuitry and exhibiting accuracy similar to that of the accelerometer was demonstrated.

2,766

Johnston, R. S., F. H. Samonski, Jr., M. W. Lippitt and M. I. Radnofsky 1962 LIFE SUPPORT SYSTEMS AND BIOMEDICAL INSTRUMENTATION. (In Results of the First U. S. Manned Orbital Space Flight, Feb. 20, 1962) (NASA Manned Spacecraft Ctr.) Pp.31-44.

2,767

Johnston, R. S. 1962 BIOENGINEERING
In (National Aeronautics & Space Administration, Wash., D. C.) Bioastronautics. NASA SP-18, Dec. 1962

ABSTRACT: This paper has presented a definition of bioengineering and has attempted to define the functions of the bioengineer in our manned space flight programs. The complexity in the evolution of life support sytems was presented and a limited research requirement was outlined.
In conclusion, bioengineering is emerging as one of the major fields of effort in the space era. To meet this challenge and to provide the skills required, some thought should be given in planning curriculum to establish a course of instruction in bioengineering. The course could combine basic engineering with some training in physiology. Graduates with such a background are needed and required by our space programs. (AUTHOR)

2,768

Johnston, S.P. 1960 REVIEW AND ANALYSIS OF AERONAUTICAL RESEARCH INFORMATION (Institute of the Aeronautical Sciences, Inc., New York) Project 9783(806); Contract AF 49(638)-185; AFOSR, DMS.

ABSTRACT: This work collects and prepares from current important unclassified

technical aeronautical literature, including AFOSR reports, indicative abstracts of approximately 100-150 words each. Approximately 50 per cent of these abstracts are from foreign literature of particular interest to the U.S. Air Force. The abstracts are disseminated through incorporation in "Aeronautical Engineering Reviews" and as a separate publication, "IAS Abstracts." 200 copies of "IAS Abstracts" are distributed through the European Office, ARDC, to the European scientific community. Abstracts cover the following scientific fields: ascoustics (sound and noise); aerodynamics and fluid mechanics (including aerothermodynamics, boundary layer, flow of fluids, internal flow, jet flaps and wings, stability and control, and wings and airfoils); aeroelasticity; electronics; fuels and lubricants; instruments; missiles and rockets; nuclear energy; power plants (including jet and turbine, ram-jet and pulse-jet and rocket); propellers; research and research facilities; rotating wing aircraft; space travel; structures (including beams and columns, cylinders and shells, sandwich construction, thermal stress)-and thermodynamics.

2,769

Joint Publication Research Service 1962 EAST EUROPEAN SCIENTIFIC AND TECHNICAL JOURNALS: BIBLIOGRAPHIC LISTINGS NO. 9. (Joint Publication Research Service, Washington D.C.) ASTIA AD-400 201, 6 November 1962

ABSTRACT: Contains bibliographic listings of authored articles appearing in 1962 issues of selected scientific and technical journals from Czechoslovakia, East Germany, Rumainia, and Yugoslavia.

2,770

Jokl, E. 1943 MEDICAL ASPECTS OF AVIATION (SPEED AND ACCELERATION). (London: Sir Isac Pitman & Sons, 1943) 104 p.

ABSTRACT: This book attempts to explain a specified group of medical problems of flying, namely those raised by speed and acceleration in the air. There are 61 sections. Some of the section headings are: speed and human reaction time: diving at 600 M.P.H.: "Blacking out;" giddiness and vertigo; the effects of being shot off; parachute jumping and aero-embolism.

In discussing the effect of acceleration in the postero-anterior direction it is reported that a remarkable phenomenon was observed in rabbits, namely, the protrusion of the eyeball. It looked as if the eye would jump out of its socket following the "magic pull" exerted by the tremendous centrifugal impulse. During observations in the anteroposterior direction, there was little, if any inter ference, with respiration in human test subjects.

During these experiments hemorrhages into the conjunctiva were observed. In some cases no hemorrhages were present immediately after the experiment but bleeding took place as late as two days afterward. Subsequently analogous occurrences were encountered in pilots after fast centrifugal flying movements. One pilot after a steep spiral descent (acceleration 5 G lasting

10 to 15 seconds) showed an extensive conjunctival hemorrhage.

2,771

Joliet, Paul V. 1962 PUBLIC HEALTH ASPECTS OF AUTOMOTIVE COLLISION. (In M.K. Cragun, ed., The Fifth Stapp Automotive Crash and Field Demonstration Conference, 14-16 Sept. 1961). Pp. 90-93

2,772

Jones, B. 1941 REPORT ON THE TORONTO CENTRIFUGE. Misc. Canadian Aviation Report #49, 22 May 1941

2,773

Jones, B. F., F. D. Chapman, R. E. Mitchel, H. H. Jasper and A. Cipriani 1943 THE EFFECT OF REPEATED EXPOSURE TO LOSS OF ATMOSPHERIC PRESSURE UPON TOLERANCE TO POSITIVE ACCELERATION IN MONKEYS. (National Research Council, Committee on Avia. Med., Washington, D. C.) CAM No. 104, Jan. 1943.

ABSTRACT: Used 9 Macaca mulatta monkeys. One half received a diet rich in iron and copper and one half a diet poor in these elements. Four hours daily exposure to a simulated altitude of 25,000 feet produced polycythemia in the Fe-rich animals which increased their "g" tolerance by 2.3 "g" (49%). Protection lasted 30 days. It was measured by extinction of brain potentials and retinograms. Desoxycorticosterone reduced recovery time in all animals and reduced extinction time and "g" threshold in polycythemic animals although raising it in the controls.

2,774

Jones, C.D., J.H. Shaw, et al. 1961 PRELIMINARY INVESTIGATION OF INTERPLANETARY LUNAR AND NEAR PLANET ENVIRONMENTS AND METHODS OF SIMULATION (Aeronautical Systems Division, Wright-Patterson AFB, Ohio) ASD TR 61-267 July 1961. ASTIA AD 268 791

ABSTRACT: Summaries of the natural environments of Mars, Venus, the Moon and interplanetary space are presented. The primary induced environmental stresses associated with thermal radiation, cosmic atomic and subatomic radiation, meteoroid particles, vibration, shock, acceleration, and low pressure are described for operation near the above bodies including range of anticipated values and methods of simulation. Additional simulation techniques associated with temperature, heat flux and atmospheric composition are discussed. An environmental test philosophy and a summary of heat transfer characteristics of high speed vehicles are included. Important areas not covered in this report are combined, induced environments associated with atmospheric entry and biological effects and nuclear reaction radiations. (Author)

2,775

Jones, C. M. 1958 DISORIENTATION IN FLIGHT. (RAF Institute of Aviation Medicine, Farnborough) FPRC Memo. No. 96; ASTIA AD 209 302.

ABSTRACT: Two of the three main sources of information about orientation normally available to man, namely the special sensations responding to linear and angular movements respectively, usually prove misleading to a pilot except in steady straight flight. This fact alone explains many cases of pilot disorientation. But it also emphasizes the supreme importance of the eyes in this context; yet even these can at times prove misleading to a pilot who is then deprived of his last resort. Experiments are described which show how this can arise during maneuvers involving a component of roll, owing to the generation of involuntary and inappropriate rotational eye movements. It is concluded that for stability of the man-machine combination, aerodynamics may not always be self sufficient; disorientation of the man can upset even the aerodynamically stable aircraft. (Author) (See also AD 39 216)

2,776

Jones, G. M. n.d. DISORIENTATION DUE TO RAPID ROTATION IN FLIGHT (RAF Institute of Aviation Medicine, Farnborough) REP 11843

ABSTRACT: Difficulties which may be associated with maneuvers involving rapid rotation in flight are described. These difficulties are discussed first in connection with loss of control in a single very rapid rolling maneuver and second in connection with certain findings from a field inquiry into the causes of pilot disorientation.

2,777

Jones, G. Melvill 1958 PRESSURE CHANGES IN THE MIDDLE EAR AFTER FLIGHT. (RAF Institute of Aviation Medicine, Farnborough) FPRC 1059; ASTIA AD 216 080.

ABSTRACT; Experiments are described in which middle ear pressure changes were measured after simulated flights in a decompression chamber, during which approximately known gas mixtures were introduced into the middle ear space by breathing gases of known composition throughout the flight. The results show that when the eustachian tube remains closed after flight the middle ear pressure systematically falls in a manner depending largely upon the oxygen content of gas inhaled during a given flight. The effect after breathing pure oxygen was observed to be roughly twice the magnitude of that after similar flights breathing through an air-mix regulator. A potential clinical hazard of delayed barotrauma due to breathing 100% oxygen during flight can be at least halved by employing air-mix. A parallel phenomenon may manifest itself in the lungs as localized collapse due to rapid absorption of oxygen in a temporarily isolated region. Again the potential clinical hazard would probably be reduced substantially by employment of air-mix in place of 100% oxygen. The results also show that the normal equilibrium partial

pressure of oxygen in the middle ear approximates 66 mm Hg which is well below that in air at sea level. It is suggested that in the same situation in a sinus with obstructed ostia, it may prove an advantage in the treatment of acute sinusitis to replace sinus washout fluid with nitrogen rather than air, for oxygen would then diffuse from tissues into sinus, thus assisting rather than inhibiting subsequent drainage through the ostia. (Author)

2,778

Jones, G. M. 1958 DISORIENTATION IN FLIGHT (RAF Institute of Aviation Medicine, Farnborough) FPRC Rept. 114; Sept. 1958.

ABSTRACT: Two of the three main sources of information about orientation normally available to man, namely the special sensations responding to linear and angular movements respectively, usually prove misleading to a pilot except in steady straight flight. This fact alone explains many cases of pilot disorientation. But is also emphasises the supreme importance of the eyes in this contest; yet even these can at times prove misleading to a pilot who is then deprived of his last resort. Experiments are described which show how this can arise during manoeuvres involving a component of roll, owing to the generation of involving a component of roll, owing to the generation of involuntary and inappropriate rotational eye movements. It is concluded that for stability of the man-machine combination, aerodynamics may not always be self sufficient.

2,779

Jones, G. M. 1960 COMPARISON OF NYSTAGMOID RESPONSES TO ROTATIONAL STIMULI ABOUT VERTICAL AND ROLLING AXES.
(Paper Meeting of the Physiological Society, 29-30 July 1960)

ABSTRACT: The present experiment compares the slow-phase angular velocity of the nystagmoid response after stopping stimuli about two orthogonal axes, namely a vertical axis with head erect (horizontal nystagmus) and a rolling axis parallel to the visual axis (rolling nystagmus). Eight subjects were each exposed to a single stopping stimulus about each of these axes after turning for 3 min at 60°/sec. The mean time constants for all subjects, obtained from calculated regression lines, were 16.4 sec (S.D. 4.0) and 3.9 sec (S.D. 0.8) for the vertical and rolling axes respectively; a difference perhaps related to the difference in likely duration of rotational movement about these two axes in everyday life. However, the corresponding mean values of slow phase angular velocity immediately after stopping were similar to one another, although well below the velocity of the stimulus. The fact that these values are statistically only just distinguishable from one another suggests that if a similar stimulus were applied with eyes shut about an intermediate axis, the axis of resulting slow phase nystagmus would initially be roughly parallel to that of the stimulus, despite the considerably reduced angular velocity of response. (J. Physiol. 154:32-33P. 1960)

2,780

Jones, G. Melvill 1960 SOME ASPECTS OF LABYRINTHINE INFLUENCE UPON EYE MOVEMENT DURING RAPID ROTATIONAL MANOEUVRES
(RAF Institute of Aviation Medicine, Royal Air Force, Farnborough) FPRC/Memo 110. ASTIA AD 239 034

ABSTRACT: In a recent study of causes of disorientation in flying it transpired in Fighter Command that difficulty was being experienced in recovery from rapid rolling manoeuvres, and in Flying Training Command during and after the so-called third stage of a spin. An apparatus has been designed to obtain quantitative information about the interference due to misleading labyrinthine signals in circumstances such as these. It is composed mainly of a cine camera mounted on a flying helmet carrying a periscope so arranged that the camera sees a close up image of one eye. This film provides a quantitative measurement of the time course of the angular movements of the eye about its optic axis. The apparatus therefore affords a convenient means for comparison of the response exhibited in the eye to rotational labyrinthine stimuli about different axes.

2,781

Jones, G. M. 1960 COMPARISON OF NYSTAGMOID RESPONSES TO ROTATIONAL STIMULI ABOUT VERTICAL AND ROLLING AXES.

ABSTRACT: Eight subjects were exposed for 3 minutes to rotation at 60 degrees/sec about the vertical axis with head erect and about a rolling axis parallel to the visual axis. The results confirm an exponential decrease of the slow-phase angular velocity of nystagmus in relation to time elapsed after stopping for the vertical axis (horizontal nystagmus), and establish a similar form of decay, but with a different time constant, about the rolling axis (rolling nystagmus). The mean time constants for all subjects, obtained from calculated regression lines, were 16.4 sec. and 3.9 sec. for the vertical and rolling axes, respectively. The corresponding mean values of slow-phase angular velocity immediately after stopping were statistically only just distinguishable from one another (28.5 degrees/sec., 23.8 degrees/sec.). It is suggested, that if a similar stimulus were applied about an intermediate axis with eyes shut, the axis of resulting slow-phase nystagmus would initially be roughly parallel to that of the stimulus, and, at more prolonged rotation, the axis of eye response would tend to move towards the vertical axis of the head. (J. Physiol. 154(1):32-33, Nov. 1960)

2,782

Jones, G. M. & D. H. Drazin 1961 OSCILLATORY MOTION IN FLIGHT.
(RAF Inst. of Aviation Medicine, Great Britain) Dept. No. FPRC/1168, July 1961. ASTIA AD-267 952.

ABSTRACT: Experiments were performed in a Javelin two-seater aircraft to define limits of aircrew tolerance. The aircraft was exposed to oscillatory conditions in roll and pitch at various frequencies and angular velocity

amplitudes. Subjects assessed the conditions on a 4 point scale of subjective tolerance ranging from entirely acceptable to entirely unacceptable, and their performance in a number of visual acuity tasks was assessed. Maximum linear acceleration at the head proved the most significant criterion. When the maximum linear acceleration at the head was less than 0.1 g conditions were entirely acceptable, and when greater than 0.2 g were entirely unacceptable. In the pitching plane much greater vertical accelerations, due to the undulating flight path, led to rapid induction of severe nausea. Despite reaching the subjective limits of tolerance, objective measurements of visual acuity showed no serious deterioration in the worst flight conditions, but a parallel laboratory experiment suggested that serious deterioration would ensue with only slightly increased severity of oscillation. (Author)

2,783

Jones, G. M. & D. H. Drazin 1962 OSCILLATORY MOTION IN FLIGHT
In Barbour, A. B. & H. E. Whittingham, eds., Human Problems of Supersonic and Hypersonic Flight (New York, Oxford, London, Paris: Pergamon Press, 1962) pp. 134-151

2,784

Jones, I. H. 1918 EQUILIBRIUM AND VERTIGO
(Philadelphia: J. B. Lippincott Co., 1918)

2,785

Jones, I. H. 1937 FLYING VISTAS. THE HUMAN BEING AS SEEN THROUGH THE EYES OF THE FLIGHT SURGEON. (Philadelphia: J. B. Lippincott Co., 1937), pp. 99-128

2,786

Jones, L. M. 1956 TRANSIT-TIME ACCELEROMETER
Rev. Sci. Inst. 27:374-377, June 1956

ABSTRACT: An omnidirectional transit-time accelerometer, developed for measuring the drag acceleration of spheres dropped from rockets, is described. The ambient density and temperature of air may be calculated from the drag acceleration. In the device, a bobbin is periodically caged and released within a cavity. The time for the bobbin to traverse the distance to the cavity, which distance is the same in any direction, is telemetered and measured. The accelerometer range is about $5X10^{-3}$ to 5 g. Systematic errors and standard deviations over the range are about 1%. The accelerometer was used successfully in a rocket flight in which the drag acceleration of a 7-in. diam. sphere was measured.

2,787

Jones, R.T. 1937 ACCELERATIONS IN LANDING WITH A TRICYCLE-TYPE LANDING GEAR. (NACA, Langley Aeronautical Lab., Langley Field, Va.) NACA ACR, Feb. 1937.

ABSTRACT: In connection with the application of stable tri-cycle-type landing gears to transport airplanes, the question arises as to whether certain of the passengers may not experience relatively great accelerations in an emergency landing. Since the main landing wheels are behind the center of gravity in this type of gear, a hard-braked landing will cause immediate nosing down of the airplane and, when this motion is stopped due to the front wheel striking the ground, there will be some tendency for the rearmost passengers to be thrown out of their seats. The following rough calculations are designed to show the magnitudes of the various reactions experienced in a severe landing under these circumstances.

2,788

Jones, W. L. 1952 **THE FLIGHT SURGEON AND FLIGHT SAFETY**
J. of Aviation Medicine 23(1):44-48, 84, February 1952.

ABSTRACT: The mission of flight safety is to foster correct techniques and habits on the part of operating as well as maintenance personnel to insure that equipment is so utilized as to minimize operational hazards. To insure the health and well-being of aviation personnel, the flight surgeon first performs very strict physical and psychological examinations on applicants for flying. The flight surgeon also gives medical care to the flyers' dependents in order to raise the morale of the flyer. Much of the sting of aircraft accidents has been removed through the development of protective equipment. Engineers, flight surgeons, and designers have developed safety equipment such as the parachute deployment bag, ejection seat and escapt chute, inertia reel, and shoulder harness. To increase man's compatibility with nes stresses, the flight surgeon has helped design and develop such devices as the anti-g suit. Other devices are automatic pressure breathing oxygen regulators, pressurized cockpits, cockpit air conditioning, and exposure suits. In spite of all of the safety equipment, physiological aids and excellend aeronautical designs, there are aircraft accidents. After the accident, the flight surgeon cares for the injured aircrew and then participates in the accident investigation.

2,789

Jones, Walton L. 1953 TYPICAL IMPACTS OF JET AIRCRAFT LAND CRASHES.
J Aviation Med., 24 (6):474-482.

ABSTRACT: Land crashes of jet aircraft with a small angle of impact usually result in minor injuries to the occupants, although the damage to the plane may be considerable. Higher speed, involving greater vertical forces, may lead to fractured vertebrae sustained by the occupants. Under these conditions, shoulder harnesses frequently fail after absorbing much of the energy of the impact. Protective helmets may lessen or prevent head injury.

Crashes with larger impact angles (30-90°) are generally fatal. Further research is needed for the development of a seat structure capable of dissipating more energy, and a cockpit capsule which would give the occupant more protection by separating him from the wreckage and possible fire.

2,790

Jones, W. L., & W. F. Madden 1963 EJECTION SEAT ACCELERATIONS AND INJURIES (Paper, 34th Annual Meeting of the Aerospace Medical Association, Statler-Hilton Hotel, Los Angeles, Calif., April 28 - May 2, 1963)

ABSTRACT: A review of acc lerations measured on ejection seat catapult tests, over the past four years, indicates a much wider range of values than was originally believed. This explains, in part, the occasional injury where no injury occurred in an almost similar set of circumstances. To reduce these values and obtain more performance capability a Rocket Assisted Propulsion Ejection Catapult (RAPEC) was developed by the Naval Ordnance Test Station, China Lake. This system is completely interchangeable size-wise with the present catapults resulting in much lower accelerations with increased trajectory. A review of the back injuries is given along with clinical management and results.

2,791

Jongbloed, J, and A. K. Noyons 1932 (CIRCULATORY RESPONSES TO ACCELERATIONS) Verh. internat. Kongr. Physiol. 1932, p. 128.

2,792

Jongbloed, J. & A.K. Noyons 1932 WEITERE MITTEILUNGEN ÜBER DEN EINFLUSS VON BESCHLEUNIGUNGEN AUF DEN BLUTKREISLAUF (Further Information Concerning the Influence of Accelerations on the Blood Circulation)
Acta brev. neerl. Physiol. (Amsterdam) 2: 164-165
See also: Ned. Tijdschr. Geneesk 77: 613-614 (1933)

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Jongbloed, J. & A.K. Noyons 1932 ÜBER DEN EINFLUSS VON BESCHLEUNIGUNGEN AUF DEN BLUTKREISLAUF (Concerning the Influence of Accelerations Upon the Blood Circulation)
Acta brev. neerl. Physiol. (Amsterdam) 2: 90-91

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Jongbloed, J. and A. K. Noyons 1933 CIRCULATORY RESPONSES TO ACCELERATIONS. Arch. Sci. biol., Bologna. 18:190.

2,795

Jongkees, L. B. W., & J. J. Groen 1946 CONSIDERATIONS REGARDING THE SECONDARY AFTER-SENSATIONS CAUSED BY A STIMULATION OF THE SEMICIRCULAR CANAL SYSTEM. J. Laryngol. 61:241-244

2,796

Jongkees, L.B.W., and J.J. Groen 1946 THE NATURE OF THE VESTIBULAR STIMULUS REQUIRED TO PRODUCE MOTION SICKNESS. J. Laryng. 61:529-541

2,797

Jongkees, L. B. W., & J. A. J. Klun 1956 ON PER- AND POST-ROTATORY REACTIONS. Acta oto-laryngologica (Stockholm) 46(4):314-318, July-Aug. 1956

ABSTRACT: The effect of the interval between on and off rotational impulses on the duration of a rotatory sensation was measured for various magnitudes of the stimulation which was equally strong for both on and off acceleration. A rotating chair was used which could be accelerated in a short period of time until a constant velocity was reached (12.5 degrees/second in 3 seconds, 24 degrees/second in 2-½ seconds, 37 degrees/second in 2 seconds, 60 degrees/second in 3 seconds). The results support the view, expressed on graphs mathematically, that the cupula endolymph system acts as a highly damped torsion pendulum. Another conclusion is that the duration of the perrotatory sensation following acceleration in the beginning is identical with the duration of the postrotatory stopping impulses.

2,798

Jongkees,L. B. W. & J. A. J. Klijn 1956 ON PER- AND POST-ROTATIORY REACTIONS Acta Oto-laryngol. 46(2):312-318.

SUMMARY: The influence of the interval between on and off rotational impulses on the duration of a rotatory sensation is measured for various magnitudes of the stimulation which is equally strong for both on and off acceleration.

The results agree with the view that the cupula endolymph system acts like a highly damped torsion pendulum. Arithmetically the form of the graphs can be exactly described from this point of view.

2,799

Jongkees, L. B. W. and A. J. Philipszoon 1960 SOME NYSTAGMOGRAPHICAL METHODS FOR THE INVESTIGATION OF THE EFFECT OF DRUGS UPON THE LABYRINTH Acta Physiol. Pharmacol. Neerlandica, 9:240, 1960.

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Jongkees, L. B. W. 1961 THE INFLUENCE OF SOME DRUGS ON THE FUNCTION OF THE LABYRINTH
Acta Oto-laryngol., 53:281. 1961.

2,801

Jongkees, L. B. and A. J. Philipszoon 1962 NYSTAGMUS PROVOKED BY LINEAR ACCELERATIONS.
In Acta.Physiol Pharmacol. Neerl. 10:239-247, 1962.

2,802

Jongkees, L. B. & A. J. Philipzoon 1963 THE INFLUENCE OF POSITION UPON THE EYE-MOVEMENTS PROVOKED BY LINEAR ACCELERATIONS.
Acta Otolaryng (Stockholm) 56:414-420, Mar.-April 1963.

2,803

Juan Valiente, F. de 1957 VERTIGO CAUSED BY INSTRUMENTS. (Vertigo de Instrumentos.) Revista de aeronautica (Madrid), 17(204): 881-884, November 1957

ABSTRACT: Aircraft accidents attributed to vertigo in the pilot may be caused by instrument flight. Vertigo is of interest to the pilot for reasons of safety, to the flight surgeon who must determine its causes, and to the aircraft engineer who is concerned with adaptation of the plane to the pilot. Pilots believe that vertigo is due to lack of confidence in the instruments during flight, insufficient training, psychophysiological factors, and external environmental causes. On the whole, the causes of vertigo during instrument flight are not well determined. It is postulated that since there is a correlation between vision and the proprioceptive system of equilibrium, any lack of stimulation from both systems can cause vertigo.

2,804

Judd, W. R. 1960 SITZMARKS OR SAFETY?
(Denver, Colo.: National Ski Patrol System, Inc., 1960)

2,805

Juin, G. 1960 UNE NOUVELLE MEDECINE DU TRAVAIL: LA MEDECINE DU TRAVAIL AERIEN A L'ERE DES REACTEURS (A NEW OCCUPATIONAL MEDICINE: AVIATION MEDICINE IN THE JET AGE) In Proceedings of the 13th International Congress on Occupational Health, New York, 25-29 July 1960 (New York: Book Craftsmen Assoc., Inc., 1960) pp. 942-947

ABSTRACT: Jet aircraft personnel are exposed to many physiological hazards,

such as anoxia, high speed and high altitude, decompression, positive and negative accelerations, vibration, climatic changes, and the wearing of cumbersome clothing. In addition, jet flight is associated with changes in normal physiological rhythms affecting sleep patterns, hours of rest, body temperature, cardiovascular and respiratory equilibrium, and digestive functions (changes in hunger sensations, types of meals). Therefore, a great number of jet personnel are suffering from flight fatigue and gastro-intestinal disorders (sever colitis, gastritis, gastro-duodenal ulcers). Exposures to ultrasonic rays affect the nervous, muscular, cardiovascular, intestinal, and endocrine systems. Mention is made of the psychological factors (tension, anxiety, emotion) related to jet flight, and recommendations are made for the extension, anxiety, emotion) related to jet flight, and recommendations are made for the extensive medical examination of jet personnel.

ACCELERATION

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2,806

Kaehler, R.C. 1957 INDIVIDUAL DATA SHEETS AND PILOT COMMENTS FOR THE X-15 CENTRIFUGE PROGRAM. (North American Aviation, Inc.) Report No. NA-57-830, July 15, 1957

2,807

Kaehler, R. C. 1959 HUMAN PILOT PERFORMANCE DURING BOOST AND ATMOSPHERE REENTRY.
Aerospace Med. 30(7):481-486.

CONCLUSIONS: 1. No physiologic limits were encountered during either of the boost or reentry conditions tested. It was demonstrated that "worst condition" accelerations, representing the maximum design limits of the aircraft, are withing the physiologic tolerance of a pilot in good physical condition with conventional G protection.

2. The tracking results for both direct and dynamic ratios have shown that performance with the right hand stick is consistently better than that with the center stick although a statistically significant difference between the two was not found.

3. Subject's comments indicated a preference for the right hand stick principally due to the amount of physical effort required to properly operate the center stick under acceleration as compared to the right hand stick.

2,808

Kaehler, R. C., J. P. Meehan, & T. Freedman 1959 DESIGNING FOR HUMAN CAPABILITIES UNDER ACCELERATION IN SATELLITE OPERATIONS (American Society of Mechanical Engineers) Paper No. 59-AV-34

ABSTRACT: The authors have attempted to survey the experimental results for human tolerance and performance capabilities under positive, negative, transverse, and positive transverse accelerations.

2,809

Kaehler, R.C. 1959 HUMAN PSYCHOMOTOR PERFORMANCE UNDER VARIED TRANSVERSE ACCELERATIONS. (Paper, Meeting of Aero Medical Association, Statler Hilton Hotel, Los Angeles, April 27-29, 1959)

ABSTRACT: A series of experiments have been conducted on the human centrifuge to quantify human psychomotor performance under varying conditions of transverse acceleration. The psychomotor parameters under investigation were response time, reach time and adjustment time. These measures were obtained from manipulations of five typical aircraft controls (lever, trim wheel, knob, "push-to-test" button and toggle switch) located in eight different workplace locations. Five subjects were exposed to front-to-back accelerations up to and including 8 G and back-to-front accelerations up to and including 4 G. Approximately 1200 centrifuge runs were made in the course of these experiments. The results demonstrate that all subjects were able to make effective control movements and adjustments throughout the range of the acceleration levels tested. Total time to respond, to reach and to adjust individual controls showed definite increases in front-to-back accelerations of 6 G and above. In back-to-front accelerations, physiologic tolerance is reached at 4 G with only minor decrements in the measures of performance studied. J. Aviation Med. 30(3):190, March 1959)

2,810

Kaehler, R. C. & J. P. Meehan 1960 HUMAN PSYCHOMOTOR PERFORMANCE UNDER VARIED TRANSVERSE ACCELERATIONS. (Wright Air Development Division, Wright-Patterson AFB, Ohio) WADD TR 60-621 August 1960 ASTIA AD-247 169.

ABSTRACT: Five male college students, 20 to 25 years old, were exposed to transverse accelerations from front-to-back up to 8 g and back-to-front up to 4 g on the USC centrifuge to investigate human motor performance. The results show that man can, with the proper controls and properly located in the workplace, participate effectively in aircraft control when exposed to relatively high transverse accelerations.
During front-to-back acceleration, man can perceive a visual stimulus, reach and adjust controls, e.g., the horizontal lever, toggle switch, and push-to-test button, regardless of location in a mean time of 1.0 second at 8 g. Controls normally more difficult to operate, the vertical wheel and rotating knob, require a mean time of 1.5 seconds at 8 g. For back-to-front accelerations, the toggle switch, horizontal lever, and push-to-test button require a mean time of 0.7 second at 4 g, whereas, the vertical wheel and rotating knob require a mean time of 1.0 second. (AUTHOR)

2,811

Kaehler, R. C. 1961 THE EFFECTS OF TRANSVERSE ACCELERATIONS AND EXPONENTIAL TIME-LAG CONSTANTS ON COMPENSATORY TRACKING PERFORMANCE. (Aerospace Medical Laboratory, Aeronautical Systems Division, Wright-Patterson AFB, Ohio & School of Medicine, University of Southern California) ASD TR 61-457; Proj. 7222; Task 71746; Contract AF33(616)-5407; ASTIA AD-268 185

ABSTRACT: A study was conducted to determine the effects and interactions of front-to-back transverse accelerations, in the magnitudes of 0, 3g, and 6g, and exponential time-lag constants of 0.1, 1.0, and 2.0 seconds on human control performance on a compensatory tracking task. In general, the results substantiated predictions of human tracking performance based on Helson's U-hypothesis and Principle of Generality. Concepts from information theory are introduced to explain certain learning phenomena which occurred in the course of the experiment. (AUTHOR)

2,812

Kaleta, Z. 1957 ZAGADNIENIE PRZYSPIESZEN W LOTNICTWIE (THE PROBLEM OF ACCELERATION IN AVIATION) Wojsk Przeglad Lotn. (Poland) Special Medical Issue, 1957, pp. 65-91 (Air Technical Intelligence Ctr., Wright-Patterson AFB, Ohio, Rept. No. ATIC-IR-1771-58, 1957)

ABSTRACT: This article deals with the following topics: classification of accelerations, determination of acceleration value, the methods of inquiry into the effect of acceleration on the organism, and acceleration acting in the long axis of the body.

2,813

Kalinin, Yu. 1961 TRAINING OF THE BRAVE. "ROOM" FLIGHT Znaniye - sila 1961(9):9-11

ABSTRACT: The article describes the purpose and applications of flight trainers for simulating all the normal and abnormal features of actual flight. A brief account of Yuriy Gagarin's training in preparation for space flight is also given. Gagarin was accustomed to weightlessness in planes and was subjected on a centrifuge to stresses equal to those encountered in rocket take-off and braking. He parachuted onto land and into water and spent long periods alone in a soundproof chamber. He was subjected to vibration on a test stand and to prolonged exposure to cold and heat in hot and vacuum chambers. Gagarin learned to drink, eat and write in a space suit. His preparation also included instruction in a special trainer complete with instruments and controls and a computer to set the flight route. The author believes that such trainers will play a due part in space technique. They will be used for studying satellite communications in space, for simulating the meeting of satellites in orbit, for compiling "interplanetary stations" and for simulating landings on various planets, etc.

2,814

Kampik, A. 1930 EXPERIMENTELLE UNTERSUCHUNGEN ÜBER DIE PRAKTISCHE LEISTUNGSFÄHIGKEIT DER VIBRATIONSEMPFINDUNGEN (Experimental Examinations Concerning the Practical Conductivity of the Vibration Sensation) Archiv für die gesamte Psychologie (Leipzig), 76:3-70

2,815

Kaniss, S. TEST AND EVALUATION OF THE P-3 AUTOMATIC PILOT CATAPULT LAUNCHING EQUIPMENT. (U.S.Naval Air Material Center, Philadelphia, Pa.) Rept. No. NAES-INSTR-63-53.

2,816

Kanowski, M.B. 1961 EVALUATION OF ARMY FREE FALL PARACHUTE ASSEMBLY TYPE A/P28S-3. (Air Force Flight Test Center, Edwards AFB, Calif.) AFFTC TR 61-37, August 1961. ASTIA AD-261 567.

ABSTRACT: Tests were conducted for the U.S. Army to determine the reliability of an interim parachute assembly, designated Type A-P28S-3, and the suitability of associated equipment. The main parachute has a 35-foot nominal diameter MC-1 canopy, modified with a 14.48 sp. ft. single orifice, and an automatic ripcord release. One-hundred fifty-three tests were made with dummies at indicated airspeeds ranging from near 0 to 400 knots. Drop altitudes ranged from 65 to 170 knots at pressure altitudes of 5,000 to 25,000 feet. Each parachutist carried a front type equipment container having a loaded weight of approximately 40 pounds which was attached to the harness D-rings. The parachutists were able to achieve body stability in a prone position. The parachute assembly and associated equipment were satisfactory. (Author)

2,817

Kapitanov, R. A. 1962 TELEMETRY PROBLEMS AT THE SECOND ALL-UNION CONFERENCE ON THE USE OF RADIOELECTRONICS IN BIOLOGY AND MEDICINE Medit. Prom. SSSR, 16(11):62-64. Translation: (Joint Publications Research Service, Washington, D. C.) JPRS 17672.

2,818

Kapor, G. 1956 REACTIONS OF FLIERS TO STRESSES OF MILITARY LIFE AND JOB REQUIREMENTS. (O reakcijama letaca na stresove vojnickog zivota ias letackog poziva.)
Vojnosanitetski pregled (Beograd) 13(11-12):544-550
In Serbo-Croatian, with English Summary. P. 550.

2,819

Karlsen, Asbjorn (Karl) 1959 HERE'S HOW TECO PULLS THE "STOP" ON HIGH G'S! (Teco Aircraft Seats, Burbank, Calif.)

2,820

Karolinska Institutet 1961 FINAL TECHNICAL REPORT UNDER CONTRACT NUMBER DA-91-591-EUC-1619; OI-7206-61 CONCERNING THE CONSTRUCTION OF A HORIZONTAL-ROTOR CENTRIFUGE. (U.S. Army Research and Development Biolab, Fort Detrick). ASTIA AD 270 204L.

ABSTRACT: The report contains the following information concerning the construction of a horizontal-rotor centrifuge:
1. Objectives of the contract.
2. Summary of the research performed
3. Implications of results for future work
4. Summary on personnel utilized and administrative actions taken
5. Estimate of number of work hours expended and of costs for materials used and for property acquired.

2,821

Kashler, R. C. 1961 *THE EFFECTS OF TRANSVERSE ACCELERATIONS AND EXPONENTIAL TIME-LAG CONSTANTS ON COMPENSATORY TRACKING PERFORMANCE. Report on Biophysics of Flight. (School of Medicine, University of Southern California, Los Angeles, Calif.) ASD TR 61-457, Sept. 1961. ASTIA AD-286 185.*

ABSTRACT: A study was conducted to determine the effects and interactions of front-to-back transverse accelerations, in the magnitude of 0, 3 g, and 6 g, and exponential time-lag constants of 0.1, 1.0 and 2.0 seconds on human control performance on a compensatory tracking task. In general the results substantiated predictions of human tracking performance based on Helson's U-hypothesis and Principle of Generality. Concepts from information theory are introduced to explain certain learning phenomena which occurred in the course of the experiment. (Author)

2,822

Kas'ian, I. I. 1962 SOME PHYSIOLOGICAL REACTIONS IN MAN UNDER CONDITIONS OF THE ALTERNATING EFFECT OF OVERLOADING AND WEIGHTLESSNESS. Izv. Akad Nauk SSSR (Biol.) 6:896-908, Nov.-Dec. 1962 (Russian).

2,823

Kasparek, Catherine F. 1960 CATALOG OF TRANSLATED MATERIAL IN SPACE PERCEPTION (REVISED) (U.S. Naval School of Aviation Medicine, Pensacola, Florida) Research Project No. MR005.13-6001 Subtask 1 Report No. 51. ASTIA AD 243 503

ABSTRACT: A revised catalog of bibliographic materials in the area of proprioception, vestibular function, and vision which have been translated from foreign languages includes 501 items. Also included are instructions for obtaining copies of the articles from the Library of Congress, Washington 25, D.C.

2,824

Kastens, D. F. 1962 HUMAN PERFORMANCE IN A SIMULATED SHORT ORBITAL TRANSFER (6570th Aerospace Med. Research Lab., Wright-Patterson AFB, Ohio). AMRL-TDR-62-138, Proj. no. 7184; Task no. 718405, December 1962.

ABSTRACT: Human performance was measured in a simulated short-range, coplanar orbital rendezvous task. Orbital conditions and vehicle dynamics were programmed on an analog computer. Two systems of vehicle control and one system of information display were investigated. Performance criteria included impact velocity, fuel consumption, and transfer time required. Comparisons were made between control systems and between initial conditions. Subjects' performance was better with an orthogonal-axes, thrust-constrol system than with a pitch attitude and one-axis thrust-control system. The simulated direct-version target display was found to be marginally acceptable. Suggestions about control systems and rendezvous techniques are included in the report.

2,825

Katzberg, A. A., & G. T. Dave 1960 SURVIVAL OF THE ISOLATED EMBRYONIC HEART WHEN EXPOSED TO HIGH RELATIVE CENTRIFUGAL FORCES. (School of Aerospace Medicine, Brooks AFB, Texas) Rept. No. 61-19, Dec. 1960. ASTIA AD 254 370

ABSTRACT: The effects of increased gravitation on the isolated embryonic chick heart were studied. Chick embryos that had incubated from 4 to 18 days were used as sources of the hearts. It was found that the younger hearts were more

resistant to trauma induced by gravitational stresses. Many of the young specimens withstood the effects of 98,500 x gravity, while most of the older group entered total cardiac arrest at levels less than the equivalent of 15,000 x gravity. Tracings made with an electrocardiograph substantiated these findings. (AUTHORS)

2,826

Katzberg, A.A. & L.H. Mori 1962 ORGAN AND TISSUE CULTURES. I. EMBRYONIC CHICK HEART AND HUMAN CELL CULTURES.
In Prince, J.E., ed., Biologic Systems of Discoverer Satellites XXIX and XXX. (School of Aerospace Medicine, Brooks AFB, Texas)
NASA N 62-17530, April 1962.

ABSTRACT: Living embryonic chick hearts were placed aboard Discoverer satellites to observe the effect that exposure to stress factors of a flight in space could have on a whole organ. Human cell cultures were also studied during the flight of the Discoverer satellites. It was concluded that the viability and the physiologic function of these hearts were not impaired by any of the stress factors that were encountered in space flight. Human cell cultures for both Discoverer satellites XXXIX and XXX showed no obvious degeneration. On being subcultered, those from Discoverer XXX showed normal proliferation. (STAR)

2,827

Katzen, E.D. and L.L. Levy Jr., 1961 ATMOSPHERE ENTRIES WITH VEHICLE LIFT - DRAG RATIO MODULATED TO LIMIT DECELERATION AND RATE OF DECELERATION-VEHICLES WITH MAXIMUM LIFT-DRAG RATIO OF 0.5.
(National Aeronautics and Space Administration, Washington, D.C.)
Technical note no. D-1145, ASTIA AD-267 471

ABSTRACT: An analysis has been made of atmosphere entries for which the vehicle lift-drag ratio was modulated to maintain specified maximum deceleration and/or maximum deceleration rates. The part of the vehicle drag polar used during modulation was from maximum lift coefficient to minimum drag coefficient. The entries were at parabolic velocity and the vehicle maximum lift-drag ratio was 0.5. Two- dimensional trajectory calculations were made for a nonrotating, spherical earth with an exponential atmosphere. The results of the analysis indicate that for a given initial flight-path angle, modulation generally resulted in a reduction of the maximum deceleration to 60% of the unmodulated rate. These results were equivalent, for a maximum deceleration of 10g, to lowering the undershoot boundary 24 miles with a resulting decrease in total convective heating to the stagnation point of 22%. The maximum convective heating rate was increased 18%. (Author)

2,823

Kaufman, A. B. 1956 ACCELEROMETER CALIBRATION BY BALLISTIC PENDULUM. Instruments and Automation 29:1322-1327, July 1956

ABSTRACT: On the six basic methods for accelerometer calibration, the ballistic pendulum provides vector (impact) test acceleration forces up to 500 g with the highest accuracy. Procedures, techniques, and variables are described for use of the ballistic pendulum, including details of calibration check and recording.

2,829

Kause, R. H., D. P. Woodward, A. J. Cacioppo 1959 EFFECT OF ACCELERATIVE FORCES ON ANIMAL PERFORMANCE (Goodyear Aircraft Co., Akron, Ohio) Rept. No. 2387; GER-9263, 26 March 1959.

ABSTRACT: Ten male albino rats were trained to perform a bar-pressing response by the use of avoidance conditioning techniques. The animals were then subjected to positive accelerative g forces. Immediately after being subjected to the g force, the rats were tested in the avoidance conditioning apparatus to check for any decrement in their performance capabilities. The experiment, which simulated the escape and reentry acceleration profiles of a space vehicle, was conducted in two parts.

2,830

Keighley, G. and W. G. Clark 1945 FLICKER FUSION FREQUENCY MEASUREMENTS ON HUMANS SUBJECTED TO POSITIVE ACCELERATION. (National Research Council, Committee on Aviation Medicine, Washington, D.C.) CAM Rept. no. 426, 29 March 1945.

2,831

Keighley, G., & W. G. Clark 1946 FLICKER FUSION FREQUENCY THRESHOLDS DURING POSITIVE ACCELERATION (William G. Kerckhoff Lab., California Institute of Technology, Pasadena; and the Dept. of Aviation Medicine, Univ. of Southern California, Los Angeles)

ABSTRACT: Monocular, flicker fusion frequency thresholds have been determined on 10 subjects, under positive acceleration on a centrifuge. The results are expressed as differences in cycles per second (C.P.S.) between the mean thresholds at rest, immediately before a run, and those found during acceleration.

At low accelerations (2.2-3.2 G, mean 3.0 G) causing no visual disturbances, 53 runs were made. Most lasted 45 seconds. The differences between thresholds ranged from +1.3 C.P.S. (Fusion frequency higher during acceleration) to - 1.6 C.P.S., and were distributed fairly equally about the zero baseline; 21 were positive; 32 negative. The range $\pm$ 1 C.P.S. includes 48 of the results 34 are in the range $\pm$ o.5 C.P.S. These figures show no changes in the flicker fusion thresholds. At higher accelerations (2.8-4.8 G, mean 4.0 G) 34 runs were made, lasting up to 60 seconds with negative pressure over the eyes to restore vision (Lambert, unpublished). At these accelerations without the negative pressure, there was dimming or loss of peripheral vision or blackout. No fusion frequency was higher during a run. The greatest difference in fusion frequency between rest and acceleration was -3.9 C.P.S. The range 0 to -2.0 C.P.S. includes 21 of the 34 results. The differences are all negative, more spread out than at lower accelerations and the range is greater. At these higher levels of accelerations, with vision restored, the fusion frequency of flicker is lowered. (Federation Proceedings 5(1):54, 1946)

2,232

Keighley, G., W. G. Clark, and D. R. Drury 1951 FLICKER FUSION FREQUENCY MEASUREMENTS ON MAN SUBJECTED TO POSITIVE ACCELERATION ON A HUMAN CENTRIFUGE. J. Appl. Physiol. 4:57-62.

ABSTRACT: Flicker fusion frequency thresholds for one eye were determined on human subjects exposed to positive accelerations. A series of 38 runs was made at accelerations ranging from 2.5G to 3.2G; at these levels there was no or only minimal dimming of vision. There were no changes in the flicker fusion thresholds.

At higher levels of acceleration, from 2.8G to 4.8G, 34 runs were made. In control runs the subjects experienced visual impairment ranging from loss of peripheral vision to total blackout. In the 34 experimental runs, vision was restored by means of negative pressure goggles which produced a lowered pressure over one or both eyes. The flicker fusion frequency thresholds were slightly decreased.

2,233

Keist, B. F., W. F. Sheeley, J. M. Byers, & H. I. Chinn 1955 RELATIVE EFFECTS OF HEAD IMMOBILIZATION AND MEDICATION ON THE INCIDENCE OF AIR SICKNESS. (Air University School Aviation Medicine, Randolph AFB Texas) Rept. No. 55-78

2,834

Keist, B. F., W. F. Sheeley, J. M. Byers, & H. I. Chinn 1956 EFFECT OF HEAD IMMOBILIZATION ON INCIDENCE OF AIRSICKNESS. J. Applied Physiol. 8(4):369-370 Jan. 1956

ABSTRACT: Paratroopers on simulated combat jumps were randomly distributed aboard C-119 aircraft and divided evenly into four groups receiving, respectively: (a) 0.65 mg. of hyoscine hydrobromide together with head support, (b) 0.65 mg. of hyoscine but no head support, (c) placebo plus head support and (d) placebo without head support. Hyoscine afforded striking protection against airsickness whether or not it was supplemented with head support. Head support, on the other hand, gave no protection. (AUTHOR)

2,835

Kellaway, C.H. 1941 NOTES ON THE ANTI-"G" DEVICE FROM DR. COTTON, SIDNEY UNIVERSITY, TRANSMITTED BY COL. C.H. KELLAWAY OF FPRC, AUSTRALIA (National Research Council, Committee on Aviation Medicine, Washington, D.C.) CAM Rept. No. 27; 21 October 1941

ABSTRACT: Photographs of the centrifuge at Sydney. Cotton suit consists of air-filled bladders pressurized by a hydrostatic resevoir. Weight of the suit is 30 pounds. Suit protects against 9.3 "g" for 19 $\pm$ 1 seconds with no visual symptoms, minimum discomfort.

2,836

Kelley, R.E. & F.R. Stauffer 1950 A DEVICE FOR THE AUTOMATIC CONTROL BY G FORCE OF THE POSITION OF THE CONTROLLABLE SUPINE SEAT. SDC PROJECT 9-U-37a
(Naval School of Aviation Medicine, Pensacola, Fla.) Project No. NM 001 059. 02.05; 31 March 1950; ASTIA ATI 79310

ABSTRACT: Herein is described a device which controls the back rest position of the controllable supine seat: SDC Project 9-U-37a. This device is operated by G. When the G-level exceeds a given amount, the back rest rotates, on an axis about its lower end, backward to a horizontal position. When the G-level falls below a given amount, the horizontal rest rotates upward to its original position. An individual seated therein is then automatically changed from a seated position to a supine position, or vice versa, at specific G-levels. The G-level at which operation occurs is controlled by a 17-position switch which provides automatic supination control at levels from 1.0-6.0 G. The supination and recovery levels are dependent upon each other, and the recovery level is slightly below that of supination. The difference between these levels at any particular setting increases with the G, being 0.8 G at 2.5 G for supination and 1.6 G at 6.0 G for supination.

Such a device should be of practical value in aircraft equipped with such movable seats, as automatic protection can then be provided for air personnel exposed to positive and negative radial acceleration. (DACO)

2,837

Kellogg, W. W. 1958 I.G.Y. ROCKETS AND SATELLITES: A REPORT ON THE MOSCOW MEETINGS, AUGUST 1958. (The RAND Corporation, Santa Monica, Calif.) P-1501, Sept. 15, 1958.

ABSTRACT: A summarization of some 77 papers presented at the Technical symposia on Rockets and Satellites during the Fifth Meeting of the Committee Spèciale de l'Année Géophysique Internationale at Moscow, July 31 to August 9, 1958. Such topics are reviewed as atmospheric structure, electromagnetic properties of the ionosphere, cosmic and auroral particles, solar and stellar untraviolet and X-ray radiation, micrometeorites, biological experiments, rocket and satellite instrumentation, and rocket and satellite programs.

2,838

Kelly, C. F., A. H. Smith, & C. M. Winget 1957 PHYSIOLOGICAL RESPONSES TO ARTIFICIAL ALTERATIONS IN WEIGHT. (California University) Annual Progress Rept. 2; 15 Apr.-15 Dec. 1957; Contract Nonr-221101; ASTIA AD-150 390

ABSTRACT: An animal centrifuge has been constructed and used in prolonged centrifugation trials with domestic birds (chickens). These experiments indicate that chickens can survive accelerative forces up to 4 Gs, though with considerable mortality and growth repression. Up to 2.5 Gs, however, this treatment appears to have little effect (i.e., normal growth and negligible mortality). No definite syndrome has been established for birds dying while exposed to an accelerative force. Although neurological disturbances are encountered (and proven not to result from infectious disease) these are not considered to be primary causes of death in acceleration stress. Birds grown under an accelerative force show some anatomic changes. Physiological changes observed have been quite variable, and sometimes contradictory between different trials. It is assumed that these differences arise from other factors (age of animals, temperature, acceleration schedule, etc.) and can be rationalized with the accumulation of more data. Consistent changes have been observed in heart rate (increased) and respiratory frequency (decreased) On return to normal gravity, the physiological differences between centrifuged birds and their controls disappear in about 3 weeks. In some cases there is a period of over compensation (viz.: respiratory frequency, which is decreased centrifugation, becomes faster than the controls during the first two weeks at normal gravity.) Some progress has been made on the development of a high-Gs strain. The first selection (involving a 60% mortality) has been made, and this group will be reproduced in the near future. (AUTHOR)

2,839

Kelly, C.F., A.H. Smith and C.M. Winget 1960 AN ANIMAL CENTRIFUGE FOR PROLONGED OPERATION. J. Appl. Physiol. 15:753-7

ABSTRACT: In 1956 the authors undertook an investigation of the effect of chronic acceleration stress on animals. An essential step was the development of a centrifuge mechanism capable of producing accelerative forces up to 6G for long periods. Similar devices have been constructed for short-term operation with man (1) and various experimental animals (2), and for long-term operation with rats (3), but the literature contains little or no information on their mechanical requirements and characteristics. This report is therefore made on the construction details and functional characteristics of the apparatus, which ahs operated without mechanical difficulty for more than 15,000 hours. Results of experiments with this centrifuge are reported elsewhere.

2,840

Kelly, E. J. 1961 THE RADAR MEASUREMENT OF RANGE, VELOCITY AND ACCELERATION. (Lincoln Lab., Mass. Inst. of Tech., Lexington) ASTIA AD-261 306; 19 Jan.1961 See also Reprint IRE Transactions on Military Electronics MIL-5:51-57, April 1961

ABSTRACT: A study is presented of the ultimate attainable accuracy in the radar measurement of range, range rate, and range acceleration. It is assumed that these quantities are to be measured by a coherent radar with a large output signal-to-noise ratio. The approach is entirely theoretical, and the accuracy evaluated is the accuracy that would be attained with an ideal receiver which performs maximum-likelihood estimates of the unknown parameters. The transmitted waveform is fixed and arbitrary, and the error variances and covariances are evaluated in detail in terms of the amplitude and frequency modulation of the transmitted wave. Specific results are also given for constant amplitude pulses carrying arbitrary combinations of linear and quadratic frequency modulation. (AUTHOR)

2,841

Kelly, C.F. and C.G. Phipps 1961 IN FLIGHT BIO-INSTRUMENTATION IN A NEAR-SPACE OPERATIONAL ENVIRONMENT.
(Paper, 1961 Meeting of the Aero Medical Association, Chicago, April 24-27)

ABSTRACT: To bring known methods of airborne physiological instrumentation to a point of usefulness in an operational environment requires close coordination between the medical profession, the electronics profession and operational aviation. This cooperation has been possible to a large degree within the frame-

work of the Naval Missile Center. A versatile system of instrumenting pilots and radar operators of high performance aircraft for the electrocardiogram and electroencephalogram will be presented. Operational methods and techniques developed to instrument subjects in the Mark IV Full Pressure Suit and obtain data which is used as a part of missile system evaluation, will be discussed. Records and results will be presented as well as applications of these methods to physiological instrumentation during space flight.
(Aerospace Med. 32(3):237)

2,842

Kempf, E.J. 1958 BASIC BIODYNAMICS.
Annals of the New York Academy of Sciences. 73: 869-910, Sept. 30, 1958

ABSTRACT: Six laws of biodynamics that govern the behavior of all forms of life in reaction to their environment are presented, with well established scientific evidence demonstrating their validity. They are consistent with the laws of thermodynamics that fovern the equilibrating behavior of enclosed, nonliving, reversible reaction system. The laws of biodynamics provide the biological sciences of genetics, cytology embrology, biochemistry, physiology, psychology,, and sociology, for the first time in their history, with a formulation of the basic natural processes involved in their special fields of investigation. These laws will clarify and facilitate the further development of secondary laws of the sciences of living behavior.

2,843

Kendall, S.K. 1942 CHARACTERISTICS OF HIGH SPEED STALL IN NAVAL FIGHTER AIRCRAFT. (National Research Council, Canada)
Report #C-2844, 15 August 1942

ABSTRACT: With the use of the Franks Flying Suit to prevent blacking out, studies were made on high speed stalls of aircraft flying at over 250 m.p.h. Trials were conducted on the Seafire, stalling speeds being determined at 100, 150, 200, 250, 300 and 350 m.p.h. at 10,000 feet and at 20,000 feet. Similar determinations were made on the Hurricane I up to 300 m.p.h. and the Martlet I up to 250 m.p.h. Also the Fulmar II aircraft up to 20 m.p.h. The pilot in these maneuvers went up to 8 1/2 and 9 G. The relationship between stalling speed and centrifugal force at various altitudes was determined.

2,844

Kendricks, E. J. 1951 MEDICAL PROBLEMS OF MILITARY AVIATION. THE KOBER LECTURE FOR 1951.
Mil. Surgeon 108(6):467-481, June 1951

ABSTRACT: With the appearance of aircraft in war, a new medical specialty developed. Man, in exploring a new environment, had encountered new physical, physiological and mental hazards. A team was then developed, consisting of scientists, engineers, and medical men, to deal with the complicated problem of keeping man, the air frame and the power plant as an efficient, relatively safe instrument of peace and war. The advance of military flhing made three things evident: (1) flyers must be carefully selected, (2) they must be classified in some way to indicate their capabilities, and (3) there must be a constant alert to search out fatigue, staleness, fear of flying, increased recklessness and foolhardiness. Research efforts fall in two broad categories: (1) Human requirements in aircraft design, as imposed by acceleration, altitude, cold, heat, and man's physiological limitations, and (2) development of personal equipment to improve tolerance of acceleration, altitude, cold, and heat.

2,845

Kendricks, E.J. 1952 AEROMEDICINE: THE DOMINANT SCIENCE
Aero Digest 64(1): 72-80, 82, 90. Jan. 1952

ABSTRACT: The physiological problems resulting from the advances of modern aviation in high-altitude and high-speed flying are briefly discussed. New methods and techniques in meeting problems such as temperature and pressure changes, anoxia, bio-acoustic effects, bailing out from high altitudes, and instrument control (human engineering) are summarized. In conclusion, the requirements for and the functions and duties of the flight surgeon are outlined.

2,846

Kendricks, E. J., et al 1955 MEDICAL PROBLEMS OF SPACE FLIGHT.
IN USAF School of Aviation Medicine, Randolph AFB, Texas, Epitome of Space Medicine, Item No. 9.
Reprinted from Instructors Journal, Winter 1954. Catalogued by ASTIA as AD 144 581.

CONTENTS:

2,847

Kendricks, E. J. 1955 MEN ARE NOW FLYING IN SPACE.
In USAF School of Aviation Medicine, Randolph AFB, Texas, Epitome of Space Medicine, pp. 1-3 ASTIA AD 144 581.

ABSTRACTS: During the years immediately following World War II, Major General Harry G. Armstrong, then Commandant of the School of Aviation Medicine, perceived that flight in the upper atmosphere or in space was an imminent reality. Therefore, he created the Department of Space Medicine at the School and placed Dr. Hubertus Strughold at its head. Dr. Strughold and his co-workers have considered all the known properties of the border zone between the troposphere, where conventional flight occurs, and outer space, with their probably effects upon the human body. The research of this Department is wholly basic, the application remaining for other agencies to perform.
Men must somehow take their own peculiar environment with them when they venture into space. Every element that supports human life, and protects it from the unfriendly medium outside, must be supplied from within the confines of the craft. A real task of aviation medicine today, then, is to show men how to live in space.
(CARI)

2,348

Kennedy, P. J., & R. O. Fimmel 1955 UNBALANCE INDICATING INSTRUMENTATION FOR FLIGHT SIMULATOR (Signal Corps Engineering Labs., Fort Monmouth, N. J.) Technical Memo. M-1666; ASTIA AD-80 667; Nov. 1955

ABSTRACT: A balancing system for use with a flight simulator was required as a safety device to indicate excessive unbalance. A system was designed using strain gages as the sensing element, a cutoff relay to trip the ignition system and a strain indicator to indicate unbalance. Mounting the strain gages on the stationary leg of the whirler mount, eliminated the need for slip rings which greatly simplified the installation. The system has been installed and is giving satisfactory operation. (SCEL)

2,849

Kennedy, R. S. and A. Graybiel 1961 A COMPARISON OF SUSCEPTIBILITY TO SYMPTOMS IN THE SLOW ROTATING ROOM (CANAL SICKNESS) AND MOTION SICKNESS IN FLIGHT PERSONNEL
Paper, 32nd annual meeting, Aerospace Medical Assoc., 24-27 April 1961, Chicago, Ill.

ABSTRACT: Previous studies have shown that stimulating the semi-circular canals in healthy subjects (caused by movements of the head while slowly

rotating in a small room) produces symptoms collectively termed "canal sickness." In this experiment susceptibility to canal sickness was measured in three groups of subjects (aviators who had completed military test pilot school, experienced aviators, and incoming flight students) and compared with their susceptibility to other forms of motion sickness and vertigo, as determined by interview and questionnaire. The findings are interpreted in terms of the validity of the test for canal sickness, as a predictor of motion sickness. Aerospace Med. 32(3):237, March 1961.

2,850

Kennedy, R.S. and A. Graybiel 1961 SYMPTOMATOLOGY DURING PROLONGED EXPOSURE IN A CONSTANTLY ROTATING ENVIRONMENT AT A VELOCITY OF ONE REVOLUTION PER MINUTE. (Naval School of Aviation Medicine, Pensacola, Fla.) Rept. No. 62. 8 Sept. 1961. ASTIA AD 268 791.

ABSTRACT: Eight subjects were systematically observed on certain tasks aboard the Pensacola Slow Rotation Room at a velocity of one RPM. Pilot experiments indicated the great majority of unselected subjects would be symptom free at this speed. Consequently, four subjects were selected whose susceptibility to canal sickness and motion sickness was far above average. The findings warranted the conclusion that under the conditions of this experiment, exposure to a constantly rotating environment on one RPM does not handicap the performance of persons with far greater than average susceptibility to canal sickness.

2,851

Kennedy, R. S., & A. Graybiel 1962 VALIDITY OF TESTS OF CANAL SICKNESS IN PREDICTING SUSCEPTIBILITY TO AIRSICKNESS AND SEASICKNESS. Aerospace Medicine 33(8):935-938, Aug. 1962

SUMMARY: Twenty-one subjects were exposed to a laboratory method for producing motion sickness (canal sickness) aboard the Slow Rotation Room. In an effort to determine the predictive ability of this method the subjects were also subjected to aerobatics in an aircraft and to heavy or calm sea states. In addition nystagmic response to caloric stimulation was observed. It was found that a positive relationship existed between performance on the Slow Rotation Room, caloric irrigation, and airsickness. This relationship also existed during heavy seas and to a lesser extent in moderate seas. (AUTHOR)

2,852

Kennedy, R.S. & A. Graybiel 1962 THE VALIDITY OF TESTS OF CANAL SICKNESS IN PREDICTING SUSCEPTIBILITY TO AIRSICKNESS AND SEASICKNESS (Naval School Aviation Medicine, Pensacola, Fla.) Proj. MR005, 13-6001, Subtask 1, rept. no. 71. 27 June 1962

2,853

Kennedy, R. S., G. C. Tolhurst, & A. Graybiel 1963 THE EFFECTS OF VISUAL DEPRIVATION ON ADAPTATION TO THE CORIOLIS ILLUSION, POSTURAL EQUILIBRIUM AND CANAL SICKNESS (Paper, 34th Annual Meeting of the Aerospace Medical Association, Statler-Hilton Hotel, Los Angeles, California, April 28 May 2, 1963)

ABSTRACT: In order to determine the effects of visual deprivation on adaptation to the Coriolis illusion and to canal sickness on the Slow Rotation Room, 10 subjects were exposed on two different occasions to 48 hours continuous rotation at a constant velocity of 5.4 rpm under two experimental conditions: (1) with vision, (2) without vision.
A stress test was employed which caused the subject's head and body to proceed through different complex arcs which in turn produced a bizarre stimulus to the vestibular apparatus. Adaptation was measured by two tests of postural equilibrium, the coriolis oculogyral illusion and general symtomatology. The findings indicated that vision played a significant role in adaptation. (Aerospace Medicine 34 (3): 258, March 1963)

2,854

Kennedy, W.A., W.K. Kerr, W.R. Martin, B.Rose and W.R. Franks 1943 THE RELATION OF BLACKOUT THRESHOLD TO AGE, WEIGHT, BODY MEASUREMENTS AND CARDIOVASCULAR TESTS. (National Research Council, Canada) Report #C-2637 August 1, 1943

ABSTRACT: This investigation is limited to studies on trainees medically fit for aircrew duties between the ages of 18 to 35, expossed to G in the human centrifuge. Within the limits studied there appears to be no correlatior between blackout threshold and age, weight, body measurements, or resting blood pressure and resting pulse rate for a series of over one hundred aircrew selected subjects. There appears to be no correlation between blackout thresh hold and the response of the cardiovascular system to tilting when ordinary clinical methods of taking blood pressure and pulse rate are used on a series of over one hundred subjects. Continuous electrocardiograms taken during tilt table tests did not enable the detection of any correlation between blackout threshold and the initial rate of increase in pulse rate on tilting on a smaller series of 48 subjects.

2,855

Kennedy, W. A., W. K. Kerr, W. R. Martin, B. Rose, & W. R. Franks 1944 RELATION OF BLACKOUT THRESHOLD TO AGE, WEIGHT, BODY MEASUREMENTS, AND CARDIOVASCULAR TESTS. (Proc. 13th meeting Ass. Comm. Aer. Med. Res., Ottawa, 1944)

ABSTRACT: In 1568 centrifuge runs on 124 subjects, no statistically significant correlation was found between "g" threshold and age, weight, body measurement, resting pulse and blood presure, and response of pulse and blood pressure to tilting. Only factor which even looks promising is heart to seat measurement, for which P is only 0.04 for over 1000 subjects. Good distribution curve for blackout threshold is included.

2,856

Kennedy, W.A., W.K. Kerr, W.A.M. Russell and W.R. Franks 1944 INFLUENCE OF ACCELERATIONS PRODUCED IN THE CENTRIFUGE ON REACTION TIME. (National Research Council, Canada) Report #C-2720, April 10, 1944

ABSTRACT: When accelerations up to blackout level were studied, apart from (3) below and runs producing blackout, no significant difference was found between the time taken to react to visual stimuli delivered at the maximum G of the run and control conditions where stimuli were presented at one and one-third G during the same run. The time taken to respond to the auditory stimuli was not found to be significantly increased over controls at levels of G which produced blackout and a significantly longer response time to visual stimuli. Almost all of the thirty-five subjects used showed an occasional tendency to be inattentive in that they failed to respond to a stimulus for an excessively long time. There was a greater tendency to this lapse in attention to visual stimuli when at maximum G (often at sub-blackout levels) than when at one and one-third. G. The average time these lapses in attention lasted was the same at maximum G as at one and one-third G. There was no similar tendency with regard to the auditory stimuli used. There was significantly less tendency with the regard to the auditory stimuli used. There was a significantly less tendency to lapse in attention to visual stimuli when wearing F.F.S. than when

2,857

Kennedy, W.A. et al. 1944 INFLUENCE OF ACCELERATIONS PRODUCED IN THE CENTRIFUGE ON REACTION TIME. Proc. Assoc. Comm. Aviation Med. Research, NRCC, Appendix Z, 29 September 1944

2,858

Kennedy, W. A., W. K. Kerr, W. A. M. Russell and W. R. Franks 1944 INFLUENCE OF ACCELERATIONS PRODUCED IN THE CENTRIFUGE ON REACTION TIME. (National Research Council, Canada) Rept. No. 11, 10 April 1944 NOTE: CARI P&S 2.1

ABSTRACT: The purpose of this investigation was to study the influence of increased G on simple reaction time to visual and auditory stimuli as measures of mental alertness under G.

This investigation, carried out in the centrifuge, includes an analysis of 7853 stimuli and responses made by a total of 35 aircrew trainees when under varying accelerations up to blackout level. Measurements were made on subjects under increased positive G with and without portection from Mark III F.F.S. Responses to light stimulus and sound stimulus (buzzer) were studied.

2,859

Kennedy, W. P. EXTRACTS FROM GERMAN LITERATURE. PERVITIN. BLOOD PROCUREMENT. GAS. EYE INJURIES DUE TO AIRPLANE BOMBS. DISCOMFORT FROM MILITARY BELTS. CARDIOVASCULAR EFFECTS OF ANOXIA AND ACCELERATION. PSYCHIC SHOCK AND CRASHES.
(Flying Personnel Research Committee, Farnborough) FPRC Rept. #321 and 321-C (WAM-153-1) ASTIA ATI 206 431

2,860

Kent, H. C., & G. D. Moon 1961 DESIGN, DEVELOPMENT, AND EVALUATION OF THREE SETS OF DUAL PENDULOUS GYRO ACCELEROMETERS. (Minneapolis-Honeywell Regulator Co., Minn.) MH Aero Rept. No. 2379-TR1; Contract AF 33(616)6712; ASD TR 61-248; ASTIA AD-331 146; 15 Aug. 1961

2,861

Kephart, E. 1955 DEFECTIVE ANTI-BLACKOUT EQUIPMENT, INVESTIGATION AND TEST OF (Naval Air Development Ctr., Johnsville, Pa.) Project TED ADC AE-5201.4; 31 Dec. 1955

ABSTRACT: It was found that malfunction was caused by a burr of the plunger in the G valve which prevented the plunger from releasing the air from the suit. The burr caused the plunger to remain in the full down position, thus retaining the full eight pounds pressure in the suit.

2,862

Kephart, E. T., P. R. Edwards, W. S. Sipple, & R. Zabelicky 1955 DEVELOPMENT OF BIOLOGICAL AND RESEARCH APPARATUS FOR USE IN ACCELERATION AND DECELERATION STUDIES. PHASE VI. (Naval Air Development Ctr., Johnsville, Pa.) Project NM 001 100 303; 31 Dec. 1955

ABSTRACT: The support of the investigative program of the laboratory depends on the continued development of instrumentation for the human centrifuge, and for the associated scientific divisions of the laboratory. Particularly important during this period has been the development of a recording spectrophotometer for use in the biochemistry department.

2,863

Kerr, C.E., W.K. Stewart & J.R. Tobin 1942 NOTE ON PRONE POSITION IN AIRCRAFT (RAF, Institute of Aviation Medicine, Farnborough) FPRC Rept. No. 500

ABSTRACT: Reclining in a prone position as a protection agsinst "g" has been abandoned by the RAF because: (1) Visual difficulties are apparnelty insuperable; the blind area above the pilot is too large although the visula field behind him is not affected and the field below him is improved. (2) The position is extremely uncomfortable and produces much fatigue. The Germans report that a prone position raises the "g" threshold to 14 to 17 "g" on the centrifuge. A Heinkel has been reported to have been equipped with reclining seats.

2,864

Kerr, T.H. 1952 PILOT ESCAPE FROM SPINNING AIRCRAFT
(Royal Aircraft Establishment, Farnborough) December 1952. ASTIA ATI 199 859

ABSTRACT: A series of pilot escape tests from models of elementary and advanced trainers, and fighter aircraft in the spin are presented. Escapes were made from varying points relative to the wing chord, on the inboard and outboard sides of the spin. The analyzed results show that if the pilot requires to bail out from a spining aircraft, it is best to leave on the outboard side of the craft and in the crouching attitude. In this condition it is most probable that he will clear the aircraft cleanly and be outside the spiral flight path within a half turn of the spin. If he bails out on the inboard side, his flight path will probably be through or very near the propeller disc and it will probably take at least two turns of the spin for him to clear the helical flight path of the aircraft.

2,865

Kerr, W.A., and A. Graybiel 1946 THRESHOLDS OF STIMULATION OF THE HORIZONTAL SEMI-CIRCULAR CANALS IN MAN Amer. Psychologist 1:237-238

2,866

Kerr, W. K., & W. A. M. Russell 1944 EFFECTS OF POSITIVE ACCELERATION IN THE CENTRIFUGE AND IN AIRCRAFT ON FUNCTIONS OF THE CENTRAL NERVOUS SYSTEM. (Canada, National Research Council) Rept. No. C2719 , April 1944
NOTE: CARI P&S 2.2rc

ABSTRACT: The purpose of this report is to describe some of the effects on functions of the central nervous system resulting from positive acceleration in the centrifuge and in aircraft.

The report includes observations on approximately 5544 runs on 542 aircrew trainees exposed to positive G in the accelerator. Supplementary information on 16 flights with 13 subjects exposed to positive G in the aircraft is included. Physiological changes associated with blackout and unconsciousness due to G are described.

2,867

Kerr, W.K. and W.A. M. Russell 1944 EFFECTS OF POSITIVE ACCELERATION IN THE CENTRIFUGE AND IN AIRCRAFT ON FUNCTIONS OF THE CENTRAL NERVOUS SYSTEM. Proc. Assoc. Comm. Aviation Med. Research, NRCC, Appendix Y, 29 September 1944

2,868

Kerr, W. K. & W. A. M. Russell 1944 EFFECTS ON POSITIVE ACCELERATION IN THE CENTRIFUGE ON FUNCTIONS OF THE CENTRAL NERVOUS SYSTEM.
(National Research Council, Canada) Rept. No. C-2719, April 15, 1944.

ABSTRACT: Effects resulting from positive accelerations on functions fo the central nervous system have been studied in the accelerator on 5544 runs on 542 aircrew trainees and in aircraft on 16 flights with 13 subjects. Apparatus, methods and procedure have been described. Associated with greying and black-out, marked impairment of cerebral functions was found. Physiological changes associated with unconsciousness due to G have been described. The occurrence and incidence of convulsive episodes have been noted and the phenomena described in detail. Possible etiological factors have been considered.

2,869

Kerr, W.K. 1962 BIBLIOGRAPHY OF CANADIAN REPORTS IN AVIATION MEDICINE, 1939-1945. (RCAF Inst. of Aviation Medicine, Canada) Report no. DR 153; ASTIA AD-290 050

ABSTRACT: The bibliography consists of brief abstracts arranged in order of the report serial numbers, assigned as they were received by the Associate Committee