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ONR REPORT ACR-75

HUMAN ENGINEERING BIBLIOGRAPHY 1960–1961

Prepared by

THE PROJECT STAFF
HUMAN ENGINEERING INFORMATION AND ANALYSIS SERVICE

Institute for Psychological Research
Tufts University

OCTOBER 1962

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OFFICE OF NAVAL RESEARCH
DEPARTMENT OF THE NAVY
Washington, D.C.

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ENGINEERING PSYCHOLOGY BRANCH
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OFFICE OF SCIENTIFIC RESEARCH
U.S. AIR FORCE

OFFICE, CHIEF OF RESEARCH AND DEVELOPMENT
DEPARTMENT OF THE ARMY

* * *

OFFICE OF NAVAL RESEARCH
DEPARTMENT OF THE NAVY
Washington, D.C.

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TABLE OF CONTENTS

	Page
INTRODUCTION	
Purpose and Scope of the Bibliography	v
Instructions and Illustrations in the Use of the Present Bibliography	v
PART I	
Topical Outline of the Literature in Human Engineering	I - 1
PART II	
Facsimile of Subject Matter Files	II - 1
PART III	
Alphabetical Index to the Human Engineering Literature	III - 1
PART IV	
Key to Abbreviations Found in Abstracts	
Key to Abbreviations of Military and Government Organizations	
Citations and Abstracts	IV - 1
PART V	
Author Index	V - 1

INTRODUCTION

PURPOSE AND SCOPE OF THE BIBLIOGRAPHY

The general objective of the contract under which the present report was prepared is to conduct long-term research required to develop an Information Analysis Service in the area of human factors engineering. The purpose of this project is to attempt to meet the information needs of personnel responsible for human factors considerations in the design and development of equipment and systems. The present bibliography is one of a planned series of annual bibliographies[1] of literature pertinent to human factors engineering, which has been designed to meet this need.

As in the past, the project staff was influenced by several considerations regarding the selection of references for inclusion in the present bibliography. First, the project staff attempted to select those references which reflected the broad spectrum of revealed interests of human factors personnel as reflected in symposia, publications, and user reaction to previously published bibliographies. A second consideration was the decision that the document had to be available to the project staff for detailed examination prior to coding and abstracting. If the document was not among the acquisitions of the project, it was not included in the bibliography. The final major consideration was that, insofar as possible, the selected references for the present bibliography be from the publication period January to December, 1961. There was some modification of this last requirement. Documents from earlier publication periods, which had only recently been acquired and which were judged especially relevant, have been included.

Because of the tremendous volume of literature published during this period, the project staff was not able to examine every document of relevance. However, these will probably be part of successive bibliographies of the present project.

In summation then, the purpose of the present bibliography is to provide a useful compilation of references to the human factors engineering literature which reflect the most current acquisitions of the Human Engineering Information and Analysis Service, Tufts University.

INSTRUCTIONS AND ILLUSTRATIONS IN THE USE OF THE PRESENT BIBLIOGRAPHY

The search for and location of references on a specific topic may proceed in three ways.

(1) The user should examine the categories in the "Topical Outline of the literature in Human Engineering" (Part I), noting the Code Category

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[1] Five "Human Engineering Bibliographies" have been published to date; ONR Report ACR-24, ONR Report ACR-32, ONR Report ACR-43, ONR Report ACR-55 and ONR Report ACR-69.

Numbers of those categories deemed pertinent to his problem. He should then locate these Numbers in the "Facsimile of Subject Matter Files" (Part II) and note the listed Accession Numbers. Finally, he should locate these Accession Numbers in the list of "Citations and Abstracts" (Part IV).

(2) The user should examine the contents of the "Alphabetical Index to the Human Engineering Literature" (Part III) for terms which are descriptive of or synonymous with his problem and note the Code Category Numbers and corresponding pages under which such material has been coded. He should then check the content description of these categories in Part I, then proceed to obtain the Accession Numbers for the selected categories in Part II, and finally, examine the citations and abstracts in Part IV.

(3) The user wishing to retrieve the citations of work by a particular author should examine the "Author Index" (Part V) and note the Accession Numbers following the author's name. He should then locate these Numbers in Part IV.

In general, users of Part I should routinely search the Bibliographies and General References categories (1.1.0, 2.1.0, 3.1.0, 4.1.0, 5.1.0, 5.2.0, 5.3.0, 5.4.0, 5.5.0, 6.1.0, 7.1.0, 8.1.0, 9.1.0, 10.1.0, 11.1.0, 12.1.0, 13.1.0, 14.1.0) in addition to the specific topic categories relevant to their problem. Likewise, if the topic categories of interest are subordinate to some categories in Part I, the supraordinate category should be searched, since articles crosscutting several subordinate categories were frequently classified into the related supraordinate category. In addition, the user should examine the references in the frequently cross-referenced categories.

It is recognized that the suggested procedures for the use of the present bibliography tend to force the user to work through Part I and Part II. Though more direct retrieval procedures are possible, those which are suggested tend to insure that the user will obtain an overview of all the subject matter categories and perceive the functional relationship among spatially proximal categories.

Illustrative Search Problem A

Given the need for information pertinent to the design of bearing scales for use with a radarscope, the user would examine Part I and discover that category 3.5.2 (Range and bearing scales and aids) was relevant to his problem. He should also note the category 3.5.0 (Radarscopes and other cathode-ray-tube displays) was supraordinate to 3.5.2 and deduce that information pertinent to his problem might be found in this category. The user should also note the cross-referenced categories of 3.6.0, 3.15.0, and 7.7.2. Finally, the user should plan to examine the category 3.1.0 (Bibliographies and general references pertinent to visual inputs and processes). Having decided that the above indicated categories are pertinent to the problem, the user would then obtain the Accession Numbers opposite these Code Category Numbers in Part II and then look up the Accession Numbers in Part IV.

Illustrative Search Problem B

Given the need for information pertiennt to the design of bearing scales for use with a radarscope, the user would turn to Part III and locate such terms as "Bearing information aids, scales," "Radar, range and bearing aids," "Radar, displays," etc., and note the Code Category Numbers - 3.5.2 and 3.5.0 - and their corresponding pages in Part I. The user should then verify the codes by referring to Part I and then look up the categories in Part II for the Accession Numbers, which will refer him to the appropriate entries in Part IV.

PART I
TOPICAL OUTLINE OF
THE LITERATURE IN HUMAN ENGINEERING

The Topical Outline of the Literature in Human Engineering (T.O.) which appears on the succeeding pages is a reflection of many considerations. It is the project staff's best estimate of a functional organization of topic headings pertinent to human engineering. The topic headings represent an appropriate description of the published literature as it became available to the project staff. As has the present outline, future forms of the T.O. are expected to reflect both user reaction and publication trends.

In the past, it has been customary to reflect code category changes that have occurred between the new bibliography and that of previous years. This practice has been discontinued. Some code categories which appear in the first five editions of the T.O., have been deleted and their material subsumed under more appropriate headings. Other categories have been expanded; new categories have been added. This has resulted in such circumstances as code numbers (7.6.6, etc.) being assigned to different categories from one year to the next. Rather than possibly confusing the reader by attempting to relate the accumulated changes, it is recommended that the user approach each T.O. as an independent unit whose relation to preceding outlines is historical but not necessarily functional. Each new topical outline supersedes all previous ones.

Table of Contents

Topical Outline of the Literature in Human Engineering

		Page
1.0.0	Human Engineering: Methods, Facilities, Equipment, and General References	1
2.0.0	Systems of Men and Machines	2
3.0.0	Visual Inputs and Processes	3
4.0.0	Auditory Input and Processes, Including Speech Production and Intelligibility	8
5.0.0	Other Sensory Inputs and Processes	11
6.0.0	Input Channels: Choice and Interaction	13
7.0.0	Body Measurements, Basic Physiological Limits in Motor Performance, Basic Motor Capacities, and Perceptual Motor Skills	13
8.0.0	Design of Controls and Integration with Displays	15
9.0.0	Layout of Panels and Consoles	16
10.0.0	Design of Work Space, Equipment, and Furniture	16
11.0.0	Clothing and Personal Equipment	18
12.0.0	Special Environmental Factors Affecting Performance	19
13.0.0	Other Individual Factors, Work Conditions, and Task Characteristics that Affect Behavioral Efficiency	20
14.0.0	Training Aids and Devices and Their Use	22
15.0.0	Other Areas of Psychological Research Pertinent to Human Engineering	22

TOPICAL OUTLINE OF THE LITERATURE IN HUMAN ENGINEERING

1.0.0 HUMAN ENGINEERING: METHODS, FACILITIES, EQUIPMENT, AND GENERAL REFERENCES

This section includes general or heterogeneous texts, review articles, etc., on human engineering; discussion and information concerning methods and apparatus used in human engineering research; descriptions of agencies, institutions, and facilities engaged in human engineering research and application.

References to specific aspects of human engineering such as vision, audition, etc., may be found in the appropriately designated sections of the outline, e.g., for special references and bibliographies on vision, see code 3.1.0.

1.1.0 GENERAL AND COMPREHENSIVE REFERENCES IN HUMAN ENGINEERING - texts, films, handbooks, articles, and heterogeneous bibliographies that are relevant to several phases of human engineering.

1.2.0 METHODS, EXPERIMENTAL DESIGN, AND PROCEDURES USED TO OBTAIN AND TREAT INFORMATION PERTINENT TO HUMAN ENGINEERING - in general, specific data obtained by way of the indicated methods are not included here but under other relevant sections of the outline.

1.2.1 Mathematical and Statistical Methods - quantitative techniques for the description and treatment of data, e.g., correlational techniques, non-parametric statistics, mathematical models, Monte Carlo techniques, stochastic formulations. For use of these techniques in systems analysis see 2.2.0.

1.2.2 Methods of Task and Personnel Description and Assessment - techniques designed to evaluate various processes in the total task, e.g., job analysis, evaluation ratings, time and motion studies; also proficiency testing, requirement setting.

1.2.3 Psychophysical Methods - includes methods such as constant stimuli, limits, etc., and the construction of scales and/or techniques to determine psychophysical thresholds, e.g., scales of sensation, signal detectability (ideal observer).

1.2.4 Physiological Methods - includes those with general utility for human engineering problems. For other specific methods see 7.5.1, 12.9.0.

1.2.5 Special Techniques - those techniques and methods not defined by the above sections, e.g., critical incident techniques, and interview methods.

1.3.0 EQUIPMENT AND APPARATUS USED PRIMARILY IN HUMAN ENGINEERING RESEARCH - includes general equipment applicable to several phases of human engineering research. Information concerning equipment specifically designated for use with problems in the areas included in this outline may be found by reference to the particular equipment category in that section; e.g., vision (3.16.0), audition (4.9.12), touch (5.1.4), temperature (5.2.2), pain (5.3.2), smell and taste (5.4.3), kinesthesis (5.5.3), vestibular functions (5.6.2), anthropometry (7.4.0), motor performance (7.6.7, 7.7.4), clothing and personal equipment (11.8.0), special environmental effects (12.9.0).

1.4.0 FACILITIES IN HUMAN ENGINEERING - installations, agencies, and organizations whose objectives, organization, and facilities are concerned with human engineering research and application.

2.0.0 SYSTEMS OF MEN AND MACHINES

Materials and references regarding the behavior of men in interaction with men and machines and acting as integrated systems are included here. In general, information pertaining to a specific man-machine interaction may be found elsewhere in the topical outline.

2.1.0 BIBLIOGRAPHIES AND GENERAL WORKS ON SYSTEMS OF MEN AND MACHINES AND THEIR COMPONENTS - includes definitions of operations and systems research as well as descriptions of origin of the fields, scope of the fields, and processes involved.

2.2.0 TECHNIQUES AND THEORETICAL FORMULATION FOR THE DESIGN AND EVALUATION OF SYSTEMS AND OPERATIONS - operations and systems research methods in general. For pre-established methods such as statistics, probability theory, cybernetics, and other psychological methods consult 1.2.0.

2.2.1 Communication and Information Theory - includes basic concepts and theoretical discussions of man as a link in communication systems, signal detection theory (2.2.2).

2.2.2 Game or Decision Theory and Linear Programming.

2.2.3 Computers and Simulation - analog and digital computers, simulation techniques, computer programming.

2.2.4 Queueing Theory and Work Measurement Techniques.

2.3.0 RESEARCH AND EVALUATION OF SYSTEMS - contains information and data on systems components, systems processes and specific systems (their design, reliability, and functional efficiency) not elaborated below. Included are data on equipment, jobs, and personnel problems. Personnel selection and proficiency tests are included under specific system categories below. See also 15.1.0; for equipment and workplace design see 10.0.0.

2.3.1 Assignment of Functions to Men or Machines - contains material on man as a system component with practically oriented studies on reception of information, processing information, and transmission of information. For tracking see 7.7.2; for watchkeeping see 7.7.1.

2.3.2 Groups as System Components - performance as a function of group structure, task, and interpersonal factors, e.g., leadership, crew assembly, problem-solving, work organization and layout; for relevant problems in social psychology see 15.2.0.

2.3.3 Communication Systems - includes variables important in communication and evaluations of specific communication systems. For information on components of auditory and speech systems see 4.3.0, 4.4.0, 4.5.0; for machine translation see 4.8.6.

2.3.4 Transportation Systems - includes weapon systems such as aircraft and missiles, ground transportation systems, and ocean transportation systems. For evaluation of components see 10.10.2, 10.10.3, 10.10.4.

2.3.5 Production, Maintenance, and Supply Systems - includes industrial systems, support systems for air- and spacecraft, maintenance scheduling, etc. For evaluation of components see 10.10.0; for maintenance design factors see 10.7.0; for training see 14.1.0.

2.3.6 Air Traffic Control System - includes history of the problem and evaluation of equipment and operational variables.

3.0.0 VISUAL INPUTS AND PROCESSES

References on basic visual data related to the design and use of equipment, problems of natural and artificial lighting, specific visual displays, and equipment and methods for basic and applied problems in vision are included.

3.1.0 BIBLIOGRAPHIES AND GENERAL REFERENCES PERTINENT TO VISUAL INPUTS AND PROCESSES.

3.2.0 NATURAL AMBIENT LIGHTING - includes general methods of measurement, effects on visual detection, visual range, and other visual tasks; excludes basic visual data (3.15.0).

3.2.1 Daytime Light - includes indoor and outdoor situations, object color and visibility. For visibility and design of work space see 10.2.1.

3.2.2 Twilight and Night - includes indoor and outdoor situations where this is one of the major variables being studied, night visual efficiency, and factors affecting night vision.

3.2.3 Special Conditions Affecting Visibility - includes haze, fog, precipitation, light at high altitudes, and visibility of submerged objects.

3.2.4 Glare - includes direct sunglare and reflected glare from clouds, moisture particles, or other objects as it affects vision; excludes glare factors of artificial illumination (3.3.4).

3.3.0 ARTIFICIAL AMBIENT LIGHTING - includes general discussions of illumination problems, materials, methods of measurement, and effects on visual tasks; excludes basic visual data (3.15.0) and instrument lighting (3.4.0).

3.3.1 Considerations of Illumination - includes effect of varied intensity levels on performance of visual tasks, preferences and recommendations for intensity levels for various types of visual tasks, and uniformity and color of illumination and surrounds. For illumination and work space design factors see 10.2.1.

3.3.2 Lighting Systems, Outdoor - includes such systems as highways, streets, landing fields, road surface characteristics, and their effects on visibility; also local lighting such as car lights and exterior aircraft lights. For light coding see 3.12.2.

3.3.3 Lighting Systems, Indoor - includes descriptions and specifications for such systems as school rooms, workrooms, factories; excludes lighting of instruments and equipments (3.4.0, 3.5.0, 3.6.0).

3.3.4 Unusual Characteristics of Artificial Illumination Affecting Visual Performance - includes glare, flicker, polarization, and inversion of illumination pattern.

3.4.0 LIGHTING OF INSTRUMENTS - includes the effect on visibility of lighting systems specifically oriented to a work place of dials and instruments as in aircraft or submarines; excludes legibility of letters, numerals, and symbols (3.9.0).

3.4.1 Direct Lighting and Floodlighting - includes descriptions, effects on visibility, mechanical efficiency, and maintenance.

3.4.2 Indirect Lighting - Edge, Ring, Rear (Transillumination), etc. - descriptions, effects on visibility, mechanical efficiency, and maintenance.

3.4.3 Color and Intensity of Illumination - includes red and ultraviolet lighting systems as they affect operator efficiency, intensity levels, and contrast.

3.4.4 Comparisons of Methods and Types of Instrument Lighting - includes human engineering evaluations of such lighting systems.

3.5.0 RADARSCOPES AND OTHER CATHODE-RAY-TUBE DISPLAYS - includes analyses and reviews of problems of radar visibility, radarscope interpretation and radar search as dependent on the interactions between the physical characteristics of the equipment and observer variables, and other types of CRT displays; excludes television (3.6.0) and basic visual data (3.15.0).

3.5.1 Physical Characteristics of Radar Equipment Displays Affecting Signal Detectability - includes types of displays, comparisons of types, electrical parameters affecting detectability, screen and pip brightness, uniformity of screen brightness, visual noise background, size, shape, location and other characteristics of the signal.

3.5.2 Range and Bearing Scales and Aids - includes grids, range rings, cursors, counters, and other devices used to obtain range and bearing information. For tracking see 7.7.2.

3.5.3 Radar Screen Size, Shape, and Orientation: Ambient Lighting Conditions - includes external physical variables of the equipment, angle of mounting and of viewing, intensity and color of room illumination. For general considerations of illumination see 3.3.1.

3.6.0 TELEVISION AND MOTION PICTURE DISPLAYS - includes physical characteristics as they affect visibility of display, physical viewing conditions, and perceptual factors; excludes basic visual data (3.15.0).

3.7.0 PICTORIAL AND SYMBOLIC DISPLAYS - includes the general area of visibility and/or legibility of displays that utilize picture and sign-like representations of a given situation; excludes legibility (3.9.0), indicators and scales (3.8.0), and printed materials (3.10.0).

3.7.1 Outside-in and Inside-out Displays - the portrayal of a situation as it would look to an observer external to it (plot board in combat information center), or within it (attitude indicators in which horizon tilts and aircraft remains stationary); includes descriptions, principles of design, and evaluations.

3.7.2 Combining Pictorial and Symbolic Display Elements - includes descriptions and evaluations.

3.7.3 Evaluation and Comparison Among Types of Pictorial and Symbolic Visual Displays - includes pictorial versus symbolic displays, outside-in versus inside-out displays, and comparisons within a type of display.

3.8.0 INDICATORS AND SCALES - includes effects on performance of various types of indicators and scales and combined instruments when used individually or in groups (e.g., radio magnetic indicator in aircraft); also includes general design principles. For problems of lighting see 3.4.0; of legibility see 3.9.0.

3.8.1 Counters - includes kind of information best presented, amount of detail, design factors such as direction of numeral movement, optimum number of numerals, use of zeros, and size.

3.8.2 Pointers - includes design factors such as length, shape, and width.

3.8.3 Scales: Shape, Size, and Direction of Increase - includes horizontal, vertical, or circular scales, dial diameter, and the kind of information best presented by each.

3.8.4 Scales: Divisions and Markings - includes the number of divisions necessary to present information adequately, size of space between divisions, number and width of markings, scale break, scale origin, and labelling.

3.8.5 Design of Scales for Qualitative Readings - includes orientation of pointer, size, and grouping (see 9.4.0 and 9.5.0 for layout problems). For individual and systems problems in monitoring see 2.3.1, 4.7.0, 7.7.1, 13.2.4.

3.8.6 Evaluation and Comparison of Indicators and Scales - includes dials versus counters, moving pointer versus moving dial, and other comparisons.

3.9.0 LEGIBILITY OF LETTERS, NUMERALS, AND OTHER SYMBOLIC FORMS - includes general information concerning design and recognition of code symbols, silhouettes, and other symbolic forms; excludes visual coding (3.12.0). See also acuity (3.15.6), form perception (3.15.10), printed material (3.10.0).

3.9.1 Design of Characters - includes form, type face, size, stroke-width, and spacing between characters and between lines.

3.9.2 Color and Contrast Between Symbol and Background - includes color of symbol and of background, brightness relations, and their effects on legibility. See also color discrimination (3.15.4), brightness contrast (3.15.5).

3.9.3 Viewing Conditions - includes factors pertaining to the task and its environment such as exposure time, illumination (3.3.0), distance, vibration, and viewing angle (3.14.0).

3.10.0 PRINTED MATERIALS - includes information concerning the design, readability, and application of graphic displays.

3.10.1 Graphs and Tables - includes design factors such as amount of detail, arrangement, length, kinds of information and their influence on operator performance.

3.10.2 Maps and Charts - design factors such as color, contrast, symbols, amount of detail and their influence on operator performance.

3.10.3 Decals, Instruction Cards, Check Lists, Labels, Instruction Charts - includes descriptions and evaluations.

3.10.4 Evaluation and Comparison of Types of Printed Materials - includes efficiency (readability) of information prese tation: continuous texts, maps versus charts, graphs versus tables.

3.10.5 Photography and Photo Interpretation - includes techniques of analysis and interpretations of images of various types of photography such as aerial and X-ray.

3.11.0 CAMOUFLAGE OR CONCEALMENT - includes the integration of equipment or landscape with the general background.

3.12.0 VISUAL SEARCH AND VISUAL CODING - includes problems in detecting an object as well as in using one or more or the visual characteristics of that object to differentiate it from other objects or the background. For problems in camouflage see 3.11.0; for unusual factors affecting visual performance see 3.14.0; for basic visual data see 3.15.0. Radar search (3.5.0) is excluded here.

3.12.1 Object Characteristics - includes color, brightness, area, shape, texture, visual number, and data on the discriminability of these characteristics; and descriptions and evaluations of standard safety color codes and coding for other purposes. For outdoor lighting systems see 3.3.2.

3.12.2 Light Coding - includes warning and signal lights and such characteristics as color, brightness, position, and temporal characteristics (blinking) and their effects on discriminability; specific systems such as Navy signal lights and industrial lights with specifications for filters are also included.

3.13.0 OPTICAL AIDS - includes information concerning the effect of optical equipment on visual performance; excludes manufacturing problems and basic visual data (3.15.0).

3.13.1 Devices for Visual Enhancement - includes sights, reticles, binoculars, periscopes, electrovisual aids, design factors, methods of use, and effects on visual performance.

3.13.2 Visual Protective Devices - includes goggles, filters, special glasses, visors; transmission requirements; sunglasses, dark adaptation goggles; design requirements, uses, and effects on visual performance.

3.14.0 OTHER FACTORS AFFECTING VISUAL PERFORMANCE - includes size of visual field; restriction of visual field, e.g., by unusual position of viewer or design of equipment; visual noise; visual fatigue; temporal factors; environmental backgrounds such as terrain, sea, etc., and complex perceptual fields. For restrictions due to work space design see 10.2.1; for other types of fatigue see 13.3.3.

3.15.0 BASIC VISUAL DATA RELATED TO THE DESIGN AND USE OF EQUIPMENT - includes reviews of sensory and perceptual studies, and pertinent theoretical formulations.

3.15.1 Individual Differences and Anomalies - includes presbyopia, population differences, color deficiencies, monocular vision, night blindness, and other common deviations.

3.15.2 Threshold Visibility - includes absolute thresholds for sensitivity to light (luminosity curves), and other thresholds dependent upon recognition of an object being "there" or "not there."

3.15.3 Adaptation, Pre-adaptation, and Pre-exposure - includes visual thresholds during the course of light, dark, or chromatic adaptation and the effect of conditions preceding measurement upon the course of adaptation, such as intensity and duration of pre-adaptation light, exposure to bright sunlight or instrument lights.

3.15.4 Perception of Color - includes thresholds for discrimination of color (aperture, illuminant, object), and factors pertaining to the physical stimulus, the eye, or the observer that influence performance, e.g., color preference, constancy. For other vision tests see 3.16.1.

3.15.5 Brightness Discrimination - includes thresholds for contrast sensitivity (Mach bands), contrast ratios, and factors of the physical stimulus, of eye, and of the observer that affect discrimination.

3.15.6 Acuity - includes vernier, stereoscopic, and dynamic acuity and factors of the physical stimulus, of the retina, and of the observer that affect performance.

3.15.7 Special Effects Dependent Upon Fixation or Exposure Time - includes flicker, figural aftereffects, and afterimages. For visual factors in spatial orientation see 6.3.2.

3.15.8 Eye Movements - includes type of movement, amount and direction during given visual tasks, and effects on visual performance.

3.15.9 Perception of Depth, Distance, and Size - includes measurements of thresholds, influence of monocular and binocular factors (including accommodation and convergence), stereoscopic vision, kinetic depth effect, perception of the median plane, relation of size and depth factors, real and apparent size, brightness constancy, and effect of past experience. For clinical tests see 3.16.2.

3.15.10 Perception of Form, Contour, and Pattern - includes visual recognition thresholds, effect of meaningfulness, completeness of detail, and word recognition.

3.15.11 Perception of Number, Angle, and Direction - includes counting, estimation, span of apprehension, estimation of angular bearing and/or direction of objects, and anchoring effects.

3.15.12 Perception of Movement - includes real and apparent motion, and autokinetic effects.

3.16.0 EQUIPMENT AND METHODS FOR BASIC AND APPLIED PROBLEMS IN VISION - includes descriptions, evaluations, and comparisons of visual equipment.

3.16.1 Tests of Color Vision - includes pseudo-isochromatic color plates, anomaloscopes, and color lanterns.

3.16.2 Other Tests of Visual Performance - includes tests of acuity, night vision, and depth perception.

3.16.3 Equipment and Methods for Basic Visual Research Problems - includes measurement and specification of visual stimuli as well as the respective equipments used, e.g., photometry, chromatic aberration, colorimetry, and various threshold methods. Subjective scaling techniques are also included.

3.16.4 Simulators, Equipment, and Tests for Specific Applied Problems - includes classroom demonstrators, radar, flight, and night vision trainers. For night vision training see 14.1.0.

4.0.0 AUDITORY INPUT AND PROCESSES, INCLUDING SPEECH PRODUCTION AND INTELLIGIBILITY

References on ambient noise, effects of auditory equipment and components, evaluations of auditory displays, speech communication, auditory presentation of information, and basic data in auditory processes are included.

4.1.0 BIBLIOGRAPHIES AND GENERAL REFERENCES PERTINENT TO AUDITORY INPUTS AND PROCESSES.

4.2.0 AMBIENT NOISE - includes the measurement and classification of noise-fields and their effects on the human operator; excludes channel noise (4.8.3) and basic psychophysical data on noise stimuli.

4.2.1 Measurement of Noise Level and Composition - includes spectral analysis, critical band analysis, autocorrelation functions, etc.

4.2.2 Noise Reduction and Control - includes hearing conservation programs, noise-reducing devices, acoustic shielding, and standards of noise level tolerance; excludes personal equipment, e.g., earplugs or helmets (11.3.3, 11.5.1).

4.2.3 General Industrial and Equipment Noise - includes vehicle noise, street noise, and machine noise not included under 4.2.4 and 4.2.5.

4.2.4 Aircraft and Weapons Noise - includes noise-fields of propeller-driven planes, jet engines, rockets, gunfire, helicopters, guided missiles, etc., including simulated aircraft noise.

4.2.5 Submarine and Ship Noise - includes engine noise, air conditioner unit noise, etc.

4.2.6 Effects of Ambient Noise and Blast on Performance - includes the effects of noise-fields and blast on performance, industrial efficiency, accident rates, etc. See 4.8.3 for the effects of noise on speech production, and 4.2.7 for hearing-loss effects of noise.

4.2.7 Noise-induced Hearing Loss - includes long-term hearing-loss resulting from noise and blast exposure, e.g., aviation deafness, industrial deafness, "boiler-maker's ear," etc.; excludes transient effects, e.g., post-stimulatory threshold shifts that are primarily produced under experimental laboratory conditions (4.9.5). (Since many of these laboratory effects are relevant and may persist under some conditions, however, 4.9.5 should also be consulted).

4.3.0 EFFECTS OF AUDITORY EQUIPMENT COMPONENTS - includes comparisons of different system components in communication systems and auditory displays, e.g., comparative ratings of different earphones in an aviation intercom system; excludes comparisons of complete systems (2.3.3, 4.4.0, 4.5.0).

4.3.1 Input Devices - includes microphones, vibration pickups, etc.

4.3.2 Transmission Devices - includes amplifiers and attenuators, filters, expanders and limiters, frequency modulators, multipliers and dividers, interrupters, scramblers, delay lines, etc. For the effects of such devices on speech see 4.8.4.

4.3.3 Output Devices - includes loudspeaker, earphones, and hearing aids (see also 11.5.1, personal auditory devices).

4.4.0 EVALUATIONS OF SPECIFIC SYSTEMS IN SPEECH COMMUNICATION - includes the effects of specific systems rather than of speaking or listening habits, etc.; excludes effects of system components (2.3.3, 4.3.0).

4.4.1 Telephone and Intercom Systems - includes comparison of different intercom systems, e.g., aviation, ship, and multi-channel intercom systems.

4.4.2 Radio Systems - includes comparisons of various radio systems for control towers, aircraft, etc.

4.5.0 EVALUATIONS OF SPECIFIC SYSTEMS IN NONVERBAL AUDITORY DISPLAY - includes the effects of specific systems rather than listening habits, etc.; excludes effects of system components (2.3.3, 4.3.0).

4.5.1 Intermittent Warning and Signaling Devices - includes sirens, bells, radio range, Geiger counters, clicks, etc.

4.5.2 Telegraphic Systems.

4.5.3 Sonar and Other Underwater Sound Systems - excludes the effects of sonar training (14.1.0) or individual differences in skill (4.7.0).

4.5.4 Flybar - includes comparisons of auditory flight guidance systems.

4.6.0 CHARACTERISTICS OF AUDITORY SIGNALS IN RELATION TO CODING - includes the relation of the stimulus properties in nonverbal auditory signals to coding efficiency, channel capacity, delayed feedback, and related problems, e.g., the determination of the maximum number of pitches giving reliable pitch coding results. See also 4.9.1, 4.9.2, 4.9.3, 4.9.8.

4.7.0 SPECIAL AUDITORY SKILLS - includes the effects of external stimulus conditions, practice, and individual differences as they affect specific auditory skills, e.g., in sonar listening, auditory search, tracking, and monitoring (2.3.1, 3.8.5, 4.7.0, 13.2.4).

4.8.0 BASIC DATA IN THE PRODUCTION AND PERCEPTION OF SPEECH - includes systematic considerations of speech communication as well as general articles, symposia, etc., in speech communication.

4.8.1 Basic Characteristics of Speech - includes speech spectra, phonetic analysis, phonemic analysis, formants, etc.

4.8.2 Speech Audiometry and Articulation Testing - includes measures of articulation, speech thresholds, and hearing loss for speech; excludes audiometry with nonverbal stimuli (4.2.7, 4.9.4).

4.8.3 Speech Masking and the Signal-to-noise Ratio - includes the effects of masking with noise, pure tones, and simultaneous speech on the production and intelligibility of speech.

4.8.4 Speech Distortion - includes the effects on speech intelligibility of clipping, chopping, amplitude modulation, frequency distortion, delay distortion, compression and expansion, etc.

4.8.5 Individual Differences and Anomalies in Listening, Speaking, and Interpreting - includes selective listening, emotional over-lay, speaker intelligibility differences as a function of nationality, sex, speech impediment, etc. See 4.2.7 for characteristics of the deaf.

4.8.6 Language Design - includes the formation of articulation and speech audiometry test materials, control tower language, "highly audible phrases," "competitive context," the NATO phonetic alphabet, mechanized translation, and related equipment such as speech recognizers.

For Training in Voice Communication - see 14.1.0.

4.8.7 Synthetic Speech - includes the use of synthetic speech in experimental phonetics, speech audiometry, bandwidth compression, and equipment used to synthesize speech.

4.9.0 BASIC DATA IN AUDITION - excludes basic speech data (4.8.0).

4.9.1 Basic Attributes: Pitch - includes pitch of pure and complex tones and noises, absolute pitch, diplacusis, tonal gaps, etc.

4.9.2 Basic Attributes: Loudness - includes loudness of pure and complex tones and atonal stimuli, recruitment phenomena, loudness of monaural and binaural stimulation, etc.

4.9.3 Basic Attributes: Timbre, Duration, and Other Qualities - includes volume, density, brightness, and vocality.

4.9.4 Thresholds and Related Phenomena - includes absolute, differential, and masked thresholds for tonal and noise stimuli, including pure-tone audiometry; excludes changes in the thresholds as a result of prior stimulation (4.9.5), speech audiometry, and speech detection thresholds (4.8.2).

4.9.5 Aftereffects of Stimulation - includes auditory fatigue, threshold recovery, acoustic reflex, tinnitus, pitch shifts, time errors, etc.; excludes permanent or long-term effects (4.2.7).

4.9.6 Stimulus Mixture - includes beats, aural harmonics, combination tones, modulation, complex tones, Tartini tones, etc.

4.9.7 Sound Localization - includes effects of interaural time and intensity differences, monaural cues, effects of non-auditory cues, stereophonic sound (auditory perspective), and obstacle avoidance.

4.9.8 Auditory Patterns and Meaning - includes discrimination of flutter, temporal patterns, melody recognition, micro-melodies, artificial meaning of melodic patterns, etc. (4.6.0, 4.9.4).

4.9.9 Psychological Scaling - includes the use of subjective scales (e.g., sone and mel scales) and their construction by means of interval scaling, ratio scaling, etc. (1.2.3, 4.9.12).

4.9.10 Norms, Individual Differences and Anomalies in Basic Auditory Performance - includes presbycusis, population differences, etc. (4.2.7, 4.9.4).

For Nonverbal Auditory Training - see 14.1.0.

4.9.11 Physiological Mechanisms - includes basic data on human auditory physiological mechanisms; excludes all animal studies save those pertinent to human physiological problems, e.g., experimentally induced deafness from very high-energy noise-fields.

4.9.12 Equipment and Methods Used in Research in Audition and Speech - includes audiometric devices, techniques of audiometry, Vocoder, etc.

5.0.0 OTHER SENSORY INPUTS AND PROCESSES

References on sensory inputs other than vision and audition, including considerations of touch, kinesthesis, temperature sensitivity, smell, taste, pain, and the vestibular sense, may be found in this section.

5.1.0 TOUCH - general references and bibliographies.

5.1.1 Basic Processes and Data - includes data on thresholds, acuity, adaptation, and individual differences.

5.1.2 Tactile Coding - e.g., the discrimination of knob shapes, thicknesses, sizes, textures, knurling (8.4.0).

5.1.3 Vibratory and Electrical Stimuli Used as Signals and Displays - e.g., buzzer on hand.

5.1.4 Equipment and Methods Used in Human Engineering Research on Touch.

5.2.0 TEMPERATURE SENSITIVITY - general references and bibliographies. For factors of thermal environment see 12.2.0, 12.2.1.

5.2.1 Basic Processes and Data - includes data on thresholds, acuity, adaptation, and individual differences.

5.2.2 Equipment and Methods Used in Human Engineering Research on Temperature Sensitivity.

5.3.0 PAIN - general references and bibliographies.

5.3.1 Basic Processes and Data - includes data on thresholds, acuity, adaptation, individual differences.

5.3.2 Equipment and Methods Used in Human Engineering Research in Pain.

5.4.0 SMELL AND TASTE - general references and bibliographies.

5.4.1 Basic Processes and Data - includes data on thresholds, acuity, adaptation, individual differences, masking odors, and deodorizing.

5.4.2 Olfactory and Gustatory Signals - e.g., smoke and noxious gases.

5.4.3 Equipment and Methods Used in Human Engineering Research on Smell and Taste.

5.5.0 KINESTHESIS - general references and bibliographies.

5.5.1 Basic Processes and Data - includes data on thresholds, acuity, adaptation, and individual differences.

5.5.2 Coding and Signalling through Kinesthesis - includes data on the use of feedback through the discrimination of control position and load (8.7.2), and discrimination through movement extents (7.6.1).

5.5.3 Equipment and Methods Used in Human Engineering Research on Kinesthesis.

5.6.0 VESTIBULAR FUNCTIONS - general references and bibliographies; includes postural orientation.

5.6.1 Basic Processes and Data - includes data on thresholds, adaptation, and individual differences.

5.6.2 Equipment and Methods Used in Human Engineering Research on Vestibular Functions.

5.7.0 TIME PERCEPTION - time discrimination, duration discrimination, psychological time scale.

6.0.0 INPUT CHANNELS: CHOICE AND INTERACTION

References on intersensory effects of stimulation and comparisons of input channels are included.

6.1.0 BIBLIOGRAPHIES AND GENERAL REFERENCES PERTINENT TO CHOICE AND INTERACTION AMONG INPUT CHANNELS - includes general studies on perception.

6.2.0 COMPARISON OF INPUT CHANNELS - includes range and resolution in different modalities, channel capacity (information handling), and other data relating to the choice of input channel.

6.2.1 Comparisons of Visual and Auditory Channels - for basic visual and auditory data see 3.15.0, 4.9.0.

6.2.2 Comparisons of Channels Other than Visual and Auditory - for basic data see code categories in 5.0.0.

6.3.0 INTERSENSORY EFFECTS - includes the effects of stimulation in one modality on perception in another; excludes the effects of distracting or masking stimulation on performance.

6.3.1 Facilitation and Inhibition of Reception - includes data on stimulus compatability, sensory overload, etc.

6.3.2 Factors Determining Orientation in Space - includes the effects of visual, auditory and proprioceptive cues, distorted cues, perceptual illusions (3.15.7), and vertigo.

For SENSORY DEPRIVATION - see 12.8.0.

7.0.0 BODY MEASUREMENTS, BASIC PHYSIOLOGICAL CAPACITIES, BASIC AND COMPLEX MOTOR PERFORMANCE

Materials and references on basic motor activities, anthropometric measurements, norms and data on muscular strength, extent of human movement, and perceptual-motor skills may be found in this section.

7.1.0 BIBLIOGRAPHIES AND GENERAL REFERENCES PERTINENT TO BODY MEASUREMENTS AND BASIC MOTOR PERFORMANCE.

7.2.0 ANTHROPOMETRIC MEASUREMENTS - includes descriptive articles, studies of body gravity.

7.2.1 Body Size, Stationary - includes distributions of and norms for body dimensions, such as hip girth, stature, weight, head size, hand size, somatotypes.

7.2.2 Body Size in Motion or in Unusual Positions - includes measurements of the space required to perform various body movements or to assume unusual positions.

7.3.0 BODY MECHANICS - includes general studies concerning the physical properties of the human body as a dynamic solid - mobility, centers of gravity, etc. Also includes normative data on individual differences. For basic data on motor performance see 7.6.0.

7.3.1 Extent of Limb Movement - leg and arm reach, pace, length, etc.

7.3.2 Flexibility of Movement - includes flexibility of joints, fingers, trunk, or neck and various combinations.

7.3.3 Muscular Strength and Endurance - includes normative data on strength, endurance, steadiness, muscular potential, posture, etc., of various limbs and combinations of limbs; also includes data on work capacity, load-carrying. For fatigue and work decrement see 13.3.3. For muscular inactivity see 12.8.0.

7.4.0 EQUIPMENT AND METHODS USED IN HUMAN ENGINEERING RESEARCH ON ANTHROPOMETRY BODY MECHANICS.

7.5.0 BASIC PHYSIOLOGICAL CAPACITIES - includes the assessment and definition of the human's structural capabilities and limits and individual differences, pathology, e.g., coronary occlusions, breathing rate, energy expenditure, basal metabolic rate, physical proficiency. See code categories in 12.0.0 for the effects of special environmental factors on these capacities.

7.5.1 Equipment and Methods Used in Research on Basic Physiological Capacities (1.2.4, 7.7.4, 12.9.0).

7.6.0 BASIC MOTOR PERFORMANCE - includes general analyses of movement classes or types, speed, and accuracy data. For data on body mechanics see 7.3.0.

7.6.1 Positioning Movements - includes bisecting movements and movement between markers and stoppers. For coding problems see 5.5.2.

7.6.2 Repetitive and Rhythmic Movements - includes tapping, cranking, and movements in particular time and rate patterns.

7.6.3 Manual Dexterity - efficiency (smoothness) of performance; includes coordination of the two hands.

7.6.4 Reaction Time - includes simple and complex RTs for various modalities and factors affecting these times.

7.6.5 Handedness - includes distributions in the population and effects of handedness on performance.

7.6.6 Involuntary Reflexes - includes sneezing, blinking, tremor, and other somatic responses.

7.6.7 Equipment and Methods Used in Human Engineering Research on Basic Motor Performance.

7.7.0 COMPLEX MOTOR PERFORMANCE - includes general analyses of the processes involved as well as specific types of performance not elaborated below.

7.7.1 Watchkeeping Performance - monitoring, vigilance tasks that require response to intermittently occurring signals, e.g., radar viewing (3.5.0) and sonar listening (4.5.3, 4.7.0), are included.

7.7.2 Tracking Performance - includes types of tracking and factors influencing performance. For studies dealing with systems evaluation primarily see 2.3.1; for design factors consult categories in 8.0.0.

7.7.3 Serial Performance - includes serial movements, e.g., handwriting and sequentially ordered tasks such as those performed by the pilot in an approach landing, by the driver of an automobile, and in industrial assembly. Consult 13.4.0 for work conditions.

7.7.4 Equipment and Methods in Human Engineering Research on Complex Motor Performance - includes psychomotor tests.

8.0.0 DESIGN OF CONTROLS AND INTEGRATION WITH DISPLAYS

References on the design and standardization of controls, integration of controls with displays, operation of controls, and time constants relevant to control operation are included.

8.1.0 BIBLIOGRAPHIES AND GENERAL REFERENCES PERTINENT TO DESIGN OF CONTROLS AND INTEGRATION WITH DISPLAYS - for visual factors consult the appropriate categories in 3.0.0; for motor performance factors see 7.0.0; for panel and console layout see 9.0.0.

8.2.0 STANDARDIZATION AND INTEGRATION OF CONTROLS AND DISPLAYS - includes various types of weapons systems such as missiles, aircraft, spacecraft; transportation vehicles such as ships, submarines, automobiles, tanks; and industrial equipment.

8.3.0 TYPES OF CONTROLS.

8.3.1 Rotary Movement Controls - includes factors affecting design and selection of knobs, cranks, wheels, etc.

8.3.2 Linear Movement Controls - includes factors affecting design and selection of levers and sticks, pushbuttons, pedals, and rudder bars. .

8.3.3 Other Types of Controls - includes controls not designated above, e.g., handgrip controls, three-axis controls, etc. Also includes special types of unusual design, e.g., eye movement, remote controls such as cranes, manipulator tongs, rectilinear arms, mobile remote holders, master-slave manipulators.

8.3.4 Multifunction Controls: Combined Controls - e.g., push-button on stick.

8.3.5 Comparisons Among Types of Controls: Choice of Type of Control - e.g., hand or foot, lever or stick.

8.4.0 CONTROL CODING - for the data in specific sensory areas see visual (3.12.0), auditory (4.6.0), tactual (5.1.2), kinesthetic (5.5.2).

8.4.1 Multiple Dimensions - e.g., visual and tactual.

8.4.2 Labelling - see 3.9.0 and 3.10.3 for visual factors of design and legibility.

8.5.0 POSITIONING AND PLANE OF OPERATION OF CONTROLS RELATIVE TO OPERATOR- for panels and consoles see 9.3.0.

8.6.0 SPECIAL CONSIDERATIONS RELATING TO PROLONGED ADJUSTMENT.

8.7.0 DISPLAY-CONTROL DYNAMICS.

8.7.1 Display-control Movement Ratios - includes gear ratios, coarse and fine tuning, gain, and attenuation.

8.7.2 Control Loading - includes inertial, fractional, and elastic resistances.

For Human Reaction Times - see 7.6.4.

8.7.3 Compatibility - includes direction and plane of motion of control and display element being controlled (3.8.5, 9.5.0), e.g., motion stereotypes, natural versus unnatural (7.6.0), and continuous versus discontinuous.

For Tracking - see 7.7.2.

8.7.4 Aided Controls - includes applications, effectiveness, and aiding constants.

8.7.5 Quickened Displays - includes applications, effectiveness, and constants.

9.0.0 LAYOUT OF PANELS AND CONSOLES

In this section are included references on integrated groups of display-control units characterized by multiplicity of display-control operation.

9.1.0 BIBLIOGRAPHIES AND GENERAL REFERENCES PERTINENT TO INTEGRATED GROUPS OF DISPLAY-CONTROL UNITS (8.1.0).

9.2.0 STANDARDIZATION AND INTEGRATION OF PANELS AND CONSOLES - for controls and displays see 8.2.0.

9.3.0 LOCATION OF PANEL RELATIVE TO OPERATOR AND TASK - includes angle of orientation, limits of working area, monitoring, sequence operations, etc. Also consult 7.3.1, 10.2.2, 10.3.0, 10.6.0.

9.4.0 GROUPING OF COMPONENTS ON PANELS AND CONSOLES - includes data on location of components on consloes.

9.4.1 Ease of Discrimination - for coding problems see 3.12.0 (kinesthetic), 5.5.2 (visual), 8.4.0 (control), and 5.1.2 (tactile).

9.4.2 Spatial Dynamics - includes frequency and order of use. For eye movement data see 3.15.8.

9.5.0 SPECIFIC ORIENTATION OF PARTS - includes direction of movement of several indicators with respect to one another; excludes movement compatibility for a single indicator (8.7.3). For design data on these indicators see 3.8.5.

10.0.0 DESIGN OF WORK SPACE, EQUIPMENT, AND FURNITURE

References pertinent to the design of work space, equipment, and furniture as related to the requirements of complex motor coordination tasks and special clothing and personal equipment worn by the operator may be found here. Evaluations of special work places and equipment are also included.

10.1.0 BIBLIOGRAPHIES, GENERAL REFERENCES, AND TECHNIQUES OF ASSESSMENT PERTINENT TO THE DESIGN OF WORK SPACE, EQUIPMENT, AND FURNITURE.

10.2.0 WORKPLACE DESIGN - includes general design principles and criteria of work units, such as comfort, as well as layout of larger work areas.

10.2.1 Visibility - includes field of view (3.14.0), location of critical task areas, obstacles and hazards, etc. For instrument lighting see 3.4.0; for indoor lighting systems see 3.3.3.

10.2.2 Ease and Speed of Movements - includes body clearance, distribution of equipment, location of tools, and reach distance (7.3.1, 9.3.0).

10.2.3 Stowage - includes arrangement of stored items for accessibility and space economy.

10.3.0 FURNITURE - includes specifications in relation to anthropometric data (7.2.0, 7.3.0), the motor requirements of the task (7.6.0, 7.7.0), arrangement (9.3.0), and comfort.

10.3.1 Seating and Body Support - includes data on bunks, chairs, couches, ejection seats, body dimensions pertinent to seat design; excludes ejection capsule design (10.10.1). For effects of special clothing and equipment see 11.6.0.

10.3.2 Seating Arrangements.

10.3.3 Work Surfaces - includes data on desks, tables, benches, etc.

10.4.0 PASSAGEWAYS, ENTRANCES, AND EXITS - includes information on size and location in relation to anthropometric data (7.2.0), traffic, tasks, hazards, and escape. For effects of special clothing and equipment see 11.6.0.

10.5.0 TOOLS.

10.6.0 DESIGN FOR COMPLEX MOTOR COORDINATION TASKS AND SPECIAL BODY POSITIONS - includes loading gun inside tank, and remote handling; excludes performance data (7.7.0).

10.7.0 DESIGN FOR MAINTENANCE - e.g., accessibility, manipulability, coding, type of fasteners, test paint, etc.; excludes maintenance systems (2.3.5) and maintenance training (14.1.0).

10.8.0 DESIGN FOR PORTABILITY IN THE DESIGN OF EQUIPMENT - for specific portable equipments see 11.5.3, 11.5.4.

10.9.0 DESIGN FOR SAFETY - includes the role of human, situational, and environmental factors in safety design and accident prevention and techniques of accident investigation. Includes studies on industrial safety and other types of safety not specified below, e.g., safety from various types of radiation, fire, explosives, chemicals, etc.

10.9.1 Motor Vehicle Safety - includes studies on traffic, road design, lighting problems (3.2.0, 3.3.2), safety aids (3.13.2, 11.3.1), accident proneness, accident investigation reports, and techniques of accident analysis, e.g., crash impact engineering (12.4.1). For driving as a serial task see 7.7.3; for transportation systems see 2.3.4.

10.9.2 Air Safety - includes aerial collision risk, accident proneness, escape from aircraft in the air or under water, techniques of accident investigation, and accident investigation reports. In addition to cross references listed under motor safety, consult 2.3.6 for air traffic control systems, 3.8.0 for individual instrument problems, and relevant categories in 12.0.0 for environmental factors.

10.10.0 HUMAN ENGINEERING DEVELOPMENT AND EVALUATION OF SPECIFIC WORK PLACES AND EQUIPMENTS NOT ELABORATED BELOW.

10.10.1 Cockpits, Space Cabins, and Capsules.

10.10.2 Air- and Spacecraft - also includes airborne equipment and related ground equipment, e.g., feeding consoles, maintenance stands, storage systems, and rescue equipment.

10.10.3 Sea and Landcraft - also includes related equipment.

10.10.4 Fire Control (Weapons) Systems Equipment.

10.10.5 Industrial Equipment - e.g., earth moving equipment, etc.

11.0.0 CLOTHING AND PERSONAL EQUIPMENT

References on the design of clothing and personal equipment worn by the operator during the performance of a task are included.

11.1.0 BIBLIOGRAPHIES AND GENERAL REFERENCES PERTINENT TO THE DESIGN OF CLOTHING AND PERSONAL EQUIPMENT FOR PROTECTION, EFFICIENCY, AND COMFORT.

11.2.0 CLOTHING ENSEMBLES - includes space clothing, development and evaluation of.

11.2.1 Thermal Protection - includes electrically heated suits, Arctic ensembles, coldbar suits, hot weather clothing, ventilated clothing, etc.

11.2.2 Pressure Suits - includes high altitude, anti-"g," divers' suits, etc.

11.2.3 Other Types of Protective Clothing - includes anti-radiation, decontamination, chemical protection, etc.

11.2.4 Fabrics for Clothing - includes data on "clo" value, color, irritant effects, etc.

11.3.0 CLOTHING COMPONENTS - includes development and evaluation.

11.3.1 Belting - includes safety belts, restraint systems, harnesses, etc. (10.9.1).

11.3.2 Body Gear - includes ballistic vests, flak suits, underclothing, etc.

11.3.3 Headgear - includes helmets, oxygen masks, self-contained breathing devices, etc.

11.3.4 Handgear.

11.3.5 Footgear.

11.4.0 CLOTHING SIZE - includes anthropometric measures and systems of size specifications (7.2.1, 7.2.2).

11.5.0 PERSONAL EQUIPMENT.

11.5.1 Auditory Devices - includes all types of ear defenders such as plugs, pads, cushions, and devices for auditory enhancement, e.g., auditory reading devices and hearing aids (4.3.3).

For Visual Protective Devices - see 3.13.2.

11.5.2 Sleeping Bags.

11.5.3 Packs and Carriers - includes knapsacks, tumplines, "A" frames, packboards, food containers, and packaging (7.3.3, 10.8.0).

11.5.4 Parachutes, Life Jackets, Life Rafts, and Other Survival Equipment - see also 7.3.3, 10.8.0, 10.10.1.

11.5.5 Prosthetics - includes artificial limbs and other body parts.

11.6.0 EFFECTS OF COMBINATIONS OF CLOTHING AND PERSONAL EQUIPMENT - includes data on compatibility and interdependence of items (11.2.0), effects on work space design (10.3.0, 10.3.1, 11.5.0), and effects on motor performance, such as escaping from ditched aircraft, mechanical maintenance in Arctic environment, etc.

11.7.0 SHELTERS - includes housing, tents, fall-out shelters, etc., for the comfort and protection of occupant personnel.

11.8.0 EQUIPMENT AND METHODS USED PRIMARILY FOR HUMAN ENGINEERING RESEARCH ON CLOTHING AND PERSONAL EQUIPMENT - e.g., clothing restriction tests.

12.0.0 SPECIAL ENVIRONMENTAL FACTORS AFFECTING PERFORMANCE

References on optimum and extreme ambient conditions as they influence human performance, health, or survival are found in this section.

12.1.0 BIBLIOGRAPHIES AND GENERAL REFERENCES PERTINENT TO SPECIAL ENVIRONMENTAL FACTORS AFFECTING PERFORMANCE, PHYSIOLOGICAL AND PSYCHOLOGICAL CONDITIONS OF THE ORGANISM; TERRAIN ENVIRONMENTS.

12.2.0 THERMAL ENVIRONMENT- includes heating, air conditioning, weather, and climate; excludes basic data on temperature sensitivity of the skin (5.2.0).

12.2.1 Temperature, Humidity and Air Velocity - includes heat tolerance, evaporative cooling, ventilation, windchill, and air- and windblast acclimatization (12.5.1).

12.2.2 Thermal Radiation - e.g., from sun, fires, and thermonuclear explosion.

12.3.0 TOXIC ENVIRONMENTS - includes atmospheric gases, airborne particles and microorganisms, solids, and liquids that come into contact with the body surface or lungs (12.5.1, 12.5.2).

12.4.0 MOTION - includes forces of unusual amplitude, frequency, or waveform that act on the whole body (13.4.4).

12.4.1 Speed and Acceleration - includes "g" forces (positive and negative), "g" protection, blackout, redout, impact injury, and atmospheric re-entry (10.9.1, 10.9.2).

12.4.2 Vibration - includes data on vibration of the whole body at all frequencies, including sonic and ultrasonic; and buffeting.

12.4.3 Motion Sickness - includes nausea and other symptoms following persistent whole-body oscillation of low frequency and large amplitude (13.5.3).

12.5.0 ALTITUDE AND DEPTH - includes water environment as it affects or acts upon whole body (7.5.0, 13.4.4).

12.5.1 Atmospheric Pressure - includes information on decompression sickness, aero otitis media, etc., at high altitude and under water (12.3.0, 12.5.2).

12.5.2 Oxygen Requirements - includes situations of high altitude and under water, studies of effects of hypoxia, and oxygen toxicity (12.3.0); also includes closed respiratory support systems other than those found in space craft (12.7.0).

12.6.0 NUCLEAR AND COSMIC RADIATION - includes information on ionizing rays and particles from space, X-ray machines, radioactive materials, nuclear reactors and explosions, and radiobiology (7.5.0).

12.7.0 SPACE TRAVEL - includes problems peculiar to life outside of the earth's atmosphere, e.g., weightlessness and closed ecological systems (7.5.0, 12.2.0, 12.4.0, 12.4.1, 12.5.0, 12.6.0).

12.8.0 SENSORY DEPRIVATION - includes effects of isolation, lack of sensory and muscular stimulation, hypodynamics, and monotonous environment upon behavior and performance.

For FACTORS DETERMINING ORIENTATION IN SPACE - see 6.3.2.

For UNUSUAL CHARACTERISTICS OF ARTIFICIAL AMBIENT LIGHTING AFFECTING VISUAL PERFORMANCE - see 3.3.4.

For EFFECTS OF AMBIENT NOISE AND BLAST ON PERFORMANCE - see 4.2.6.

12.9.0 SPECIAL EQUIPMENT AND METHODS UTILIZED IN THE STUDY OF THE EFFECTS OF SPECIAL ENVIRONMENTS ON PERFORMANCE - e.g., climatic chamber, human centrifuge, techniques of thermal assessment, water immersion, etc. (1.2.4, 7.5.1, 7.7.4).

13.0.0 INDIVIDUAL FACTORS, WORK CONDITIONS, AND TASK CHARACTERISTICS THAT AFFECT BEHAVIORAL EFFICIENCY

References pertinent to a variety of psychological and physiological factors that are internal to the operator or dependent upon the task are included here, along with considerations of behavior decrement, the aging process, and effects of nutrition and drugs. For equipment and research methods see 1.2.5.

13.1.0 BIBLIOGRAPHIES AND GENERAL REFERENCES PERTINENT TO INDIVIDUAL FACTORS, WORK CONDITIONS, AND TASK CHARACTERISTICS THAT AFFECT BEHAVIORAL EFFICIENCY.

13.2.0 FACTORS PERTAINING TO THE INDIVIDUAL - includes variables that are for the most part internal or intrinsic to the operator and independent of the task; excludes learning (14.0.0).

13.2.1 Motivation and Emotion - includes data on such factors as morale, incentives, level of aspiration, perception of self, anxiety, fear, and other emotional variables.

13.2.2 Intelligence and Aptitudes - includes data on the relationship between the intelligence and/or aptitudes of the operator and his performance.

13.2.3 Thought Processes - includes data on the cognitive processes of man as an independent unit, e.g., imagery, judgments, integration of concepts, problem-solving, and creativity; excludes Decision Theory (2.2.2) and man as a decision maker in a system (2.3.1).

13.2.4 Attention, Alertness, Vigilance - includes studies referring to the central process determining performance on certain kinds of tasks, e.g., readiness to respond; for data on performance itself, e.g., monitoring and watchkeeping, see 7.7.1 or, when related to systems studies in particular, 2.3.1.

13.3.0 INTERACTIONS BETWEEN INDIVIDUAL FACTORS AND WORK FACTORS - includes conditions arising within the individual as a result of interaction between individual factors and work factors.

13.3.1 Effects of Individual Understanding of Task or Set Toward Task - includes partial or selective perception and response, report (instructions), and perceptual anticipation.

13.3.2 Acceptability of Equipment, Clothing, Food, and/or Task - includes consumer acceptance, attitude surveys pertinent to the design of equipment, and preference studies.

13.3.3 Fatigue and Behavior Decrement - for visual fatigue see 3.14.0; for auditory fatigue see 4.2.6; for vigilance decrements see 7.7.1; for muscular strength and endurance see 7.3.3.

13.3.4 Stress - excludes monotony and sensory deprivation (12.8.0).

13.4.0 WORK, REST, AND EFFICIENCY - includes variables that are intrinsic to the task and relatively independent of the particular operator.

13.4.1 Conditions of Work - includes accuracy and speed requirements, length of work periods, distribution of rest periods, work load (see also 13.4.3); excludes effects of environmental conditions (12.0.0).

13.4.2 Methods of Work - includes time and motion studies, self-pacing, and forced-pacing.

13.4.3 Levels of Complexity - includes data on the number and degree of difficulty of discriminations required; excludes basic data on motor performance (7.6.0, 7.7.0).

13.4.4 Unusual Characteristics of the Work - includes potential injury, e.g., combat; physical punishment, e.g., rifle recoil; and secondary tasks; excludes environmental conditions (12.0.0), as well as visual (4.2.6), and auditory (3.3.4) distractions. For sensory deprivation and monotony see 12.8.0.

13.5.0 PERFORMANCE AS AFFECTED BY CERTAIN PHYSIOLOGICAL PROCESSES AND SELECTED DIETARY AND PHARMACOLOGICAL SUBSTANCES.

13.5.1 Sleep - includes data on the role of sleep and insomnia in the performance of a task.

13.5.2 Diet, Food, and Nutrition - includes studies on the effects of vitamin and nutritional deficiencies upon performance, studies on food preferences, feeding problems, food allowances, etc.

13.5.3 Drugs - includes studies on the effects of the administration and consumption of such substances as alcohol, tobacco, psychopharmaceutical agents, etc.

13.5.4 Aging - includes the effects of aging on psychological and physiological functions, e.g., thought processes and motor ability.

14.0.0 TRAINING AIDS AND DEVICES AND THEIR USE

This section deals with principles of design and application of training aids and devices in training programs, as well as references dealing with the outcomes of incorporation of aids in training programs. Also included are data on the phenomena of learning relevant to the design of aids and devices, and the development and institution of training programs.

14.1.0 BIBLIOGRAPHIES, GENERAL REFERENCES, AND COMPREHENSIVE REPORTS DEALING WITH SEVERAL ASPECTS OF TRAINING AIDS AND DEVICES - includes symposia, all-inclusive articles, handbooks, source lists, literature surveys, etc.

15.0.0 OTHER AREAS OF PSYCHOLOGICAL RESEARCH PERTINENT TO HUMAN ENGINEERING

A selected group of heterogeneous materials from the areas of social and personnel psychology of relevance to human engineering practice and research are included here.

15.1.0 PERSONNEL PSYCHOLOGY RELEVANT TO HUMAN ENGINEERING.

15.2.0 SOCIAL PSYCHOLOGY RELEVANT TO HUMAN ENGINEERING.

PART II
FACSIMILE OF SUBJECT MATTER FILES

The Facsimile of the Subject Matter Files which appears on the immediately succeeding pages is an integrated symbolic representation of the Code Categories of the preceding Topical Outline of the Literature in Human Engineering (Part I) and the succeeding listing of Citations and Abstracts (Part IV). In essence, it is a listing of the Accession Numbers (found in Part IV) which have been coded to each of the Code Categories (found in Part I). Inclusion of the Facsimile as part of the present bibliographic system permits maximal spatial condensation of the Topical Outline and also eliminates the need for printing a given citation and abstract more than once.

FACSIMILE OF SUBJECT MATTER FILES

Code Category Numbers	Accession Numbers						
1.1.0	17,303	17,304	17,446	17,485	17,516	17,517	17,518
	17,719	18,256	18,520	18,522	18,523	18,625	18,662
	18,679	18,687	18,719	18,727	18,736	18,755	18,771
	18,776	18,788	18,789	18,793	18,802	18,807	18,819
	18,868	18,897	18,901	18,946	18,949	18,953	18,983
	19,063	19,117	19,136	19,215			
1.2.0	17,439	17,444	17,454	17,525	18,488	18,715	18,802
	19,108						
1.2.1	1,562	14,892	16,248	16,608	16,622	16,626	16,631
	16,652	16,695	16,717	16,732	16,760	16,761	17,246
	17,445	17,449	17,450	17,455	17,462	17,549	17,578
	17,579	17,665	17,680	17,684	17,689	17,694	17,776
	18,056	18,105	18,154	18,250	18,251	18,393	18,460
	18,493	18,498	18,502	18,504	18,508	18,524	18,617
	18,739	18,777	18,803	18,805	18,808	18,826	18,828
	18,839	18,921	18,926	19,011	19,067	19,068	19,069
	19,070	19,071	19,072	19,073	19,121	19,144	19,155
	19,158	19,199	19,202	19,203	19,205	19,211	19,214
	19,224	19,230	19,231	19,244	19,291		
1.2.2	5,299	16,106	17,421	17,539	17,558	18,257	18,258
	18,453	18,473	18,503	18,523	18,526	18,553	18,558
	18,565	18,605	18,606	18,722	18,735	18,798	18,812
	18,826	18,843	18,974	18,990	19,013	19,056	19,109
	19,159	19,168	19,200	19,207	19,214	19,239	
1.2.3	1,562	16,487	17,250	17,342	17,349	17,415	17,447
	17,452	17,461	17,500	17,587	17,588	17,597	17,605
	17,683	17,733	17,773	17,892	18,469	18,493	18,497
	18,540	18,579	18,610	18,639	18,728	18,738	18,803
	18,919	18,924	18,925	18,933	18,942	18,945	19,094
	19,126	19,138	19,156	19,290			
1.2.4	14,850	17,343	17,371	17,372	17,448	17,467	17,530
	17,645	17,646	17,730	17,753	18,407	18,498	18,813
	18,866	19,026	19,160	19,161	19,278	19,292	
1.2.5	14,325	17,411	18,626				
1.3.0	17,490	18,261	18,652	19,277	19,293	19,296	
1.4.0	17,472	17,564	17,576	17,577	18,472	18,557	18,647
	18,764	18,802	19,000	19,001	19,128	19,184	
2.1.0	15,354	17,517	17,574	17,576	17,577	17,580	17,581
	17,582	17,583	17,712	18,246	18,611	18,612	18,687
	18,714	18,756	18,759	18,761	18,984	18,993	19,098
	19,099	19,136	19,212				

Code Category Numbers	Accession Numbers						
2.2.0	14,325	16,482	17,298	17,473	17,574	17,576	17,577
	17,578	17,581	17,582	17,583	17,718	18,248	18,249
	18,261	18,394	18,487	18,488	18,490	18,491	18,573
	18,602	18,643	18,668	18,720	18,734	18,760	18,762
	18,765	18,817	18,863	18,889	18,906	18,990	19,097
2.2.1	16,425	16,610	16,796	16,865	17,247	17,348	17,359
	17,650	17,706	17,801	17,806	17,833	18,197	18,253
	18,254	18,285	18,447	18,489	18,493	18,530	18,610
	18,832	18,988	18,992	19,112	19,148	19,188	19,189
	19,224	19,246					
2.2.2	15,052	16,219	16,488	16,693	16,809	17,345	17,357
	17,491	17,500	17,572	17,587	17,588	17,592	17,597
	17,605	17,651	17,806	17,869	18,096	18,293	18,493
	18,538	18,652	18,758	18,803	18,809	18,848	18,850
	18,871	18,919	18,941	19,098	19,126	19,291	
2.2.3	16,248	16,285	16,610	16,773	17,371	17,472	17,572
	17,657	17,806	18,150	18,197	18,293	18,393	18,418
	18,419	18,423	18,472	18,498	18,525	18,538	18,557
	18,572	18,587	18,602	18,620	18,689	18,804	18,808
	18,810	18,826	18,975	18,991	19,045	19,074	19,098
	19,100	19,157	19,160	19,230			
2.2.4	17,579	17,584	17,895	17,896	17,897	18,864	
2.3.0	16,219	17,540	17,574	17,576	17,577	18,254	18,261
	18,277	18,734	18,757	18,986	18,989	19,005	19,017
	19,118	19,200					
2.3.1	937	4,713D	16,248	16,771	17,299	17,309	17,451
	17,654	17,709	17,801	17,806	18,197	18,252	18,262
	18,417	18,477	18,479	18,574	18,601	18,620	18,628
	18,748	18,763	18,768	18,770	18,772	18,804	18,811
	18,848	18,849	18,942	18,958	18,988	19,005	19,075
	19,089	19,098	19,099	19,100	19,120	19,170	19,171
	19,214	19,246	19,251				
2.3.2	14,325	16,168	16,198	17,400	17,412	17,423	17,429
	17,471	18,096	18,393	18,492	18,552	18,553	18,554
	18,576	18,721	18,726	18,811	18,817	18,826	18,864
	18,976	19,056	19,093	19,291			
2.3.3	14,184	16,198	16,460	16,482	16,870	17,471	17,475
	17,657	17,833	17,880	18,252	18,253	18,254	18,285
	18,492	18,558	18,666	18,699	18,748	18,833	18,864
	18,984	18,988	18,992	19,005	19,075	19,148	
2.3.4	14,743	15,354	17,573	17,655	17,657	17,715	17,880
	18,099	18,418	18,419	18,441	18,481	18,491	18,615
	18,627	18,643	18,644	18,665	18,685	18,798	18,837
	18,847	18,864	18,903	19,009	19,120	19,170	
2.3.5	17,338	17,579	17,584	17,656	17,657	18,099	18,150
	18,259	18,260	18,261	18,277	18,397	18,596	18,627
	18,628	18,663	18,837	18,903	18,906	18,976	19,074
	19,162	19,163	19,164	19,166	19,171	19,172	19,213
	19,234						
2.3.6	17,419	17,423	17,862	17,880	18,248	18,249	18,252
	18,477	18,631	18,833	18,959	18,969	19,289	

Code Category Numbers	Accession Numbers						
3.1.0	4,713B 18,767	4,713D 18,819	17,519 18,824	17,570 18,945	17,571 19,075	18,222 19,212	18,611
3.2.0	17,513	17,519	18,999				
3.2.1	18,841						
3.2.2	5,269B	16,103	17,420	18,440			
3.2.3	18,608	18,609	18,619	19,101			
3.2.4	19,101						
3.3.0	4,713F	5,269A	17,519				
3.3.1	4,713C 18,823	17,427 18,844	18,542	18,543	18,544	18,545	18,822
3.3.2	5,269C 19,191	17,321	17,420	17,586	18,608	18,609	18,619
3.3.3	17,568	17,569	18,542	18,544	18,545	18,733	
3.3.4	17,568	17,705	18,733				
3.4.0	17,520	19,124					
3.4.1							
3.4.2	17,653						
3.4.3	17,653	18,466					
3.4.4	17,653	19,265					
3.5.0	17,337 19,005	17,440 19,017	18,248 19,217	18,249	18,969	18,986	18,989
3.5.1	16,145 18,975	17,296 19,007	17,488	17,890	18,248	18,249	18,252
3.5.2	18,475						
3.5.3	16,145	18,381	18,466				
3.6.0	18,503	18,563	18,620	18,750	18,853	18,903	
3.7.0	17,370 19,225	17,389	17,555	17,714	17,808	18,620	18,987
3.7.1	17,322	17,655	18,997				
3.7.2	19,012						
3.7.3	17,416	17,486	17,805	18,741	19,217	19,242	
3.8.0	17,370	17,413	18,620	18,664	18,677		
3.8.1	18,485						
3.8.2	17,441						
3.8.3	17,562	18,485					

Code Category Numbers	Accession Numbers						
3.8.4	17,441	17,489	17,562				
3.8.5	3,996	17,310					
3.8.6	17,304	17,486	17,555	18,902			
3.9.0	5,269C	17,359	17,459	18,970			
3.9.1	4,376	17,416	17,476	17,479	17,488	17,668	17,804
	18,995	19,132					
3.9.2	4,376	17,441	17,709	17,758	17,759	17,760	
3.9.3	17,668	17,804	18,749	18,896	19,303		
3.10.0	17,475	18,930					
3.10.1	17,477	17,478					
3.10.2	4,376	17,476	17,480	18,712	18,713	18,995	
3.10.3							
3.10.4	17,459	18,503	18,950				
3.10.5	17,820	17,831	17,833	18,471	18,598	18,827	18,955
	18,970	18,986	18,989	18,995	19,004	19,153	
3.11.0							
3.12.0	16,104	16,870		17,245	17,348	17,359	17,481
	17,561	17,808	18,467	18,530	18,547	18,549	18,550
	18,620	18,666	18,749	18,803	18,862	18,942	18,970
	18,986	18,987	18,999	19,004	19,008	19,075	19,132
	19,211	19,265					
3.12.1	16,103	16,104	17,296	17,402	17,416	17,479	17,734
	17,803	17,808	18,351	18,467	18,712	18,713	18,731
	18,749	18,841	18,862	18,987	19,105	19,190	
3.12.2	4,391	17,310	17,321	17,420	17,555	17,586	17,803
	18,589	18,861	18,862	18,895			
3.13.0	17,816	17,829	18,254				
3.13.1	17,322	17,469	17,740	17,821	18,955		
3.13.2	5,269D	15,043	18,651	18,821	18,956	19,058	19,228
	19,252	19,253					
3.14.0	4,713C	16,104	17,199	17,296	17,557	17,559	17,678
	17,709	17,822	17,890	18,479	18,586	18,749	18,896
	19,219	19,220	19,288	19,302	19,303		
3.15.0	4,713D	4,713E	17,734	17,735	17,743	17,822	17,836
	17,837	17,842	18,540	18,544	18,773		
3.15.1	4,713H	17,456	17,696	17,741	17,745	17,755	17,818
	17,830	17,839	17,840	17,842	17,844	17,845	18,483
	18,546	18,841					
3.15.2	17,352	17,353	17,481	17,659	17,739	17,818	17,823
	17,835	17,836	17,842	18,541	18,547	18,548	18,549
	18,550	18,555	18,597	18,860	19,257		

Code Category Numbers	Accession Numbers						
3.15.3	13,304	17,295	17,695	17,743	17,824	17,835	17,841
	17,842	18,591	18,823	18,956	19,257		
3.15.4	13,304	17,253	17,679	17,690	17,709	17,751	17,752
	17,827	17,830	17,832	17,839	17,840	17,841	17,843
	17,853	17,868	18,471	18,483	18,551	18,635	18,731
	18,841	18,853	19,130	19,138	19,223	19,252	19,253
3.15.5	4,713F	17,346	17,349	17,352	17,353	17,360	17,679
	17,743	17,825	17,834	17,835	17,837	17,844	17,868
	17,872	18,541	18,542	18,545	18,547	18,548	18,549
	18,550	18,613	18,681	18,935	19,228	19,302	
3.15.6	4,713C	4,713F	5,269B	5,269D	17,414	17,481	17,727
	17,819	17,828	18,457	18,466	18,542	18,556	18,594
	18,613	18,655	18,676	18,701	19,022	19,023	19,024
	19,101	19,228					
3.15.7	17,346	17,457	17,559	17,659	17,660	17,666	17,671
	17,674	17,679	17,690	17,693	17,700	17,728	17,743
	17,746	17,751	17,754	17,817	17,818	17,824	17,825
	17,838	17,847	17,848	17,867	18,700	18,705	18,925
	18,979	19,130	19,279	19,280	19,281	19,282	19,283
	19,304						
3.15.8	16,104	17,440	17,660	17,728	17,737	17,828	18,353
	18,398	18,404	18,594	18,597	18,621	18,704	18,705
	18,718	19,023	19,025	19,110	19,298	19,301	
3.15.9	4,713G	5,269A	17,349	17,363	17,546	17,670	17,673
	17,675	17,678	17,686	17,687	17,702	17,704	17,715
	17,722	17,726	17,727	17,733	17,735	17,738	17,744
	17,752	17,755	17,757	17,764	17,766	17,772	17,773
	17,819	17,854	18,381	18,382	18,400	18,401	18,404
	18,535	18,589	18,676	18,691	18,692	18,712	18,713
	18,929	18,934	19,130	19,262			
3.15.10	16,103	17,247	17,296	17,322	17,324	17,351	17,359
	17,363	17,671	17,693	17,704	17,708	17,709	17,733
	17,735	17,757	17,771	17,773	17,783	17,803	17,890
	18,534	18,621	18,681	18,713	18,822	18,845	18,929
	18,934	19,190					
3.15.11	16,103	17,348	17,355	17,359	17,676	17,691	17,702
	17,704	17,715	17,733	17,757	17,771	17,773	17,803
	17,852	17,857	18,479	18,592	18,730	19,021	19,065
	19,300						
3.15.12	5,269A	17,414	17,418	17,481	17,664	17,676	17,704
	17,715	17,721	17,735	17,736	17,803	18,501	18,556
	19,024	19,300					
3.16.0	4,713I	18,203	18,474	19,211	19,294		
3.16.1	17,255	17,696	17,827	17,846	19,223		
3.16.2	4,713E	5,269B	17,559	17,739	17,844	18,440	18,773
	18,844	19,038					
3.16.3	17,346	17,352	17,733	17,734	17,815	17,820	17,821
	17,824	17,839	17,840	17,844	18,350	18,351	18,462
	18,488	18,535	18,591	18,597	18,619	18,635	18,672
	18,718	18,925	18,930	18,945	19,075	19,110	19,190
	19,223	19,298	19,301				

Code Category Numbers	Accession Numbers						
3.16.4	17,668 19,301	17,731	18,563	18,589	18,677	18,708	18,930
4.1.0	17,287	18,564	18,767	18,834			
4.2.0	17,302						
4.2.1	17,495 19,137	17,501	17,593	17,807	18,725	18,753	18,795
4.2.2	17,487 18,874	17,495 19,137	17,609	17,807	18,536	18,697	18,698
4.2.3	17,807						
4.2.4	17,593 19,031	18,697 19,247	18,745 19,263	18,753	18,885	18,886	18,918
4.2.5	18,536						
4.2.6	17,302 18,838	17,556 18,885	17,611 18,886	17,705 19,288	17,807	18,528	18,782
4.2.7	17,798 19,137	17,807	18,744	18,745	18,752	18,753	18,854
4.3.0							
4.3.1							
4.3.2							
4.3.3	18,752						
4.4.0							
4.4.1	17,304						
4.4.2	19,131						
4.5.0							
4.5.1	17,199	17,310	18,481	18,695			
4.5.2							
4.5.3	17,596						
4.5.4	18,277						
4.6.0	17,491	17,797	18,447	18,585	18,660	18,875	19,132
4.7.0	17,245 17,604 18,941	17,491 17,669 18,977	17,500 17,801 18,978	17,587 18,737 18,996	17,588 18,825 19,287	17,592 18,875 19,288	17,597 18,919
4.8.0	17,463	17,598	17,801	17,811	17,812	18,568	18,569
4.8.1	17,507 18,657	17,508 18,683	17,594 18,900	17,811 19,235	17,870 19,296	18,630 19,298	18,633
4.8.2	18,540	18,900	19,032	19,096	19,131		

Code Category Numbers	Accession Numbers						
4.8.3	4,382	17,487	17,508	17,589	18,514	18,717	18,840
	19,031	19,096	19,235	19,236	19,238		
4.8.4	4,382	17,503	17,759	18,900	19,096	19,131	
4.8.5	17,463	18,632	18,922	19,235	19,236	19,238	
4.8.6	17,607	17,811	18,514	18,631	18,633	18,634	18,923
	19,236	19,237					
4.8.7	17,525	17,602	18,683	19,103	19,123	19,154	
4.9.0	17,496	17,598	17,797				
4.9.1	17,499	17,504	17,505	17,512	17,590	17,599	
4.9.2	17,501	17,509	17,513	17,590	17,591	17,599	17,761
	17,810	18,431	18,729	18,794	19,041	19,047	19,128
4.9.3	17,505	17,506					
4.9.4	17,286	17,492	17,497	17,498	17,499	17,511	17,597
	17,600	17,601	17,761	17,797	17,799	17,810	17,849
	18,540	18,697	18,781	18,782	18,794	18,795	19,031
	19,047						
4.9.5	17,199	17,286	17,494	17,497	17,502	17,510	17,538
	17,591	17,599	17,610	18,405	18,409	18,697	18,698
	18,753	18,918	18,964	19,047	19,049	19,050	
4.9.6	18,729						
4.9.7	17,506	17,512	17,548	17,603	17,612	17,800	18,585
	19,057						
4.9.8	17,505	17,506	17,771				
4.9.9	17,288	17,509	17,513	17,761	17,851	18,729	
4.9.10	17,369	18,744	18,785	19,035	19,040	19,042	19,050
4.9.11	17,369	17,510	17,512	17,590	17,612	18,409	18,622
	18,697	18,698	18,829	18,854	18,980	18,981	18,982
	19,041						
4.9.12	17,286	17,490	17,501	17,505	17,605	17,669	17,797
	17,810	17,811	17,812	18,458	18,536	18,618	18,725
	18,729	18,737	18,743	18,744	18,745	18,753	18,785
	18,795	18,874	19,137	19,235	19,247		
5.1.0	17,871	18,767					
5.1.1	17,354	17,364	17,465	17,504	17,526	17,606	17,677
	17,681	17,682	17,688	17,724	17,725	17,732	17,750
	18,701	18,746	19,285	19,288			
5.1.2	17,661	17,732	18,701	18,746	18,875		
5.1.3	17,465	17,606	17,681	17,682	17,742	17,750	18,575
	18,660	18,746	18,996	19,285			
5.1.4	17,354	17,669	17,677	17,681	17,682	17,724	17,732
	17,742	18,701					

Code Category Numbers	Accession Numbers						
5.2.0	18,767	19,177					
5.2.1	17,791	17,792	17,891	18,774	19,149		
5.2.2	17,791	17,792	18,774				
5.3.0							
5.3.1	17,742						
5.3.2	17,742						
5.4.0							
5.4.1	17,401 18,579	17,515 18,932	17,550	17,711	17,723	17,794	17,889
5.4.2	18,736						
5.4.3	17,620	17,711	18,579	18,932			
5.5.0	18,767	19,021					
5.5.1	17,361 17,775	17,526 18,570	17,662 18,571	17,698 18,778	17,729 19,025	17,768 19,304	17,770
5.5.2	17,702	18,738					
5.5.3	17,768	17,770	18,778				
5.6.0	17,745	18,588	18,645	18,916	19,021	19,076	
5.6.1	17,374 18,398 18,705	17,379 18,403 18,814	17,383 18,592 18,870	17,544 18,604 18,872	17,545 18,614 18,873	17,624 18,645 18,957	17,692 18,704 19,051
5.6.2	17,342	18,403	18,604	19,051			
5.7.0	17,440 18,747	17,667 18,944	17,672 19,130	17,748	18,581	18,659	18,711
6.1.0	18,469	18,610	18,803	18,820	18,851	18,925	
6.2.0	17,349	18,811					
6.2.1	6,513 18,562	15,374 18,895	17,310	17,747	17,771	17,777	18,529
6.2.2	17,364	17,504	17,777	18,660	18,996	19,304	
6.3.0	17,747	17,852	18,856				
6.3.1	17,364 18,519 19,286	17,723 18,528 19,305	17,751 18,529	18,398 18,746	18,516 18,811	18,517 18,859	18,518 19,285
6.3.2	17,379 18,516 18,649 18,938	17,383 18,517 18,654 19,021	17,389 18,518 18,704 19,198	17,544 18,519 18,705 19,221	17,545 18,585 18,736 19,241	17,692 18,586 18,873 19,254	17,852 18,592 18,916
7.1.0	17,884	18,736					
7.2.0	17,551	17,553	18,642				

Code Category Numbers	Accession Numbers						
7.2.1	4,369	17,308	17,373	17,438	17,784	17,785	17,786
	17,882	17,883	17,885	17,887	17,898	18,593	18,818
7.2.2	17,300	17,301	17,470	18,439	18,566	18,593	
7.3.0	17,300	17,521	17,523	17,552	17,632	17,635	17,636
	18,640	18,642	18,779	18,965	19,044	19,113	19,122
	19,146	19,147	19,195				
7.3.1	17,252	17,300	17,524	18,566	18,818	19,113	19,122
	19,195						
7.3.2	17,524	19,113	19,122	19,195			
7.3.3	17,300	17,309	17,323	17,380	17,384	17,398	17,408
	17,522	17,613	17,615	17,626	17,631	17,637	17,638
	17,639	17,640	17,641	17,782	17,789	17,790	18,402
	18,567	18,667	18,947	18,998	19,054	19,113	19,122
	19,185	19,221					
7.4.0	17,252	17,373	17,470	17,524	17,553	17,642	18,402
	18,640	18,947	18,965	19,016	19,122	19,134	19,195
7.5.0		17,358	17,364	17,366	17,376	17,380	17,384
	17,390	17,391	17,398	17,408	17,409	17,542	17,615
	17,616	17,617	17,618	17,630	17,631	17,632	17,635
	17,636	17,637	17,638	17,774	17,787	17,788	18,446
	18,451	18,468	18,476	18,577	18,600	18,607	18,649
	18,650	18,667	18,694	18,695	18,830	18,920	19,018
	19,037	19,044	19,076	19,111	19,206	19,266	
7.5.1	17,329	17,404	17,437	17,448	17,530	17,595	17,619
	17,630	17,645	17,646	17,730	17,787	17,788	17,860
	18,203	18,629	18,813	18,866	18,914	19,038	19,077
	19,134	19,173	19,174	19,266	19,278	19,292	
7.6.0	16,485	17,242	17,467	17,521	17,523	18,649	18,769
	19,113	19,130	19,195				
7.6.1	17,323	17,407	18,465	18,586	18,779	18,786	
7.6.2	19,287	19,288					
7.6.3	17,421	17,422	17,456	17,702	18,444	18,445	
7.6.4	17,346	17,362	17,703	17,858	18,562	18,656	18,660
	18,667	18,773	18,779	18,787	18,841	18,869	19,176
7.6.5	17,886	19,284					
7.6.6	17,737	17,864	18,353	18,446	18,690	19,146	19,147
7.6.7	17,456	17,522	18,835	18,958			
7.7.0	16,485	17,384	17,408	17,467	17,647	18,578	18,649
	18,769	18,804	18,876	19,033	19,076	19,130	
7.7.1	3,996	17,311	17,372	17,557	17,561	17,714	17,856
	18,248	18,252	18,470	18,527	18,528	18,529	18,530
	18,660	18,666	18,714	18,787	18,815	18,825	18,875
	18,877	18,902	18,930	18,944	18,996	19,219	19,220
	19,265						

Code Category Numbers	Accession Numbers						
7.7.2	937	9,347	16,166	16,749	16,865	17,245	17,267
	17,302	17,312	17,324	17,347	17,451	17,474	17,555
	17,604	17,716	17,749	17,769	17,779	17,782	17,805
	17,859	18,247	18,381	18,410	18,412	18,417	18,418
	18,423	18,431	18,442	18,482	18,556	18,667	18,674
	18,680	18,686	18,690	18,707	18,714	18,763	18,783
	18,806	18,838	18,892	19,005	19,012	19,196	19,226
	19,233						
7.7.3	17,298	17,304	17,368	17,428	17,715	17,858	18,419
	18,574	18,628	18,644	18,688	18,707	18,726	18,748
	18,816	18,858	18,952	19,002	19,204	19,219	19,220
	19,243						
7.7.4	937	17,298	17,311	17,372	17,421	17,560	17,769
	18,587	18,707	18,815	18,930	19,045	19,101	19,214
	19,243						
8.1.0	16,248	16,749	17,309	18,772	18,819	18,857	
8.2.0	18,418	18,661	19,088	19,089			
8.3.0							
8.3.1	17,562	17,715					
8.3.2	17,603	18,410	18,567	18,748	18,875	18,944	19,243
8.3.3	18,570	18,571	18,903				
8.3.4	17,267						
8.3.5	17,312	18,410	18,428				
8.4.0	16,870	19,105					
8.4.1	17,599						
8.4.2	19,105						
8.5.0	18,783						
8.6.0							
8.7.0	16,166	17,647	17,859	18,381	18,410	18,417	18,419
	18,482	18,644	18,846	18,847	18,858		
8.7.1	16,166	16,749	17,859	18,751	18,806	19,196	
8.7.2	16,749	17,267	17,562	17,859	18,381	18,412	18,423
	18,431	18,567	18,748	18,751			
8.7.3	16,749	17,337	17,424	17,489	18,442	19,196	19,201
8.7.4	16,166	17,267	18,381	19,145	19,226		
8.7.5	17,474	18,412	18,532	18,902	19,012	19,145	19,196
	19,226						
9.1.0	17,370	18,522	18,819				
9.2.0	18,487	18,489	18,661	18,664	19,124	19,145	
9.3.0	19,124						

Code Category Numbers	Accession Numbers						
9.4.0	3,996	19,124					
9.4.1	17,806	18,896					
9.4.2	19,102						
9.5.0							
10.1.0	17,263	18,642	18,740	18,776	18,793	18,928	19,117
10.2.0	17,300	18,566	18,642	18,915	18,994		
10.2.1	18,593						
10.2.2	18,593						
10.2.3	18,654	19,131					
10.3.0	17,300	18,642	18,994	19,029			
10.3.1	16,604 18,593	17,307 19,055	17,376 19,085	17,393 19,249	17,438	17,470	18,439
10.3.2							
10.3.3							
10.4.0	17,483	18,480	18,994	19,255			
10.5.0	17,301	17,309	17,656	18,567	18,636	18,883	
10.6.0	17,470	17,715	18,748	18,994	19,095		
10.7.0	17,301 18,994 19,168	17,656 19,162 19,169	18,260 19,163 19,171	18,596 19,164 19,172	18,626 19,165 19,213	18,627 19,166 19,234	18,883 19,167
10.8.0	18,723	19,131					
10.9.0	17,284	18,801	19,058				
10.9.1	17,320 18,580	17,418 18,609	17,420 18,637	17,484 18,639	17,586 18,646	17,710 18,678	17,866
10.9.2	17,284 17,717 18,916	17,321 18,451 18,917	17,366 18,454 19,003	17,393 18,480 19,046	17,402 18,608 19,055	17,517 18,831	17,540 18,833
10.10.0	18,903						
10.10.1	17,395 18,566 19,150	17,397 18,654	17,470 18,726	17,648 18,912	17,874 19,055	17,875 19,076	17,876 19,077
10.10.2	17,284 18,424 19,029	17,337 18,428 19,088	18,410 18,615 19,151	18,415 18,665 19,185	18,417 18,846	18,420 18,847	18,423 18,858
10.10.3	17,715	18,459	18,580	18,639	18,642	18,994	
10.10.4	18,573						
10.10.5	17,796						

Code Category Numbers	Accession Numbers						
11.1.0	17,509	17,564	18,985				
11.2.0	18,867	19,271					
11.2.1	17,563	18,443	18,446	19,062	19,270	19,271	
11.2.2	17,539	17,618	17,649	18,904	18,972	19,019	19,240
11.2.3	18,888						
11.2.4	18,670	18,716	18,915	18,973			
11.3.0							
11.3.1	17,647	18,884					
11.3.2	18,669	18,841	18,973				
11.3.3	17,378 18,792	17,543 18,841	17,600 18,913	18,694 18,966	18,695 18,967	18,708 19,019	18,752 19,066
11.3.4	18,444	18,445	18,724	19,271			
11.3.5	19,271						
11.4.0	17,661						
11.5.0							
11.5.1	17,611	18,458	18,963	19,263			
11.5.2	19,270	19,271					
11.5.3	17,554	18,636	18,648				
11.5.4	19,055	19,150					
11.5.5	17,523	17,524	18,836				
11.6.0	17,300	17,438	18,566	18,593	18,752	19,249	
11.7.0	18,513	18,915	19,271				
11.8.0	17,525	18,670	18,973	19,066			
12.1.0	17,396 18,736 19,248	17,644 18,790 19,261	17,855 18,890	17,884 18,920	18,415 18,936	18,520 18,940	18,666 18,985
12.2.0	18,915	19,150	19,260	19,267			
12.2.1	17,305 17,616 17,628 18,406 18,539 18,742 18,976 19,229 19,271	17,306 17,617 17,629 18,443 18,590 18,774 18,985 19,260 19,272	17,377 17,619 17,638 18,444 18,624 18,775 19,002 19,264 19,273	17,422 17,621 17,640 18,445 18,669 18,796 19,037 19,267 19,274	17,427 17,622 17,792 18,446 18,670 18,866 19,054 19,268 19,275	17,528 17,626 17,855 18,468 18,693 18,887 19,177 19,269 19,276	17,563 17,627 17,864 18,476 18,716 18,888 19,207 19,270
12.2.2	16,460	17,305	17,855	18,867	18,888	18,927	19,149

Code Category Numbers	Accession Numbers						
12.3.0	17,794	17,795	17,796	18,797	18,878	18,905	18,908
	18,927	18,954	18,962	19,104	19,175	19,176	19,208
	19,209	19,210	19,232	19,254			
12.4.0	18,410	18,879	19,198				
12.4.1		17,320	17,374	17,376	17,390	17,406	17,407
	17,409	17,460	17,543	17,544	17,625	17,647	17,793
	17,861	17,863	18,398	18,403	18,424	18,441	18,465
	18,478	18,482	18,581	18,588	18,592	18,604	18,645
	18,655	18,671	18,704	18,814	18,870	18,872	18,873
	18,892	18,909	18,911	18,927	18,935	18,938	18,957
	19,003	19,018	19,127	19,266			
12.4.2	16,143	17,528	17,636	18,482	18,600	18,601	18,624
	18,638	18,667	18,884	19,032			
12.4.3	17,526	18,588	18,780	18,814	18,870	19,241	
12.5.0	17,386	18,831	18,910	19,028	19,139	19,150	19,240
	19,254						
12.5.1	17,368	17,375	17,378	17,385	17,392	17,528	17,532
	17,541	17,623	18,582	18,791	18,911	18,935	18,954
	18,961	18,962	19,019	19,020	19,030	19,053	19,064
	19,092	19,232	19,240	19,250	19,254	19,255	19,256
12.5.2	16,767	17,368	17,381	17,392	17,397	17,398	17,405
	17,406	17,529	17,538	17,614	17,616	17,617	17,623
	17,633	17,634	17,637	17,847	17,864	18,537	18,781
	18,782	18,792	18,856	18,881	18,907	18,909	18,912
	18,935	18,962	19,019	19,052	19,059	19,092	19,104
	19,208	19,232	19,240	19,254	19,255		
12.6.0	16,460	17,388	17,528	17,535	17,536	17,537	17,763
	18,386	18,415	18,464	18,561	18,595	18,663	18,784
	18,799	18,800	18,801	18,830	18,891	18,899	18,927
	19,034	19,036	19,043	19,175	19,176		
12.7.0	13,202	16,767	16,768	16,771	16,773	17,322	17,323
	17,330	17,374	17,377	17,379	17,380	17,383	17,384
	17,390	17,395	17,397	17,398	17,399	17,400	17,403
	17,404	17,405	17,407	17,408	17,411	17,482	17,531
	17,533	17,542	17,545	17,566	17,567	17,643	17,644
	17,647	17,648	17,652	17,656	17,713	18,415	18,419
	18,420	18,421	18,441	18,496	18,537	18,563	18,566
	18,567	18,588	18,603	18,620	18,623	18,626	18,627
	18,644	18,648	18,649	18,650	18,655	18,663	18,664
	18,735	18,766	18,772	18,780	18,786	18,790	18,858
	18,881	18,892	18,899	18,903	18,907	18,912	18,927
	18,936	18,937	18,938	18,939	18,965	19,029	19,039
	19,044	19,056	19,076	19,077	19,089	19,198	19,206
	19,221	19,227	19,232	19,240	19,248	19,250	19,254
	19,261						
12.8.0	13,202	17,380	17,384	17,387	17,395	17,403	17,408
	17,533	18,459	18,461	18,496	18,516	18,517	18,518
	18,519	18,585	18,586	18,641	18,650	18,653	18,663
	18,706	18,709	18,820	18,876	18,890	18,893	18,894
	18,965	18,998	19,033	19,044	19,130	19,259	19,261
12.9.0	15,394	16,768	16,769	16,773	17,330	17,371	17,383
	17,386	17,411	17,529	17,619	17,645	17,652	17,655

Code Category Numbers	Accession Numbers						
12.9.0 (cont'd.)	18,464	18,476	18,626	18,638	18,649	18,653	18,682
	18,693	18,799	18,866	18,879	18,881	18,927	18,939
	19,003	19,043	19,052	19,056	19,059	19,060	19,064
	19,157	19,173	19,198	19,221	19,255	19,274	
13.1.0	17,644	18,611					
13.2.0	17,464	17,549	17,647	18,553	18,826	18,843	18,894
	19,099	19,130					
13.2.1	17,345	17,358	17,400	17,403	17,412	17,527	17,534
	17,539	17,672	17,703	17,736	17,780	17,856	17,865
	18,461	18,496	18,577	18,721	18,809	18,859	18,877
	18,996	19,010	19,100	19,126	19,159		
13.2.2	17,456	17,551	17,726	17,767	17,779	18,499	18,565
	18,703	19,010	19,109	19,126	19,135		
13.2.3	15,052	15,412	16,481	16,487	16,488	17,345	17,349
	17,355	17,357	17,415	17,429	17,467	17,500	17,527
	17,592	17,658	17,700	17,705	17,765	17,767	17,802
	17,850	17,853	17,857	17,888	18,096	18,479	18,534
	18,538	18,541	18,628	18,703	18,809	18,871	18,919
	18,951	18,957	19,010	19,125	19,126	19,140	19,141
	19,143	19,162	19,165				
13.2.4	17,364	17,372	17,467	17,561	17,856	18,470	18,527
	18,529	18,530	18,541	18,660	18,666	18,704	18,705
	18,825						
13.3.0	19,114	19,115	19,116				
13.3.1	16,103	16,104	17,343	17,362	17,542	17,658	17,700
	17,722	17,758	17,759	17,760	17,764	17,783	18,461
	18,477	18,530	18,534	18,620	18,704	18,705	19,153
13.3.2	16,604	17,307	17,320	17,415	17,420	17,425	18,600
	19,151						
13.3.3	17,439	17,625	17,637	18,461	18,511	18,666	18,947
13.3.4	17,358	17,364	17,380	17,387	17,400	17,401	17,403
	17,439	17,534	17,560	17,685	17,703	17,707	18,511
	18,577	18,583	18,659	18,666	18,931		
13.4.0	17,305	17,552	17,647	18,808	19,116	19,129	
13.4.1	17,304	17,399	17,412	17,439	17,440	17,614	17,622
	17,672	17,779	18,461	18,477	18,511	18,528	18,574
	18,721	19,090	19,091	19,227			
13.4.2	17,304	17,312	17,557	19,091			
13.4.3	16,870	17,304	17,399	17,439	17,440	17,558	17,560
	17,705	17,708	17,758	17,760	17,806	18,461	18,477
	18,531	18,838					
13.4.4	17,387	17,439	17,707	18,459	18,570	18,571	18,574
13.5.0	18,669						
13.5.1	17,384	17,467	17,703	18,721	19,039		
13.5.2	17,373	17,397	17,629	17,648	18,539	18,775	18,910

Code Category Numbers	Accession Numbers						
13.5.2 (cont'd.)	19,029	19,033					
13.5.3	17,396	17,464	17,542	17,640	17,663	17,685	17,697
	17,699	17,870	18,407	18,499	18,578	18,583	18,584
	18,658	18,696	18,702	18,747	18,800	18,801	18,869
	18,931	18,957	18,961	18,980	18,981	18,982	19,027
	19,035	19,049	19,053	19,127			
13.5.4	17,295	17,308	17,456	17,661	17,726	17,736	17,798
	18,591	18,684	18,822	19,036	19,107	19,114	19,115
	19,116	19,129					
14.1.0	4,713H	5,299	9,347	14,184	16,106	16,425	16,854
	17,344	17,351	17,356	17,357	17,365	17,378	17,389
	17,419	17,426	17,442	17,443	17,445	17,463	17,471
	17,514	17,539	17,547	17,585	17,588	17,608	17,701
	17,703	17,706	17,707	17,708	17,720	17,741	17,762
	17,765	17,767	17,778	17,779	17,781	17,783	17,799
	17,850	17,854	17,873	17,877	17,878	17,879	17,881
	17,888	18,277	18,441	18,470	18,480	18,503	18,517
	18,526	18,531	18,532	18,533	18,534	18,538	18,559
	18,560	18,563	18,569	18,572	18,595	18,596	18,616
	18,623	18,628	18,673	18,680	18,686	18,710	18,732
	18,735	18,737	18,827	18,828	18,852	18,855	18,880
	18,882	18,892	18,896	18,898	18,903	18,952	18,958
	18,971	18,975	18,978	18,991	18,993	18,996	19,004
	19,006	19,007	19,008	19,009	19,013	19,048	19,061
	19,065	19,086	19,087	19,119	19,130	19,135	19,141
	19,142	19,152	19,153	19,155	19,162	19,163	19,164
	19,165	19,169	19,172	19,178	19,179	19,180	19,181
	19,182	19,183	19,186	19,187	19,197	19,216	19,218
	19,222	19,226	19,234	19,245	19,255	19,295	19,302
	19,303						
15.1.0	17,539	17,664	17,669	17,710	17,862	17,869	17,877
	17,878	18,527	18,565	18,641	18,689	18,735	18,817
	18,826	18,827	18,828	18,843	18,974	19,009	19,098
	19,099	19,109	19,118	19,120	19,135	19,200	19,207
	19,251	19,259	19,273	19,275			
15.2.0	14,325	16,168	17,387	17,400	17,403	17,644	18,096
	18,552	18,553	18,554	18,576	18,641	18,699	18,851
	18,885	18,886	19,056	19,063	19,093	19,108	19,275
	19,291						

PART III
ALPHABETICAL INDEX TO
THE HUMAN ENGINEERING LITERATURE

The Alphabetical Index to the Human Engineering Literature (A.I.) that follows on the immediately succeeding pages is a device intended to facilitate the user's search for materials in the present bibliography. In essence, it is a list of terms and phrases, synonymous with the categories in the preceding Topical Outline. Use of the A.I. should compensate for variation in the user's vocabulary and/or the project staff's possible capriciousness in establishing the titles of the subject matter categories in the Topical Outline. It is recognized that user reaction and additional staff experience should lead to expansion and revision of the A.I. in subsequent editions.

ALPHABETICAL INDEX TO THE HUMAN ENGINEERING LITERATURE

Search Term	Code Category	Page
Aberration		
anomalies	3.15.1	7
equipment	3.16.3	8
Abridged color systems (see Color)		
Absolute thresholds (see Thresholds)		
Acceleration		
as coding stimulus	5.5.2	12
	5.6.1	12
effects on performance	12.4.0	19
	12.4.1	20
measurement of	12.9.0	20
Acceptibility		
of clothing	13.3.2	21
of equipment	13.3.2	21
of food	13.5.2	22
of task	13.3.2	21
Accessibility		
dimension	10.2.0	17
	10.2.3	17
general workplace	10.2.0	17
maintenance	10.7.0	17
stored items	10.2.3	17
Accidents and accident rates		
adjustment errors in aircraft accidents	10.9.2	18
aging	13.5.4	22
aircraft	10.9.2	18
industrial	10.9.0	17
motor vehicles	10.9.1	17
noise and blast	4.2.6	9
prevention	10.9.0	17
	10.9.1	17
	10.9.2	18
probability vs. rate	10.9.0	17
proneness	10.9.0	17
	10.9.1	17
	10.9.2	18
records and report forms	10.9.0	17
safety aids	10.9.0	17
sea	10.9.2	18
survival	10.9.1	17
	10.9.2	18
types and causes	10.9.0	17
	10.9.1	17
	10.9.2	18
Acclimatization	12.1.0	19
extreme temperature	12.2.1	19
high altitudes	12.5.1	20
	12.5.2	20
physiological	12.2.0	19
physiological, cont.	12.2.1	19
	12.5.0	20
Accommodation		
visual	3.15.9	8
Achromatic color	3.15.4	7
Achromatopia	3.15.1	7
Acoustic		
environment	4.2.0	8
noise	4.2.0	8
noise, control handbook	4.2.2	8
power level measurement	4.2.1	8
reflex	4.9.5	11
	4.9.11	11
shielding	4.2.2	8
trauma	4.2.7	9
workplace design	10.2.0	17
Action potentials, muscle	7.3.3	14
Activity analysis	1.2.2	1
Acuity		
auditory	4.9.4	11
kinesthetic	5.5.1	12
olfactory	5.4.1	12
pain	5.3.1	12
stereoscopic	3.15.6	7
	3.15.9	8
taste	5.4.1	12
temperature	5.2.1	12
visual	3.15.6	7
visual, tests of	3.16.2	8
Adaptation		
auditory	4.9.5	11
cutaneous	5.1.1	11
dark, light, and chromatic	3.15.3	7
effects of aging (see Aging)		
gustatory	5.4.1	12
olfactory	5.4.1	12
pain	5.3.1	12
tactile	5.1.1	11
theory	1.2.1	1
to high-altitude effects	12.5.0	20
to tilt	5.5.1	12
	5.6.1	12
	6.3.2	13
Adjustment		
personality	13.2.0	21
	13.2.1	21
psychophysical method of	1.2.3	1
Advanced Visual Information Display (AVID)	3.7.1	5
Aerial		
aids for observation	14.1.0	22
maps	3.10.2	6

Search Term	Code Category	Page
Aerial, cont.		
observation	3.12.0	6
observation training	14.1.0	22
photography	3.10.5	6
Aerodynamic		
aircraft	8.7.0	15
	10.10.2	18
simulators	1.3.0	2
space vehicles	10.10.2	18
Aeroembolism	12.5.1	20
Aerometeorism	10.9.2	18
Aerotitis media	12.5.1	20
Aesthetic preference	13.2.3	21
Afterimage	3.15.7	7
Aftersensation, warmth	5.2.1	12
Aging, general and related effects of	13.5.4	22
Aided controls	8.7.4	16
Aided tracking	7.7.2	14
	8.7.4	16
Aids		
bearing information	3.5.2	4
graphic	3.10.0	6
hearing	11.5.1	19
optical	3.13.0	6
	3.13.1	7
	3.13.2	7
training	14.1.0	22
Aiming movements (see also Marksmanship)	7.6.1	14
Air		
blast	12.2.1	19
	13.4.4	22
conditioning	12.2.0	19
	12.2.1	19
ionization (see Atmosphere)		
movement	12.2.1	19
pollution	12.3.0	19
purification	12.5.2	20
reconnaissance	2.3.3	3
	3.12.0	6
safety (see Aircraft accidents)		
sea rescue gear	3.12.0	6
	11.5.4	19
sickness (see Motion sickness)		
-to-air search	2.3.3	3
	3.12.0	6
	3.15.9	8
traffic (see Air traffic control)		
velocity	12.2.1	19
Air Defense System	2.3.4	3
Air traffic control		
airport towers	10.10.2	18
communications	2.3.3	3
	2.3.6	3
displays	3.5.0	4
	3.6.0	5
	3.7.2	5
systems	2.3.6	3
Air traffic control, cont.		
training	14.1.0	22
Airborne		
equipment	10.10.2	18
particles and organisms	12.3.0	19
vibration, effects of	12.4.2	20
Aircraft		
accidents	10.9.2	18
camouflage	3.11.0	6
carrier approach light system	3.3.2	4
Combat Control Center	2.3.3	3
	2.3.6	3
communication systems	4.4.0	9
	10.10.5	18
communication systems, radio	2.3.3	3
	4.4.2	9
communication sytems, telephone and intercom	4.4.1	9
controls	8.2.0	15
design, human engineering evaluation	10.10.2	18
design, in accidents	10.9.2	18
emergency evacuation	10.4.0	17
	10.9.2	18
health hazards, fuel	12.3.0	19
instrument arrangements	9.2.0	16
interception	2.2.4	2
	2.3.3	3
lighting systems	3.3.2	4
noise	4.2.4	9
recognition, coding cues	3.12.0	6
	3.15.10	8
seats	10.3.1	17
Airplane (see Aircraft)		
Airport		
lighting systems	3.3.2	4
maintenance systems	2.3.5	3
Alcohol		
general effects of	13.5.3	22
in driving accidents	10.9.1	17
industrial accident causation	10.9.0	17
Alertness (see also Vigilance)	13.2.4	21
Alertness indicator	13.2.4	21
	13.5.1	22
Allocation of functions, man-machine	2.3.1	2
Alphabet		
ICAO	4.8.6	10
letter design	3.9.1	6
Alpha-numeric symbols	3.9.1	6
Altimeters	3.8.0	5
in aircraft accidents	3.8.0	5
	10.9.2	18
Altitude (see also High altitude)		
effects of high	12.5.0	20
	12.5.1	20
	12.5.2	20
research, equipment and tests	12.9.0	20

Search Term	Code Category	Page
Altitude, cont.		
suits	11.2.2.	18
tolerance	12.5.0	20
Ambient		
humidity	12.2.1	19
lighting, artificial	3.3.0	3
lighting, natural	3.2.0	3
noise and blast	4.2.6	9
temperature	12.2.1	19
Amblyopia	3.15.1	7
Ambulances	10.10.3	18
Ammunition		
container design	10.10.0	18
	11.5.3	19
pyrotechnics	3.3.2	4
Amplifiers and attenuators	4.3.2	9
Analgesics	5.3.0	12
	13.5.3	22
Analog		
computers	2.2.3	2
electronic correlator, multichannel	2.2.3	2
pilot simulator	2.2.3	2
	7.7.4	15
simulator, communication systems	2.2.3	2
speech synthesizer	4.9.12	11
Anchoring effects		
thought processes	13.2.3	21
visual	3.15.11	8
Anechoic chamber, design and use of	4.9.12	11
Anesthesia	5.1.1	11
	5.3.1	12
	13.5.3	22
Angiosiotoma	13.5.1	7
Angular bearing, estimation of	3.15.11	8
Aniseikonia	3.15.1	7
Annoyance level, body vibration	12.4.2	20
Annoyance threshold, noise	4.2.2	8
Annunciator, automatic	4.9.12	11
Anomalies		
auditory	4.9.10	11
listening and speaking	4.8.5	10
visual	3.15.1	7
Anomaloscopes	3.16.3	8
Anoxia	12.5.2	20
Anthropometry		
components of variance	7.4.0	14
methods and equipment	7.4.0	14
military aviation	7.1.0	13
nomographs	7.4.0	14
working positions	7.2.2	14
	7.4.0	14
Anti-"g" suits	11.2.2	18
Antiradiation clothing	11.2.3	18
Anxiety	13.2.1	21
Apparent		
movement	3.15.12	8
shape	3.15.10	8
size	3.15.9	8
Apparent, cont.		
slant	3.15.11	8
Appetite	13.5.2	22
Apprehension, span of visual	3.15.11	8
Approach landing indicators	3.8.0	5
	10.10.2	18
Aptitudes, individual	13.2.2	21
Aqua lung	11.5.0	19
Arctic climate		
and exercise	12.2.1	19
clothing	11.2.1	18
ensembles	11.2.1	18
studies of	12.2.0	19
	12.2.1	19
survival rations	13.5.2	22
Area, discrimination of object	3.12.1	6
Arm		
force positions	7.3.3	14
-hand movement precision	7.6.1	14
length	7.2.1	13
prosthetics	11.5.5	19
reach	7.3.1	13
rests	10.3.1	17
strength tests	7.3.3	14
Armored		
suits	11.2.3	18
	11.3.2	18
vehicle communication systems	4.4.1	9
	4.4.2	9
	10.10.3	18
vests	11.3.2	18
Army personnel, body measurements	7.2.1	13
Army research and development facilities	1.4.0	2
Articulation, techniques of testing	4.8.2	10
	4.8.6	10
Artificial		
atmospheres	12.9.0	20
limbs	11.5.5	19
stuttering	4.8.4	10
Asbestos suits	11.2.1	18
Astigmatism	3.15.1	7
Astronautics, space flight applications	12.7.0	20
Atmosphere		
optics	3.2.0	3
pollution	3.2.0	3
	12.3.0	19
sealed cabin	12.5.1	20
	12.5.2	20
	12.7.0	20
space vehicles	12.5.2	20
	12.7.0	20
submarine	12.5.2	20
Atomic burns	12.2.2	19
Attention span	13.2.4	21
auditory	13.2.4	21
visual	13.2.4	21
Attenuation (controls)	8.7.1	16

Search Term	Code Category	Page
Attitude		
change	13.2.1	21
indicators	3.7.1	5
tests, in job assessment	1.2.2	1
towards equipment	13.3.2	21
towards task	13.3.1	21
	13.3.2	21
Audiogyric effect	6.3.2	13
Audiometry		
equipment and methods	4.9.12	11
standards for	4.9.12	11
threshold data	4.9.4	11
Audio-visual monitoring, interactions	6.3.1	13
Audition, basic data	4.9.0	10
after effects of stimulation	4.9.5	11
anomalies	4.9.10	11
auditory patterns and meaning	4.9.8	11
bibliographies, general references	4.1.0	8
delayed feedback	4.6.0	10
	4.8.4	10
duration	4.9.3	11
effects of aging	4.9.10	11
	13.5.4	22
individual differences	4.9.10	11
loudness, pure and complex tones	4.9.2	11
physiological mechanisms	4.9.12	11
pitch, pure and complex tones	4.9.1	10
reaction times	7.6.4	14
repetitive stimulation	4.9.8	11
sound localization	4.9.7	11
stimulus mixture	4.9.6	11
thresholds and related phenomena	4.9.4	11
timbre	4.9.3	11
Auditory		
adaptation	4.9.5	11
bibliographies, general references	4.1.0	8
detection	4.7.0	10
display systems (nonverbal)	4.5.1	9
	4.5.2	9
	4.5.3	10
	4.5.4	10
equipment components	4.3.0	9
equipment, input devices	4.3.1	9
equipment, output devices	4.3.3	9
equipment, transmission devices	4.3.2	9
fatigue	4.9.5	11
flight guidance systems	4.5.4	10
flutter rate discrimination	4.6.0	10
	4.9.8	11
guidance for the blind, a device	11.5.1	19
localization	4.9.7	11

Search Term	Code Category	Page
Auditory, cont.		
masked thresholds	4.9.4	11
monitoring	4.7.0	10
numerousness	4.6.0	10
	4.9.8	11
orientation	4.9.7	11
patterns	4.9.8	11
perspective	4.9.6	11
search	4.7.0	10
signals, characteristics of	4.6.0	10
skills, conditions affecting	4.2.6	9
	4.7.0	10
thresholds	4.9.4	11
thresholds, shifts	4.9.5	11
tracking	4.7.0	10
warning desplays	4.5.1	9
Aural harmonics	4.9.6	11
Aural reading devices	11.5.1	19
Autistic Distortion	13.2.0	22
Autokinetic illusion	3.15.7	7
	3.15.12	8
	6.3.2	13
Automatic		
check out	2.3.5	3
	10.7.0	17
control systems	2.3.6	3
Ground Control Approach Systems (AGCA)	2.3.6	3
learning devices	14.1.0	22
maintenance	2.3.5	3
Automation	2.3.0	2
	2.3.1	2
Automobile-barrier impact	10.9.1	17
	12.4.1	20
Automobile safety	10.9.1	17
Aviation		
deafness	4.2.7	9
intercom systems	4.4.1	9
medicine, bibliography	1.1.0	1
medicine, environmental factors	12.1.0	19
psychology	1.1.0	1
safety	10.9.2	18
Avitaminosis	13.5.2	22
Backlash		
in controls	8.7.2	16
tracking performance	4.7.2	14
Backlighting (see also Instrument lighting)	3.4.2	4
Back rests	10.3.1	17
Bailout	10.4.0	17
Ballistic missile systems	2.3.4	3
Ballistic vests	11.3.2	18
Ballistocardiography	7.5.1	14
	7.7.4	15
	12.9.0	20
Band compression, speech	4.8.7	10
Barometric pressure	12.5.1	20
Basal metabolic rate	7.5.0	14

Search Term	Code Category	Page
Basic motor activity and capacity	7.6.0	14
Battelle reader for the blind	4.8.6	10
	11.5.1	19
Batting (baseball)	7.7.0	14
Beacon lights	3.3.2	4
	3.12.2	6
Bearing information aids, scales	3.5.2	4
Beats, auditory	4.9.6	11
Behavior decrement	13.3.3	21
Bells	4.5.1	9
Belts and belting	11.3.1	18
Bends (Caisson disease)	12.5.1	20
Bezold-Brücke effect	3.15.0	7
Bibliographies		
audition	4.1.0	8
basic motor capacities	7.1.0	13
body measurements	7.1.0	13
clothing and personal equipment	11.1.0	18
controls and displays	8.1.0	15
human engineering	1.1.0	1
individual factors and task characteristics	13.1.0	20
input channels	6.1.0	13
kinesthesis	5.5.0	12
layout of panels and consoles	9.1.0	16
olfaction	5.4.0	12
pain	5.3.0	12
personnal equipment	11.1.0	18
special environmental factors	12.1.0	19
systems of men and machines	2.1.0	2
taste	5.4.0	12
temperature sensitivity	5.2.0	12
touch and vibration	5.1.0	11
vestibular functions	5.6.0	12
vision	3.1.0	3
work space equipment and furniture	10.1.0	16
Binary		
communication displays	2.2.1	2
data analysis	1.2.1	1
numbers-names	1.2.0	1
Binaural		
communication systems	2.3.3	3
discriminations	4.9.1	10
	4.9.2	11
guidance system	4.5.4	10
sound localization	4.9.7	11
thresholds	4.9.4	11
Binocular		
acuity	3.15.6	7
disparity and depth perception	3.15.9	8
field	3.15.9	8
fusion	3.15.9	8
vision	3.15.9	8
Binoculars	3.13.1	7
Bio-electric		
equipment	1.3.0	2
	7.5.1	14
	12.9.0	20
methods	1.2.4	1
	7.5.1	14
	12.9.0	20
Bioinstrumentation	1.3.0	2
	7.5.1	14
	12.9.0	20
Biokinetic analysis	7.6.7	14
Biomechanics, body	7.3.0	13
Bionics	2.2.0	2
	2.2.1	2
Biopack	10.10.1	18
	12.7.0	20
Biosatellites, decompression	12.5.1	20
Bisecting movements, speed and accuracy	7.6.1	14
Biserial coefficients	1.2.1	1
Bit, information theory	2.2.1	2
Blackout	12.4.1	20
Blackout suits	11.2.2	18
Blackout thresholds	7.5.0	14
	12.4.1	20
Blast		
air and wind	12.2.1	19
and vibration	12.4.2	20
effect on performance (see Ambient noise and blast)		
-injection olfactometry	5.4.3	12
Blindness		
color	3.15.1	7
	3.15.4	7
flash	3.15.3	7
	12.6.0	20
Blinking reflex	7.6.6	14
Blinking signal light	3.12.2	6
Blink rate, fatigue	3.14.0	7
	13.3.3	21
Boards, plotting	3.7.1	5
Bocci image	3.15.7	7
Body		
armor	11.3.2	18
build	7.2.1	13
density	7.2.1	13
dimensions	7.2.0	13
	7.2.2	13
dimensions and clothing size	11.4.0	19
dimensions and furniture specifications	10.3.0	17
dimensions and workplace design	10.2.2	17
force system, analysis of	7.3.3	14
locomotion	7.6.0	14
measurements, stationary	7.2.1	13
mechanics	7.3.0	13
	7.4.0	14
movement, perception of	5.5.1	12
position, perception of	5.5.1	12
	6.3.2	13

Search Term	Code Category	Page
Body, cont.		
position and vestibular function	5.6.0	12
size, bibliography	7.1.0	13
size, racial types	7.2.1	13
specific gravity and body build	7.2.0	13
support	10.3.1	17
surface area	7.2.1	13
sway	5.6.1	12
temperature	5.2.1	12
	7.5.0	14
types	7.2.0	13
wear	11.3.2	18
Boiler-maker's ear	4.2.7	9
Bone conduction, vibrations	12.4.2	20
Boots	11.3.5	18
Boredom	13.2.4	21
Braille	5.1.2	12
Break-off phenomenon (see Spatial orientation)		
Breathing		
capacity	7.5.0	14
capacity, tests of	7.5.1	14
devices	11.3.3	18
oxygen	12.5.2	20
pressure	12.5.1	20
Brightness		
comfort relationships	3.2.4	3
constancy	3.15.5	7
discrimination	3.12.1	6
	3.15.5	7
enhancement	3.3.0	3
	3.4.0	4
	3.12.0	6
sky	3.2.1	3
tonal, auditory	4.9.3	11
British information sources	1.4.0	2
Brownian movement, aural detection	4.9.4	11
Buffeting	12.4.2	20
Buildings, noise control	4.2.2	8
	10.2.0	17
Burns		
cold	12.2.1	19
radiation	12.2.2	19
	12.6.0	20
Button design	11.3.0	18
Cabin(s)		
sealed, atmosphere	12.5.1	20
	12.5.2	20
sealed, maintaining man in	12.7.0	20
sealed, simulator	12.9.0	20
space	10.10.1	18
	12.7.0	20
Cabs		
crane	10.10.5	18
truck	10.10.3	18
Caffeine, effects of	13.5.3	22
Caisson disease	12.5.1	20
Caloric intake and energy expenditure	7.5.0	14
	13.5.2	22
Calorimetry	1.2.4	1
	5.2.2	12
	11.8.0	19
Camouflage	3.11.0	6
equipment evaluation	3.11.0	6
nets	3.11.0	6
suits	3.11.0	6
	11.2.0	18
tents	3.11.0	6
	11.7.0	19
visual principles	3.11.0	6
Canadian-Arctic Five-Man Ration Pack	13.5.2	22
Canal sickness	12.4.3	20
Canned food	13.3.2	21
	13.5.2	22
Canopies, cockpit	10.10.1	18
Capsule, escape	10.10.1	18
Car		
accidents and safety	10.9.1	17
driving skills	7.7.3	15
lights	3.3.2	4
turning signals	3.9.0	5
	3.12.2	6
Carbon dioxide toxicity	12.5.2	20
Carbon monoxide toxicity	12.5.2	20
Cardiovascular indices	7.5.0	14
Cargo handling equipment, evaluation of	10.9.0	17
	10.10.0	18
Cargo handling system	2.3.4	3
	2.3.5	3
Cargo handling system, analysis and methodology	2.2.2	2
	2.2.4	2
Carriers (aircraft), approach light system	2.3.6	3
	3.3.2	4
Carriers (packs)	11.5.3	19
Cartography	3.10.2	6
Cathode-ray tube displays (see also Radar)	3.5.0	4
Catwalks	10.10.0	18
Caution indicators (see Warning lights and Warning devices)		
Centrality indices	1.2.5	1
	2.2.3	2
Centrifugal acceleration	12.4.1	20
Centrifuge, human	12.9.0	20
Chambers, altitude	12.9.0	20
Channel capacity	6.2.0	13
of humans	2.3.1	2
	6.2.0	13
multiple sensory inputs	6.2.1	13
	6.2.2	13
	6.3.0	13
	6.3.1	13

Search Term	Code Category	Page
Charts	3.10.2	6
Checkerboard test	3.16.2	8
	3.16.3	8
Checklists	1.2.2	1
	3.10.3	6
Chemical		
protective clothing	11.2.0	18
senses	5.4.0	12
Choice behavior		
decision theory	2.2.2	2
group	2.3.2	2
individual	13.2.3	21
Choice time (see Reaction time)		
Chokes (dyspnea)	12.5.1	20
Chopping, speech distortion	4.8.4	10
Chromatic aberration	3.15.1	7
	3.16.3	8
Chromatic adaptation	3.15.3	7
Chronography	7.6.7	14
Cinematography	7.6.7	14
Classification equations	1.2.1	1
Classification tests	1.2.2	1
	15.1.0	22
Click-pitch threshold	4.6.0	10
	4.9.1	10
Climate	12.2.0	19
chamber	12.9.0	20
effect on performance	12.2.0	19
tolerance	12.2.1	19
Clipping, speech distortion	4.8.4	10
Closure	13.2.3	21
Clothing		
antiradiation	11.2.3	18
belting	11.3.1	18
bibliographies	11.1.0	18
body armor	11.3.2	18
chemical protection	11.2.3	18
color	11.2.4	18
decontamination	11.2.3	18
effect on work space	11.6.0	19
equipment and research methods	11.8.0	19
equipment combinations	11.6.0	19
evaluation and development	11.2.0	18
	11.3.0	18
fabrics	11.2.4	18
footgear	11.3.5	18
handgear	11.3.4	18
headgear	11.3.3	18
pressure suits	11.2.2	18
protective	11.2.0	18
radiant heat protection	11.2.1	18
restriction tests	11.8.0	19
restrictive effects	11.6.0	19
size	11.4.0	19
thermal protection	11.2.1	18
"Clo" values, fabrics	11.2.4	18
	11.8.0	19
Clutter		
and visual performance	3.14.0	7
radar display	3.5.1	4
Cochlear response	4.9.12	11
Cockpits, human engineering evaluation of	10.10.1	18
Coding		
auditory	4.6.0	10
controls	8.4.0	15
kinesthetic	5.5.2	12
safety	10.9.0	17
tactile	5.1.2	12
visual	3.12.0	6
Coefficient of constraint	1.2.1	1
Cognition (see Thought processes)		
Cold		
acclimatization	12.2.1	19
and exercise	7.3.3	14
and manual dexterity	7.6.3	14
and sleep	13.5.1	22
burn	12.2.1	19
environments	12.2.0	19
	12.2.1	19
exposure	12.2.1	19
mapping, skin	5.2.1	12
	5.2.2	12
stress	12.2.1	19
tolerance	12.2.1	19
weather clothing	11.2.1	18
	12.2.1	19
weather diet	12.2.1	19
	13.5.2	22
weather equipment	11.5.0	19
	12.2.1	19
weather face masks	11.3.3	18
weather living, military training practices	12.2.1	19
Coldbar suits	11.2.1	18
Collisions		
aircraft	2.3.6	3
	10.9.2	18
injury research, methods	10.9.0	17
lights	3.3.2	4
motor vehicles	10.9.1	17
warning system	3.5.0	4
	10.9.2	18
Color		
abridged systems	3.15.4	7
abridged systems, television	3.6.0	5
adaptation	3.15.4	7
blindness	3.15.1	7
coding	3.12.1	6
	8.4.1	15
conspicuity of	3.9.2	6
	3.12.1	6
	3.15.4	7
constancy	3.15.4	7
deficiency	3.15.1	7
	3.15.4	7
densitometer	3.16.1	8
discrimination	3.12.1	6
	3.15.4	7
filters	3.13.2	7
in food preference	13.5.2	22

Search Term	Code Category	Page
Color, cont.		
light signals	3.12.2	6
memory	3.15.4	7
preference	3.15.1	7
role in safety	3.12.1	6
	10.9.0	17
sensitivity	3.15.4	7
smokes, assessment of	3.16.2	8
tests	3.16.1	8
vision	3.15.4	7
vision, tests of	3.16.1	8
Colorimetry	3.16.3	8
Combat		
clothing	11.2.0	18
	11.3.0	18
crew effectiveness	2.3.2	2
information centers (CIC)	2.3.4	3
information centers, research and evaluation	2.3.3	3
stress	13.4.4	22
surveillance systems	2.3.0	2
	2.3.3	3
	2.3.4	3
Combination tones	4.9.6	11
Comfort	10.2.0	17
	13.3.3	21
Communication(s)		
air traffic control	2.2.3	2
	2.3.6	3
data	2.2.0	2
	2.2.1	2
nets	2.2.3	2
patterns	2.2.3	2
simulator	4.9.12	11
social	15.2.0	22
systems, evaluation and classification (see also Speech communication systems, Auditory display systems (nonverbal))	2.2.3	2
theory	2.2.1	2
Compatibility		
clothing-equipment combinations	11.6.0	19
display-control	8.7.3	16
	9.5.0	16
stimulus-response (interference in learning)	14.1.0	22
Compensatory tracking, factors affecting	7.7.2	14
Complex		
noise	4.2.0	8
psychomotor performance	7.7.0	14
reaction time	7.6.4	14
tones	4.9.6	11
Compression		
speech distortion	4.8.4	10
speech systems	4.8.7	10
Computers and simulation	1.3.0	2
	2.2.0	2
	2.2.3	2
Concealment (see Camouflage)		
Concept formation and learning	13.2.3	21
	14.1.0	22
Conference reports, heterogeneous human engineering	1.1.0	1
Confidence		
decision theory	1.2.1	1
	2.2.2	2
ratings	1.2.3	1
tables of limits	1.2.1	1
Configural analysis	1.2.1	1
Consoles and panels	9.1.0	16
Conspicuity		
colors	3.9.2	6
	3.12.1	6
	3.15.4	7
flashing light signals	3.12.2	6
	3.15.5	7
Constancy		
brightness	3.15.5	7
color	3.15.4	7
distance	3.15.9	8
size	3.15.9	8
Constant, aided tracking time	8.7.4	16
Constant errors	1.2.1	1
Constant stimuli, psychophysical methods	1.2.3	1
Constraint, coefficient of	1.2.1	1
Consumer acceptance	13.3.2	21
Contact Analog display, submarine control	2.2.3	2
	3.7.0	5
Contact burn	12.2.1	19
Contact chemoreception	5.3.1	12
Contact lenses	3.13.1	7
	3.13.2	7
Contagion masks	11.3.3	18
Containers	11.5.3	19
Contamination, enviornmental	12.3.0	19
Contextual map (decision-making)	2.2.0	2
Contingency techniques	1.2.1	1
Continuity principle, control relationships	8.7.3	16
Continuous spectogram	4.2.1	8
Contour, perception of	3.15.10	8
Contrast		
brightness	3.15.5	7
color	3.15.4	7
symbol and background	3.9.2	6
	3.12.1	6
thresholds	3.15.2	7
Controlled blast technique, olfaction	5.4.3	12
Control(s)		
adjustment	8.6.0	15
coding and labelling	8.4.0	15
Crane cabs	8.3.4	15
design	3.1.0	3
	4.1.0	8
	8.1.0	15
-display compatibility	8.7.3	16

Search Term	Code Category	Page
Control(s), cont.		
-display integration	8.1.0	15
-display ratios	8.7.1	16
-display, tracking proficiency	7.7.2	14
dynamics	8.7.0	15
functions, systems	2.3.0	2
handles	8.3.3	15
hand versus foot	8.3.5	15
human eye	8.3.3	15
knobs	8.3.1	15
labelling	8.4.2	15
loading	8.7.2	16
location	10.2.2	17
manipulation areas	10.2.2	17
multidimensions	8.4.1	15
multifunction	8.3.4	15
panels	9.2.0	16
	9.3.0	16
position	8.2.0	15
	9.4.0	16
positioning relative to operator	8.5.0	15
remote	8.3.3	15
resistance	8.7.2	16
sensitivity and amplification	8.7.0	15
sticks	8.3.2	15
system lags	8.7.4	16
three-axis	8.3.3	15
tower, design and layout	2.3.6	3
tower, evaluation	2.3.6	3
tower communication systems	4.4.1	9
	4.4.2	9
tower consoles, evaluation of	9.2.0	16
tower language	4.8.6	10
types, comparisons	8.3.5	15
visibility	10.2.1	17
Convergence	3.15.9	8
Conviction, decision theory	1.2.1	1
	2.2.2	2
Coriolis acceleration	5.6.0	12
	6.3.2	13
	12.4.1	20
Corneal sensitivity, pain	5.3.1	12
Correlational techniques	1.2.1	1
Cosmic radiation	12.6.0	20
Cost effectiveness analysis	1.2.5	1
Countermeasures, research	2.2.0	2
	2.3.0	2
Counters	3.5.2	4
	3.8.1	5
Counting	3.15.11	8
Crank controls	8.3.1	15
Cranking	7.6.2	14
Crash (see also Accidents)		
impacts and decelerations	12.4.1	20
location beacon	3.3.2	4
	10.9.2	18
snubbing test	10.9.1	17

Search Term	Code Category	Page
Crash, cont.		
survival, seating	10.3.2	17
Creativity	13.2.3	21
Crew		
compartment habitability	10.2.0	17
effectiveness	2.2.1	2
	2.3.2	2
selection	1.2.2	1
	15.1.0	22
Critical		
band, unit of hearing	4.9.4	11
	4.9.12	11
band analysis	4.2.1	8
flicker frequency	3.15.7	7
incident technique	1.2.5	1
task areas, locational	10.2.1	17
Cross correlation	1.2.1	1
Cross modality matching	6.3.0	13
Cupolometry	12.9.0	20
Cursors	3.5.2	4
Curvilinear regression	1.2.1	1
Cushions	10.3.1	17
Cutaneous		
communication	5.1.3	12
heat loss	5.2.1	12
	12.2.1	19
pain	5.3.1	12
sensitivity	5.1.0	11
shape discrimination	5.1.2	12
Cybernetics	1.2.1	1
Damping	4.2.2	8
Dark adaptation	3.15.3	7
Data		
discarding	1.2.1	1
handling systems	2.2.3	2
processing systems	2.1.0	2
Daylight viewing, radar displays	3.5.3	4
Daytime light	3.2.1	3
Dazzle (see Glare)		
Dead space	11.3.3	18
Deafness		
aviation	4.2.7	9
industrial	4.2.7	9
temporary	4.9.5	11
Decals	3.10.3	6
Deceleration	12.4.1	20
as coding stimulus	5.5.2	12
forces in aircraft accidents	10.9.2	18
forces in automobile accidents	10.9.1	17
	12.4.1	20
Decibel loss	4.2.7	9
	4.6.0	10
	4.9.5	11
Decision-making		
group characteristics in	2.3.2	2
thought process	13.2.3	21

Search Term	Code Category	Page
Decision theory	2.2.2	2
Decompression sickness	12.5.1	20
Decontaminants, toxic effects of	12.3.0	19
Decontamination suits	11.2.3	18
Deformation, skin	5.1.1	11
Degradation and visual performance	3.14.0	7
Delay lines	4.3.2	9
Delayed sidetone	4.8.3	10
	4.8.4	10
Density		
filters	4.9.12	11
tonal	4.9.3	11
Deodorizing	5.4.1	12
Deprivation		
food	13.5.2	22
sensory	12.8.0	20
sleep	13.5.1	22
Depth perception	3.15.9	8
kinetic	3.15.9	8
	3.15.12	8
tests for	3.16.2	8
Desert clothing	11.2.1	18
Desert stress	12.2.1	19
Design for safety (see Safety design)		
Detectability, radar signal	3.5.1	4
Detection, visual	3.11.0	6
	3.12.0	6
Detection theory	1.2.3	1
	2.2.1	2
	2.2.2	2
Detectors		
radar	3.5.1	4
thermal	11.2.1	18
	12.2.1	19
Deuteranopia	3.15.1	7
Dials	3.8.0	5
divisions and markings	3.8.4	5
lighting of	3.4.0	4
shape, size, direction of increase	3.8.3	5
Diet	13.5.2	22
Dietary allowances	13.5.2	22
Difference and summation tones	4.9.6	11
Differential thresholds (see Thresholds)		
Diffraction	3.2.0	3
	3.3.0	3
	3.12.0	6
Digital		
computer	2.2.3	2
readout indicators	3.8.1	5
skin temperature	7.5.0	14
	12.2.1	19
Dimensional analysis, movement	7.6.0	14
Dimensions		
cockpit	10.10.1	18
furniture	10.3.0	17

Search Term	Code Category	Page
Dimensions, cont.		
human figure	7.2.1	13
workplace	10.2.0	17
Diplacusis, binaural	4.9.1	10
Diplopia	3.15.1	7
Direction		
estimation of object	3.15.11	8
of increase for scales and indicators	3.8.3	5
of movement relationships	8.7.3	16
	9.5.0	16
	10.2.2	17
perception of	3.15.11	8
Directional hearing (see Sound localization)		
Directional orientation of movement, panels and consoles	9.5.0	16
Directional signals	3.12.2	6
Disaster training	14.1.0	22
Discrimination		
color	3.9.2	6
	3.12.1	6
	3.15.4	7
function	1.2.1	1
intensity	3.12.1	6
	3.15.5	7
tactile	5.1.1	11
Discriminatory analysis	1.2.1	1
Disorders, perceptual	3.15.1	7
Disorientation	6.3.2	13
Disparity, binocular	3.15.9	8
Dispatching (see Scheduling)		
Displays		
combination, pictorial and symbolic elements	3.7.2	5
control arrangement	9.1.0	16
	9.2.0	16
	9.4.0	16
	9.4.1	16
	9.4.2	16
control compatibility	8.7.3	16
location	9.3.0	16
pictorial	3.7.0	5
	3.7.3	5
radar	3.5.0	4
symbolic	3.7.0	5
	3.7.3	5
television	3.6.0	5
three-dimension radar	3.5.1	4
vibrotactile	5.1.3	12
Distance perception	3.15.9	8
Distortion		
auditory	4.6.0	10
orientation	6.3.2	13
sensory deprivation	12.8.0	20
visual	3.14.0	7
Distress signals for radiotelephone	4.4.2	9
	4.5.1	9
Distribution		
of aircraft accidents	10.9.2	18
of industrial accidents	10.9.0	17

Search Term	Code Category	Page
Distribution, cont.		
of information, communication nets	2.3.3	3
Diurnal cycle, physiological	13.5.0	22
Diving		
deep sea, decompression	12.5.1	20
suits	11.2.2	18
Division of labor within a system	2.3.2	2
Division of scales	3.8.4	5
Dominance		
eye	3.15.0	7
hand	7.6.5	14
Door handles	8.3.0	15
	10.4.0	17
Doors, access	10.4.0	17
Doorways	10.4.0	17
Doppler hovering indicator	4.5.4	10
Doppler sonar	4.5.3	10
Double vision (see Diplopia)		
Drift index, tracking	7.7.2	14
Driving		
habit check list	10.9.1	17
performance	7.7.3	15
rating scales	10.9.1	17
reference time	10.9.1	17
visibility	10.9.1	17
Drugs		
decision-making	13.2.3	21
	13.5.3	22
general effects of	13.5.3	22
visual performance	3.14.0	7
Dual pointer instruments	3.8.2	5
Dummy, anthropomorphic test	7.5.1	14
	10.9.1	17
Dummy-damage diagnosis in motor vehicle impact studies	10.9.1	17
Dye markers	3.12.1	6
Dynamic acuity	3.15.6	7
Dynamic body measurements	7.2.2	13
	7.4.0	14
Dysbarism	12.5.1	20
Dyspnea (chokes)	12.5.1	20
Ear		
defenders	11.5.1	19
impairment	4.2.7	9
	4.8.5	10
muffs	11.5.1	19
phones	4.3.3	9
plugs	11.5.1	19
protectors	11.5.1	19
sensitivity	4.8.2	10
	4.9.4	11
Ecological systems, space travel	12.5.2	20
	12.7.0	20
Edge gradient	3.15.10	8
Edge lighting, instruments	3.4.2	4
Ego-involvement	13.2.1	21
Ejection capsule	10.10.1	18
Ejection seat	10.3.1	17
Elastic resistances	8.7.2	16
Electrical pursuit meter, null balance	7.7.4	15
Electrocardiogram	1.2.4	1
Electrocardiography	7.5.1	14
	7.7.4	15
Electrodes, surface	1.2.4	1
Electroencephalogram	1.2.4	1
Electroendosmosis	5.1.1	11
Electroluminenscent lighting	3.4.4	4
Electromyography	7.4.0	14
	7.5.1	14
	7.6.7	14
	7.7.4	15
Electronic equipment	1.3.0	2
countermeasures	2.3.3	3
design guidebook	1.1.0	1
	10.1.0	16
	10.7.0	17
maintenance	2.3.5	3
	10.7.0	17
reliability	2.3.0	2
training	14.1.0	22
Electroretinogram	3.16.3	8
Electrovisual aids	3.6.0	5
	3.13.1	7
Embeddedness	3.15.10	8
Emergency		
belts	11.3.1	18
lights	3.3.2	4
	3.12.2	6
rations	13.5.2	22
Emissivity	12.2.2	19
Emmetropia	3.15.1	7
Emotion, general effects of	13.2.1	21
Empty field myopia	3.15.9	8
Empty visual field, visual detection	3.14.0	7
Encoding of information	1.2.1	1
End cues, effect on positioning movement	7.6.1	14
Endurance, muscular	7.3.3	14
Energy expenditure	7.5.0	14
Engine noise	4.2.3	9
	4.2.4	9
	4.2.5	9
Enhancement, brightness (see Brightness enhancement)		
Entopic stray light, measurement of	3.16.3	8
Entrances	10.4.0	17
Entropy	1.2.1	1
Environment		
and nutritional requirements	13.5.2	22
automotive	10.9.1	17
special types	12.1.0	19
Eosinophil count as measure of psychological stress	7.5.1	14
	13.3.4	21

Search Term	Code Category	Page
Equal contour scaling, auditory data	4.9.9	11
Equal discriminability scaling	1.2.3	1
Equipment		
accessibility	10.2.3	17
	10.7.0	17
arrangement	10.2.2	17
	10.2.3	17
distribution and location of	10.2.2	17
human engineering evaluations	10.10.0	18
maintenance	10.7.0	17
manipulability	10.7.0	17
noise	4.2.3	9
personal, effect on work space	11.6.0	19
portability	10.8.0	17
techniques of assessment	10.1.0	16
Escape		
capsules	10.3.1	18
	10.10.1	18
design for	10.4.0	17
safety problems in	10.9.0	17
seats	10.3.1	17
systems	10.10.1	18
Estimations, predictive value	1.2.1	1
Evacuation slide	10.10.0	18
Evaporative cooling	12.2.1	19
Exercise, effect on strength	7.3.3	14
Exercise in decompression sickness	12.5.1	20
Exits	10.4.0	17
Expanders and limiters	4.3.2	9
Expansion, speech distortion	4.8.4	10
Expectancy, vigilance	13.2.4	21
Experimental conditions, psychophysical thresholds	1.2.3	1
Explosive decompression	12.5.1	20
Exposure apparatus, visual	3.16.0	8
	3.16.3	8
Exposure suits	11.2.1	18
Exposure time		
auditory effects	4.6.0	10
visual effects	3.9.3	6
	3.15.7	7
Extent of limb movement	7.3.1	13
	9.3.0	16
	10.2.0	17
Eye		
blink rate as a measure of psychological stress	7.5.1	14
	13.3.4	21
dominance	3.15.0	7
fixations, instrument flight	9.4.2	16
movements	3.15.8	7
movements, electrical recordings	3.16.3	8
shields	3.13.2	7
Eyestrain (see Visual fatigue)		
Fabrics		
"Clo" index	11.2.4	18
clothing	11.2.4	18
color	11.2.4	18
moisture permeability index	11.2.4	18
	11.8.0	19
Face mask	11.3.3	18
Faceometer	7.4.0	14
Facial vision	4.9.7	11
Facilitation and inhibition, multi-input channels	6.3.1	13
Facilitation of production, work models	2.3.5	3
Facilities in human engineering	1.4.0	2
Factor analysis	1.2.1	1
Failure and success	13.2.1	21
	14.1.0	22
Failure or Unsatisfactory Report System (FUR), air safety	10.9.2	18
Fallout		
radioactive	12.6.0	20
shelters	11.7.0	19
	12.6.0	20
Farnsworth 100-hue color test	3.16.1	8
Farsightedness	3.15.1	7
Fasteners, clothing	11.3.0	18
Fasting	13.5.2	22
Fatigue		
and accidents	10.9.0	17
and monitoring performance	7.7.1	14
and prolonged performance	13.4.1	21
and prolonged wakefulness	13.5.1	22
and tracking	7.7.2	14
auditory	4.9.5	11
indices	13.3.3	21
olfactory	5.4.1	12
pain	5.3.1	12
physiological	7.5.0	14
	13.3.3	21
subjective, boredom	13.2.1	21
	13.3.4	21
uniforms	11.2.0	18
visual	3.14.0	7
Fear	13.2.1	21
Feedback		
delayed auditory	4.6.0	10
delayed speech	4.8.4	10
kinesthetic	5.5.1	12
tracking	7.7.2	14
Feeding problems	13.5.2	22
Fenestration	3.2.1	3
Ferrograph, two-channel	4.9.12	11
Field(s)		
free sound	4.2.0	8
noise	4.2.0	8
of view, workplace	10.2.1	17
sleeping gear	11.5.2	19
visual	3.14.0	7
Figural aftereffects		
kinesthesis	5.5.1	12
vision	3.15.7	7
Figure and ground, perception	3.15.7	7

Search Term	Code Category	Page
Figure and ground, perception, cont.	3.15.10	8
	6.1.0	13
Films		
display-use	3.6.0	5
general	1.1.0	1
photography	3.10.5	6
training	14.1.0	22
Filtering, controls	8.7.0	15
Filters		
auditory	4.3.2	9
optical	3.13.2	7
Finger		
cold response	5.2.1	12
	12.2.1	19
pressure control	7.3.3	14
tremor	7.6.6	14
Fire control systems	10.10.4	18
maintenance	2.3.5	3
Fire-fighting clothing	11.2.3	18
Fire-fighting equipment, evaluation	10.10.0	18
Fire potentials in aircraft accidents	10.9.2	18
Fission products, contamination	12.6.0	20
Fitness, physical	7.3.3	14
	7.4.0	14
Fixation, visual	3.15.7	7
Fixed-wing aircraft, instrumentation	8.2.0	15
	9.2.0	16
	10.10.2	18
Fixtures, lighting	3.3.3	4
Flak suits	11.3.2	18
Flares		
battle field illumination	3.3.2	4
signal lights	3.12.2	6
smokes	3.12.1	6
Flavor (see also Food)		
evaluation of	5.4.1	12
	13.5.2	22
identity control	13.5.2	22
measurement	5.4.1	12
	13.5.2	22
quality control	13.5.2	22
Flesch Reading Ease Formula	1.2.5	1
Flexibility of body movement	7.3.2	13
Flicker		
critical frequency	3.15.7	7
fusion	3.15.7	7
light source	3.3.4	4
	3.15.7	7
subjective sensations	13.4.4	22
Flight		
cabins, evaluation of	10.10.1	18
clothing and components	11.2.0	18
	11.3.0	18
controls and displays	8.2.0	15
control systems	3.8.0	5
	7.7.2	14
	8.7.0	15

Search Term	Code Category	Page
Flight, cont.		
data panels	3.8.0	5
feeding	13.5.2	22
guidance systems, auditory	4.5.4	10
guidance systems, visual	3.7.0	5
simulators	14.1.0	22
trainers, human engineering evaluation of	10.10.0	18
Floodlights	3.3.2	4
Flow-chart methodology	1.2.2	1
Flow paths	2.2.2	2
Flow process	2.2.4	2
Fluorescent markings	3.12.0	6
	3.14.0	7
Fluorescent materials, evaluation	10.10.0	18
Fluorescent paint	3.12.0	6
	3.14.0	7
Flybar	4.5.4	10
Flying personnel, body measurements	7.2.1	13
Fog, effect on visibility	3.2.3	3
Fog horns	4.5.1	9
Folding chair	10.3.1	17
Folding partition, efficiency of movement	10.2.2	17
Food	13.5.2	22
acceptance testing	1.2.5	1
	13.3.2	21
containers	11.5.3	19
packets	11.5.3	19
	13.5.2	22
preferences	13.3.2	21
	13.5.2	22
preservation	13.5.2	22
supplements	13.5.2	22
tablets	13.5.2	22
Foot		
controlled tracking	7.7.2	14
dimensions, interrelationships, soldiers	7.2.1	13
gear	11.3.5	18
movements during walking	7.3.0	13
strength	7.3.3	14
Force resistances, controls	8.7.2	16
Forces, gravitational	12.4.0	19
Forces exertable, shoulder and elbow joints	7.3.3	14
Formants of speech	4.8.1	10
Form perception	3.15.10	8
differentiation	3.12.0	6
recognition	3.9.0	5
	3.15.10	8
Foul weather clothing	11.2.1	18
Foveal vision	3.15.0	7
Fractional resistances	8.7.2	16
Fractionation, in scaling methods	1.2.3	1
Free escape	10.9.0	17
	12.5.1	20
"Freeway" highways	10.9.1	17
Frequency, etc., see next page		

Search Term	Code Category	Page
Frequency, cont.		
analyser	1.3.0	2
modulators	4.3.2	9
sensitivity, auditory	4.9.1	10
Frostbite	12.2.1	19
Fumes, noxious	5.4.2	12
	12.3.0	19
Functions analysis	1.2.2	1
Functions assignment		
to individuals within a system	2.3.1	2
to men or machines	2.3.1	2
Funnel systems, air traffic control	2.3.6	3
Furniture specifications	10.3.0	17
Fusion		
binocular	3.15.9	8
contours	3.15.10	8
flicker	3.15.7	7
Gain, display-control	8.7.1	16
Gait	7.3.0	13
Galvanic skin response	1.2.4	1
fatigue indicator	13.3.3	21
Game theory	1.2.1	1
	2.2.2	2
cognitive aspects	13.2.3	21
operational techniques	2.2.0	2
Gamma movement	3.15.12	8
Gamma radiation	12.6.0	20
Garment (see Clothing)		
Gas		
atmospheric	12.3.0	19
masks	11.3.3	18
Gear ratios	8.7.1	16
Geiger counters	4.5.1	9
Glare	3.2.4	3
	3.3.4	4
Gloves	11.3.4	18
Goggles	3.13.1	7
	3.13.2	7
Graphic displays	3.10.0	6
	14.1.0	22
Graphs	3.10.1	6
Gravity (see also Acceleration)		
stress	12.4.1	20
Gravity-free state (see Weightlessness)		
Grids, range and bearing aids	3.5.2	4
Grips, control stick	8.3.3	15
Grip strength	7.3.3	14
Ground-controlled approach radar (GCA), system evaluation	2.3.2	2
	2.3.6	3
Group		
communications	2.3.2	2
interview method	1.2.5	1
leaders, assessment of		
small unit	1.2.2	1

Search Term	Code Category	Page
Group, cont.		
orientation method in accident prevention	10.9.0	17
	10.9.2	18
productivity	2.2.0	2
psychology, bibliography	2.1.0	2
research techniques	1.2.0	1
	2.2.0	2
	15.2.0	22
structure in work organization	2.3.2	2
Grouping		
of controls	8.3.5	15
	8.5.0	15
	9.4.1	16
of instruments	3.8.5	5
	9.4.0	16
	9.4.1	16
Guided missiles		
evaluation	10.10.2	18
training of personnel	14.1.0	22
Gust loads in seat design	10.3.1	17
Gust scale of taste	5.4.1	12
	5.4.3	12
Gustatory signals	5.4.2	12
Habitability	10.2.0	17
	10.10.-	18
	11.7.0	19
Halo error	13.2.1	21
Hand		
cranking	7.6.2	14
dimensions	7.2.1	13
-eye coordination tests	7.7.4	15
glove versus bare	11.3.4	18
	11.6.0	19
grips	8.3.3	15
movements	7.6.0	14
signals, flight line	3.12.0	6
size measurements	7.2.1	13
	11.4.0	19
wheel, tracking	8.5.0	15
	8.7.2	16
Handbooks, heterogeneous human engineering	1.1.0	1
Handedness and performance	7.6.5	14
Handgear	11.3.4	18
Handles	8.3.1	15
	8.3.3	15
Handrails, human engineering evaluation of	10.10.0	18
Hardy-Rand Rittler color vision test	3.16.1	8
Harmonic Analysis, tracking behavior	7.7.2	14
	7.7.4	15
Harmonics, aural	4.9.6	11
Harness, safety	11.3.1	18
Hats	11.3.3	18
Hazards, etc., see next page		

Search Term	Code Category	Page
Hazards, passageways, exits, and entrances	10.4.0	17
Haze	3.2.3	3
Head		
balance and posture	7.3.3	14
measurements nomograph	7.2.1	13
Headache	5.3.1	12
Headgear	11.3.3	18
Headlamp illumination intensity in motor vehicle accidents	3.3.2	4
	10.9.1	17
Headlight		
glare	3.3.4	4
illumination	3.3.2	4
Headphones	4.3.3	9
Headrests, motor vehicle safety	10.9.1	17
Hearing (see also Audition)		
aids	11.5.1	19
conservation	4.2.2	8
	4.2.7	9
loss for speech, measurement of	4.8.2	10
loss, permanent (see Noise-induced hearing loss)		
loss, temporary	4.9.5	11
normal standards	4.2.7	9
	4.9.4	11
	4.9.10	11
tests types	4.9.4	11
Heat		
casualties in military training, control	12.2.1	19
exchanges	12.2.1	19
injury	12.2.1	19
limits	12.2.1	19
load	12.2.1	19
loss, cutaneous	5.2.1	12
perception	5.2.1	12
stress	12.2.1	19
stress index	12.2.0	19
tolerance	12.2.1	19
Heated suits	11.2.1	18
Heating and ventilation	12.2.0	19
Height-weight sizing system, clothing	11.4.0	19
Hellicopter		
airborne equipment	10.10.2	18
instrumentation	3.7.0	5
	3.8.0	5
	3.8.6	5
lighting system, landing	3.3.2	4
Helmets	11.3.3	18
Heterophoria	3.15.1	7
High altitude		
adaptation to	12.5.0	20
clothing and clothing components	11.2.1	18
	11.2.2	18
	11.3.0	18
environment	12.5.0	20
High altitude, cont.		
environment	12.5.1	20
	12.5.2	20
research stations	1.4.0	2
	12.9.0	20
sickness	12.5.1	20
	12.5.2	20
Highly audible phrases	4.8.6	10
Highway		
safety	10.9.1	17
signs	3.9.1	6
Horizon illusion	3.15.7	7
Hospital beds, human engineering evaluation of	10.10.0	18
Hot climates	12.2.0	19
	12.2.1	19
Hot dry temperature endurance	12.2.1	19
Hot weather		
clothing (see also 11.2.0, 11.3.0)	11.2.1	18
living, military training practices	12.2.1	19
uniforms	11.2.1	18
Housing, human engineering evaluation of	10.10.0	18
	11.7.0	19
Howard-Dolman test, depth perception	3.16.2	8
Howitzers, human engineering evaluation of	10.10.0	18
Hue (see also Color)	3.15.4	7
Human		
as an engineering component	2.2.1	2
	2.3.1	2
body dynamics	7.3.0	13
centrifuge	12.9.0	20
channel capacity	6.1.0	13
engineers, organization of	1.1.0	1
Factors Research	1.1.0	1
lags	7.6.4	14
morphology	7.1.0	13
operator versus machine, basis for choice	2.3.1	2
Humidity	12.2.1	19
Hunger regulation	13.5.2	22
Hypermetropia	3.15.1	7
Hyperopia	3.15.1	7
Hyperventilation	12.5.2	20
	13.5.0	22
Hypodynamics	12.8.0	20
Hypoxia	12.5.0	20
ICAO phonetic alphabet	4.8.6	10
Ideal observer, psychophysics	1.2.3	1
Identification and visual detection (see Visual detection)		
Illumination		
artificial ambient lighting problems	3.3.0	3
color of	3.3.1	3

Search Term	Code Category	Page
Illumination, cont.		
color of	3.4.3	4
	3.5.3	4
flicker	3.3.4	4
glare	3.3.4	4
indoor lighting systems	3.3.3	4
instrument lighting systems	3.4.0	4
legibility of letters, numerals and symbols	3.9.3	6
level of	3.3.1	3
	3.4.3	4
outdoor lighting systems	3.3.2	4
pattern, inversion of	3.3.4	4
polarization	3.3.4	4
preferences	3.3.1	3
radar room	3.5.3	4
specifications	3.3.0	3
uniformity	3.3.1	3
Illusions		
autokinetic	3.15.12	8
	6.3.2	13
oculogyral	6.3.2	13
visual	3.15.7	7
Image interpretation, photography	3.10.5	6
Imagery	13.2.3	21
Immersion		
suits	11.2.1	18
water environment	12.5.0	20
	12.9.0	20
Impact		
injury	12.4.1	20
noise, measurement of	4.2.1	8
research, automobiles	10.9.1	17
Impaired hearing and performance	4.2.7	9
Impermeable protective suits	11.2.3	18
Impregnated clothing	11.2.3	18
	11.6.0	19
Incentives	13.2.1	21
Incidental		
learning	14.1.0	22
memory in problem-solving	13.2.3	21
Incompatibility problems, clothing and personal equipment	11.6.0	19
Indicator response, psychophysical thresholds	1.2.3	1
Indicators and scales		
comparison of types of	3.8.6	5
layout of	9.2.0	16
	9.3.0	16
	9.4.0	16
visual	3.8.0	5
	3.8.1	5
	3.8.2	5
	3.8.3	5
	3.8.4	5
	3.8.5	5
	3.8.6	5
Individual differences		
alertness, attention, vigilance	13.2.4	21
and work interactions	13.3.0	21
aptitude	13.2.2	21
audition	4.9.10	11
cognitive processes	13.2.2	21
	13.2.3	21
intelligence	13.2.2	21
vision	3.15.0	7
	3.15.1	7
Individual interview method	1.2.5	1
Industrial		
accident rates	10.9.0	17
deafness	4.2.7	9
equipment development and evaluation	10.10.5	18
hearing conservation programs	4.2.2	8
noise	4.2.3	9
safety	10.9.0	17
special purpose mask	11.3.3	18
systems	2.3.0	2
Inertial resistances	8.7.2	16
Information		
analysis, codes	3.9.0	5
analysis, speech	4.8.1	10
assessment techniques	1.2.1	1
	2.2.1	2
flow	2.2.1	2
processing	2.2.1	2
	2.3.1	2
	13.2.3	21
retrieval	2.2.1	2
	2.3.0	2
theory	2.2.1	2
transmission	2.2.1	2
	2.3.1	2
Infrared		
backgrounds	3.2.0	3
	3.4.3	4
radiation	12.2.2	19
sensitivity of eye	3.15.2	7
skiascope	3.16.3	8
Injuries, types occuring in accidents	10.9.0	17
	10.9.1	17
	10.9.2	18
Input channels, sensory		
choice and interaction	3.15.0	7
	4.9.0	10
	6.1.0	13
comparisons	6.2.0	13
intersensory effects	6.3.0	13
Insecurity	13.2.1	21
Inside-out displays	3.7.1	5
Insight	13.2.3	21
Insomnia	13.5.1	22
Installations, human engineering research	1.4.0	2
Instruction(s)		
cards and charts	3.10.3	6
	14.1.0	22

Search Term	Code Category	Page
Instruction(s), cont.		
effect upon performance	14.1.0	22
Instrument		
boards and panels, coding of	3.12.0	6
	5.1.2	12
	5.5.2	12
	8.4.0	15
boards and panels, layout of	9.1.0	16
	9.2.0	16
	9.3.0	16
	9.4.0	16
	9.5.0	16
dual pointer	3.8.2	5
landing system, airborne	10.10.2	18
lighting	3.4.0	4
lighting, color	3.4.3	4
lighting, comparison	3.4.4	4
lighting, direct	3.4.1	4
lighting, edge	3.4.2	4
lighting, floodlighting	3.4.1	4
lighting, indirect	3.4.2	4
lighting, intensity	3.4.3	4
lighting, rear	3.4.2	4
Insulation, clothing	11.2.1	18
Integrated		
display panels	8.2.0	15
	9.2.0	16
instruments	3.8.0	5
Intellectual ability (see Intelligence)		
Intelligence	13.2.2	21
effects of aging on	13.5.4	22
tests	1.2.2	1
	1.2.5	1
	13.2.2	21
Intelligibility		
of speech	4.8.0	10
tests	4.8.2	10
	4.8.6	10
Interaural		
noise, cross correlation	4.9.7	11
phase cues	4.9.7	11
Intercom communication systems, evaluation	4.4.1	9
International Language for Aviation	4.8.6	10
Interrupters	4.3.2	9
Intersensory effects, interaction of input channels	6.3.0	13
Inter-Society Color Council Color Aptitude Test	3.16.1	8
Interval scaling	1.2.3	1
Interview methods	1.2.5	1
Inventory control systems	2.3.0	2
	2.3.5	3
Involuntary movements	7.6.6	14
Irradiation, cosmic and nuclear	12.6.0	20
Ishihara test	3.16.1	8
Isolation, effects of	12.8.0	20
Isophotes	3.2.0	3
Jamming, communications systems	2.2.3	3
Jerkins	11.2.1	18
Jet aircraft		
accidents	10.9.2	18
civilian transport	1.1.0	1
	2.3.4	3
	10.10.2	18
human factors evaluation	10.10.2	18
noise problems	4.2.2	8
	4.2.4	9
Job(s)		
analysis	1.2.2	1
check list	1.2.2	1
description and assessment	1.2.2	1
performance and age	13.5.4	22
satisfaction	13.3.2	21
work, rest and efficiency conditions	13.4.0	21
Johnson noise	4.2.0	8
Judgment(s)		
group	2.3.2	2
	15.2.0	22
individual	13.2.3	21
psychophysical	1.2.3	1
Jump boots	11.3.5	18
Jungle environment and survival	12.1.0	19
	12.2.0	19
Just noticeable difference	1.2.3	1
Keinath-Scanning Technique	1.2.5	1
Kelvin temperature	12.2.2	19
Key tapping	7.6.2	14
Key set configuration	2.2.3	2
	9.4.1	16
	9.4.2	16
Keystone View Telebinoculars	3.16.0	8
Kindel earmuff	11.5.1	19
Kinematics of the human body	3.8.6	5
	7.3.0	13
	7.3.1	13
	7.3.3	14
	7.4.0	14
Kinesiology	7.2.2	13
	7.3.0	13
Kinesthesis		
basic data	5.5.1	12
bibliographies	5.5.0	12
coding	5.5.2	12
equipment and research methods	5.5.3	12
reaction time	5.5.1	12
	7.6.4	14
Kinetic-depth effect	3.15.9	8
Knapsacks	11.5.3	19
Kneeling heights	7.2.2	13
Knobs, etc., see next page		

Search Term	Code Category	Page
Knob(s)		
comparisons	8.3.5	15
configuration	8.3.1	15
	9.4.0	16
	9.4.1	16
control coding	8.4.0	15
design of	8.3.1	15
force resistances	8.7.2	16
gripping surface	8.3.1	15
setting, accuracy of	7.6.1	14
spacing	8.3.1	15
	9.4.0	16
tactual discrimination of	5.1.2	12
turn stereotypes	8.7.3	16
Knowledge of results	14.1.0	22
and psychophysical thresholds	1.2.3	1
Knutson Personal Security Inventory	1.2.5	1
Labels and labelling	3.10.3	6
	8.4.2	15
Labyrinthine stimulation	5.6.1	12
Lags, display-control dynamics	7.6.4	14
	8.7.1	16
	8.7.2	16
	8.7.4	16
	8.7.5	16
Landcraft, evaluations	10.10.3	18
Language		
analysis	1.2.5	1
	4.8.0	10
	4.8.1	10
	4.8.6	10
	4.8.7	10
communications	2.2.1	2
design	4.8.6	10
structure	4.8.0	10
	4.8.1	10
	4.8.6	10
training	14.1.0	22
Lap belts	11.3.1	18
Lateral dominance	7.6.5	14
Layout		
panels and consoles	9.1.0	16
work place design	10.2.0	17
Leadership	2.3.2	2
	13.2.0	21
Lead-lag intervals	8.7.5	16
Learning	14.1.0	22
Leg		
reach	7.3.1	13
strength	7.3.3	14
Legibility (letters, numerals, symbols)		
color and contrast	3.9.2	6
design of characters	3.9.1	6
general problems	3.9.0	5
viewing conditions	3.9.3	6
Lenses	3.13.1	7
	3.13.2	7
Lesions, skin	11.6.0	19
Letters, legibility and design	3.9.0	5
Level of aspiration	13.2.1	21
Lever(s)		
comparisons	8.3.5	15
control coding	8.4.0	15
design	8.3.2	15
positioning	7.6.1	14
Life jackets and preservers	11.5.4	19
Life-support systems	12.5.2	20
	12.7.0	20
Light		
adaptation	3.15.3	7
coding	3.12.2	6
daytime	3.2.1	3
glare	3.2.4	3
measurement	3.2.0	3
	3.16.0	8
night	3.2.2	3
special conditions affecting visibility	3.2.3	3
twilight	3.2.2	3
Lighting		
artificial ambient	3.3.0	3
direct	3.4.1	4
edge	3.4.2	4
electroluminescent	3.4.4	4
indirect	3.4.2	4
individual shield	3.3.3	4
natural ambient	3.2.0	3
plastic edge	3.3.3	4
rear	13.1.0	20
sandwich type (see Lighting, plastic edge)		
systems, indoor	3.3.3	4
systems, instruments	3.4.0	4
systems, outdoor	3.3.2	4
systems, radar	3.5.3	4
Limb movement		
extent of	7.3.1	13
flexibility of	7.3.2	13
Line spectrogram, audition	4.2.1	8
Line symbols in map design	3.10.2	6
Linear		
acceleration	12.4.1	20
movement controls	8.3.2	15
programming	2.2.2	2
pursuit	7.7.2	14
regression	1.2.1	1
scales	3.8.3	5
Linearity, human operator	2.3.1	2
Linguistics	4.8.0	10
Lip reading	14.1.0	22
Listening		
distributed attention	13.2.4	21
individual differences	4.8.5	10
selective	4.8.5	10
signal detection	2.2.1	2
	4.7.0	10
sonar	4.7.0	10

Search Term	Code Category	Page
Load carrying		
performance	7.3.3	14
	11.5.3	19
systems	11.5.3	19
Localization		
auditory	4.9.7	11
in the blind	4.9.7	11
pain	5.3.1	12
tactile	5.1.1	11
Logistics	1.2.1	1
	2.2.0	2
	2.3.5	3
Longshore safety	10.9.0	17
Loudness		
adaptation (see Auditory fatigue)		
ambient noise	4.2.0	8
binaural versus monaural stimulation	4.9.2	11
level, discrimination	4.9.2	11
level, identification	4.9.1	10
	4.9.2	11
recruitment phenomena	4.9.2	11
scales	4.9.9	11
summation	4.9.2	11
Loudspeakers	4.3.3	9
Luckiesh-Moss Visibility Meter	3.16.3	8
Luminaires	3.3.2	4
	3.3.3	4
Luminance (see also Illumination)		
gradients	3.15.5	7
threshold	3.15.2	7
Luminescent material	3.3.0	3
Luminosity functions	3.15.2	7
Mach		
bands, visual	3.15.5	7
	3.15.10	8
effect	12.4.1	20
indicator	3.8.0	5
Machine		
constants in control operation	8.7.4	16
noise	4.2.3	9
Mackworth Clock Test	3.16.2	8
Macromotion studies	1.2.2	1
Magnitude estimation	1.2.3	1
Maintenance		
bibliographies	2.1.0	2
design for	10.7.0	17
systems	2.3.5	3
training	14.1.0	22
Management, operations research	2.1.0	2
Man-machine systems (see also Systems of men and machines)	2.1.0	2
Manned space flight (see also Space flight)	12.7.0	20
Mannikins	1.3.0	2
	11.8.0	19
Manpower utilization, job analysis of	1.2.2	1
Manual		
controls, design factors	8.3.0	15
dexterity	7.6.3	14
movements, components of	7.6.0	14
performance	7.6.3	14
tracking	7.7.2	14
Map design, symbols	3.9.0	5
	3.10.2	6
Maps	3.10.2	6
Markers		
dye	3.12.1	6
radioactive self-luminance	3.12.1	6
safety	3.9.0	5
	3.12.1	6
	14.1.0	22
sea	3.12.2	6
symbolic	3.9.0	5
visibility	3.3.0	3
	3.9.0	5
	3.12.1	6
Marketing research	2.2.0	2
Marking of controls, scales, and indicators	3.8.4	5
Marksmanship		
rifle	7.7.0	14
	7.7.3	15
rifle, low illumination	3.2.2	3
	3.3.1	3
rifle, startle	7.6.6	14
rifle, training	14.1.0	22
Masking		
camouflage	3.11.0	6
odors	5.4.1	12
speech	4.8.3	10
symbol recognition	3.9.3	6
tonal signals	4.7.0	10
	4.9.4	11
visual tasks	3.14.0	7
Masks		
civilian protective	11.3.3	18
gas	11.3.3	18
oxygen	11.3.3	18
Mast Pedestal Sight Manipulation Test	7.7.4	15
Mathematical		
analysis (see Statistical analysis)		
methods	1.2.1	1
models	1.2.1	1
Meat tenderizing	13.5.2	22
Mechanized translation	4.8.6	10
Melody recognition	4.9.8	11
Memo-motion photography	1.2.5	1
	3.10.5	6
Memory	14.1.0	22
Meniere's disease	4.2.7	9
Mental set	13.3.1	21
Message, etc., see next page		

Search Term	Code Category	Page
Message, formation (see also Information)	4.8.6	10
Meters		
brightness	3.16.3	8
noise	4.9.12	11
Method		
absolute judgments	1.2.3	1
adjustment	1.2.3	1
constant stimuli	1.2.3	1
limits	1.2.3	1
of constant stimulus differences, statistical analysis	1.2.1	1
psychophysical	1.2.3	1
Micromelodies	4.9.8	11
Micromotion techniques	1.2.2	1
Microphones, types and placement	4.3.1	9
Military		
decision theory	2.2.0	2
physiology, special environmental factors	12.1.0	19
reference man, anthropometric	7.2.1	13
spelling alphabets	4.8.6	10
Miniaturization, maintenance for	10.7.0	17
Miniaturized equipment guide	1.1.0	1
Mirror-Image Words	3.9.1	6
Missiles		
equipment evaluation	10.10.4	18
systems	2.3.4	3
Mittens	11.3.4	18
Mode-of-operation coding, controls	8.4.1	15
Models		
communication systems	2.2.3	2
mathematical	1.2.1	1
	2.2.0	2
nervous system	2.2.0	2
	14.1.0	22
systems research	2.2.0	2
Momsen Lung (see Submarine escape appliance)		
Monaural		
cues in auditory localization	4.9.7	11
hearing aids	11.5.1	19
thresholds	4.9.4	11
Monitoring (see also Vigilance and Watchkeeping)		
air traffic control	2.3.6	3
functions in systems	2.2.1	2
	2.3.1	2
multiple displays	3.8.5	5
	7.7.1	14
performance	7.7.1	14
	13.2.4	21
radar viewing	3.5.0	4
	3.12.0	6
sonar listening	4.7.0	10

Search Term	Code Category	Page
Monocular vision	3.15.1	7
Monotony, task and environment	12.8.0	20
Monte Carlo methods	1.2.1	1
Moon illusion	3.15.9	8
Morale		
group	2.3.2	2
individual	13.2.1	21
Morphological codes	7.2.0	13
Morse Code	4.6.0	10
training	14.1.0	22
Motion picture displays	3.6.0	5
Motion sickness		
drugs	13.5.3	22
symptoms	12.4.3	20
Motion stereotypes	8.7.3	16
Motivation	13.2.1	21
tests of	1.2.5	1
Motor performance		
complex tasks	7.7.0	14
component analysis	7.6.0	14
research methods and equipment	7.6.7	14
tests	7.6.7	14
	7.7.4	15
Motor skills aptitudes	7.1.0	13
	13.2.2	21
Motor vehicle		
accidents	10.9.1	17
human factors evaluation	10.10.3	18
impact studies	10.9.1	17
	12.4.1	20
seat	10.3.1	17
Movement		
between points, speed and accuracy	7.6.1	14
compatibility, display-control	8.7.3	16
components, repetitive tasks	7.6.2	14
forces acting on human body	12.4.0	19
precision, controls	8.7.1	16
range of limb	7.3.1	13
ratios, controls	8.7.1	16
restrictive effect of clothing	11.8.0	19
speed, basic	7.6.0	14
types of	7.6.0	14
Movements, eye	3.15.8	7
Multichannel		
communication systems, theory	2.2.1	2
	4.4.0	9
	4.6.0	10
listening	4.4.1	9
	4.7.0	10
voice communication systems	2.3.3	3
	4.4.0	9
	4.4.1	9
	4.4.2	9
Multifunction controls, design of	8.3.4	15
Multimanned aircraft, research and evaluation	2.3.4	3

Search Term	Code Category	Page
Multinominal distribution	1.2.1	1
Multiple		
criterion technique	1.2.2	1
display, monitoring	3.8.5	5
	7.7.1	14
image photography	5.5.3	12
	7.6.7	14
	7.7.4	15
regression	1.2.1	1
Multipliers and dividers	4.3.2	9
Multivariate		
information analysis	1.2.1	1
	2.2.1	2
transmission analysis	1.2.1	1
	2.2.1	2
Munsell colors	3.16.3	8
Muscle		
action potentials	7.3.3	14
mechanical properties	7.3.0	13
Muscular		
endurance and strength	7.3.3	14
inactivity	12.8.0	20
tension	7.3.3	14
Myopia	3.15.1	7
empty field	3.15.9	8
Nagel anomaloscope	3.16.1	8
Narcosis, deep sea divers	12.5.2	20
Narcotics	13.5.3	22
NATO phonetic alphabet	4.8.6	10
Navigation		
charts	3.10.2	6
displays (see Displays)		
systems, airborne	10.10.2	18
Navy Lantern Tests	3.16.0	8
Near accidents	10.9.1	17
	10.9.2	18
Nearsightedness	3.15.1	7
Neck measures	7.2.1	13
Negative acceleration	12.4.1	20
Netfessel's pursuit apparatus	7.7.4	15
Neural quantum		
theory	3.15.0	7
thresholds	3.15.2	7
Neurohypothalmic theory	13.5.2	22
	13.5.3	22
New London Navy Lantern Test	3.16.1	8
Nicotine	13.5.3	22
Night		
blindness	3.15.1	7
driving efficiency	3.2.2	3
	10.9.1	17
glasses	3.13.0	6
	13.4.1	21
lighting, motor vehicle accidents	3.3.2	4
	10.9.1	17
natural ambient illumination	3.2.2	3

Search Term	Code Category	Page
Night, cont.		
vision	3.2.2	3
	3.15.2	7
	3.15.3	7
vision, tests	3.16.2	8
vision, trainers	3.16.4	8
	14.1.0	22
Nitrogen narcosis	12.3.0	19
	12.5.2	20
Nitorus oxide (NO_2), effect on behavior	12.3.0	19
Noise		
and blast	4.2.6	9
background	4.2.0	8
	4.9.4	11
composition	4.2.1	8
control	4.2.2	8
criteria for buildings	4.2.2	8
effect on performance	4.2.6	9
masking	4.8.3	10
	4.9.4	11
measurement	4.2.1	8
reduction	4.2.2	8
spectrum analyses	4.2.1	8
speech interference level	4.2.2	8
susceptibility index	4.9.5	11
tolerance standards	4.2.2	8
visual	3.9.2	6
	3.14.0	7
Noise fields		
aircraft	4.2.4	9
armored vehicles	4.2.3	9
classifications	4.2.0	8
equipment	4.2.3	9
guided missiles	4.2.4	9
industrial	4.2.3	9
measurement	4.2.1	8
motor	4.2.3	9
office	4.2.3	9
rockets	4.2.4	9
shipboard	4.2.5	9
submarine	4.2.5	9
Noise-induced hearing loss, characteristics of	4.2.7	9
Noise-operated interphone system	4.4.0	9
Noise-reducing devices	4.2.2	8
Nomographs	1.2.1	1
Nonauditory cues and localization	4.9.7	11
Nonparametric statistics	1.2.1	1
Nonverbal auditory training	14.1.0	22
Noxious odors	5.4.2	12
	12.3.0	19
Nuclear		
aircraft	12.7.0	20
radiation	12.6.0	20
Number telling methods	4.8.6	10
Numerals, legibility of	3.9.0	5
Numerical transformations	1.2.1	1
Nutrition	13.5.2	22

Search Term	Code Category	Page
Nystagmus	3.15.8	7
	5.6.1	12
Obesity	7.2.0	13
Observational methods	1.2.5	1
Observation interview method	1.2.5	1
Obstacles		
perception by the blind	4.9.7	11
visibility in workspace	10.2.1	17
Occupational		
deafness	4.2.7	9
health, bibliography	1.1.0	1
information, human engineering	1.1.0	1
noise	4.2.0	8
stress	13.3.4	21
	13.4.4	22
Ocular		
defects	3.15.1	7
dominance	3.15.1	7
fatigue	3.14.0	7
movements	3.15.8	7
pursuit	3.15.8	7
tests	3.16.1	8
	3.16.2	8
Oculoagravic effect	6.3.2	13
Oculogyral illusion	3.15.7	7
	6.3.2	13
Odor (see Olfaction)		
Office Scientific Research and Development (OSRD), catalogue of reports	1.1.0	1
Old age (see Aging)		
Olfaction		
basic data	5.4.1	12
bibliographies	5.4.0	12
equipment and research methods	5.4.3	12
signals	5.4.2	12
Olfactometer	5.4.3	12
Olfactometry, blast injection	5.4.3	12
Olfactory		
mechanisms	5.4.1	12
sensitivity	5.4.1	12
Operating controls, panel layout and arrangement	9.1.0	16
Operational readiness, assessment technique	1.2.5	1
Operations research	2.2.0	2
Operative temperature	12.2.1	19
Operator position		
effect on location of controls	8.5.0	15
effect on visual performance	3.14.0	7
effect on work space design	10.6.0	17
Optical		
aids	3.13.0	6
Optical, cont.		
aids and motor vehicle safety	10.9.1	17
aids, protection	3.13.2	7
aids, visual enhancement	3.13.1	7
equipment systems	3.16.0	8
filters, general	3.13.2	7
shimmer	3.5.0	4
surveillance	3.12.0	6
tone generator	4.9.12	11
Optics, atmospheric	3.2.0	3
Ordinal scale	1.2.1	1
Ordnance equipment, human engneering evaluation of	10.10.0	18
Organization of men, factors in	2.3.2	2
Orientation		
angle, panels and consoles	3.5.3	4
	9.3.0	16
spatial	6.3.2	13
Ortho-Rater	3.16.2	8
Osmics	11.3.0	18
Output		
information rates	2.2.1	2
	2.3.1	2
mechanical power of men	7.3.3	14
work	13.4.0	21
Outside-in displays	3.7.1	5
Oximeter, two-channel earpiece	12.9.0	20
Oxygen		
deprivation (see Hypoxia)		
helmet	11.3.3	18
masks	11.3.3	18
requirements	12.5.2	20
toxicity	12.3.0	19
	12.5.2	20
warning signal generator	4.5.1	9
Ozone, toxic effects	12.3.0	19
Pace length	7.3.1	13
Paced work	13.4.1	21
	13.4.2	21
Packaging	11.5.3	19
Packs and packboards	11.5.3	19
Pain		
and high intensity noise	4.9.4	11
and skin temperature	5.2.1	12
as signal	5.3.1	12
basic data	5.3.1	12
bibliographies	5.3.0	12
equipment and research methods	5.3.2	12
Paired comparison versus rating scale method	1.2.1	1
Palatability	13.5.2	22
Palmar		
resistance	1.2.4	1
sweat indicator	1.2.4	1
Panels		
and console arrangement, grouping of components	9.4.0	16

Search Term	Code Category	Page
Panels, cont.		
and console layouts, general considerations	9.1.0	16
and consoles, standardization and integration	8.2.0	15
	9.2.0	16
Pantograph radar	3.5.0	4
Parachutes	11.5.4	19
Parallax, movement	3.15.12	8
Partial pressure		
glove	11.3.4	18
suits	11.2.2	18
Passageways	10.4.0	17
Past experience, effects on visual perception	3.15.0	7
	3.15.9	8
	3.15.10	8
	3.15.11	8
	3.15.12	8
Pathology	7.5.0	14
Pattern (s)		
auditory perception	4.9.8	11
communication systems	2.2.3	2
	2.3.3	3
visual perception	3.15.10	8
work distribution	2.2.2	2
	2.3.1	2
	13.4.1	21
Pay incentive and psychophysical thresholds	1.2.3	1
	13.2.1	21
Payoff, game theory	2.2.2	2
Pedal controls, design of	8.2.0	15
	8.3.2	15
Peer ratings	1.2.2	1
Perceptible signal	3.15.10	8
Perception		
color	3.15.4	7
contour	3.15.9	8
	3.15.10	8
depth and distance	3.15.9	8
form	3.15.10	8
general	6.1.0	13
of body position and movement	6.3.2	13
of direction	3.15.11	8
of motion	3.15.12	8
of self	13.2.1	21
pain	5.3.1	12
pattern	3.15.10	8
space	3.15.9	8
	6.3.2	13
span of	3.15.0	7
	3.15.11	8
time	5.7.0	12
visual number	3.15.11	8
Perceptual		
anticipation	13.2.4	21
	13.3.1	21
closure	3.15.7	7
	3.15.10	8
fluctuation, as fatigue index	13.3.3	21

Search Term	Code Category	Page
Perceptual, cont.		
illusion	6.3.2	13
isolation	12.8.0	20
motor skills	7.7.0	14
motor tasks, perceptual errors	7.7.0	14
satiation	3.15.3	7
	12.2.0	19
	13.3.2	21
set	3.15.7	17
	13.2.4	21
	13.3.1	21
Performance		
aging	13.5.4	22
diet, food, nutrition	13.5.2	22
drugs	13.5.3	22
effect of task factors	13.4.0	21
	13.4.1	21
	13.4.4	22
envirnomental effects	12.1.0	19
evaluation, work groups	2.2.1	2
	2.3.2	2
individual factors	13.3.0	21
motor	7.6.0	14
	7.7.0	14
sleep	13.5.1	22
Peripheral		
blindness	3.15.1	7
field of vision	3.14.0	7
	3.15.0	7
Peripherality indices	1.2.5	1
	2.2.3	2
Periscopes	3.13.1	7
Perseveration	13.2.3	21
Personal equipment		
and motor performance	10.6.0	17
bibliographies	11.1.0	18
carriers	11.5.3	19
clothing combinations	11.6.0	19
ear defenders	11.5.1	19
equipment and research methods	11.8.0	19
goggles	3.13.2	7
hearing aids	11.5.1	19
life jackets	11.5.4	19
packs	11.5.3	19
parachutes	11.5.4	19
prosthetics	11.5.5	19
restrictions on work space	10.5.0	17
sleeping bags	11.5.2	19
special glasses	3.13.2	7
survival	11.5.4	19
visors	3.13.2	7
Personality	13.2.1	21
characteristics	13.2.1	21
Personnel		
general problems	15.1.0	22
selection tests	1.2.2	1
	2.3.0	2
subsystems	2.3.0	2
Perspective		
auditory	4.9.7	11

Search Term	Code Category	Page
Perspective, cont.		
illusion	3.5.1	4
	3.15.9	8
transformations	3.16.3	8
visual	3.15.9	8
Pharmacology and toxicology, drugs and their effects on performance	13.5.3	22
Phase-plane technique, tracking study application	7.7.2	14
Phoneme detector	4.9.12	11
Phonemic analysis	4.8.1	10
Phonetically balanced work lists	4.8.2	10
	4.8.6	10
Phonetic(s)		
analysis	4.8.1	10
information theory research	4.8.1	10
Phoria	3.15.1	7
tests of	3.16.2	8
Phosphene(s)		
method	3.16.3	8
theory	3.15.0	7
thresholds	3.15.2	7
Phosphors, cathode ray tube	3.5.1	4
Photic stimulation, intermittent prolonged periods	3.3.4	4
	13.4.4	22
Photo interpretation	3.10.5	6
fatigue factors	3.14.0	7
Photoelectric		
corneal reflex method	3.15.8	7
	3.16.3	8
plethysmograph	1.2.4	1
Photography	3.10.5	6
Photometers	3.16.0	8
	3.16.3	8
Photometry	3.16.0	8
Photopic vision	3.15.0	7
Physical fitness	7.3.3	14
	7.5.0	14
job analysis techniques	1.2.2	1
	7.4.0	14
	7.5.1	14
proficiency	7.5.1	14
tests	7.5.1	14
Physical stress and performance	13.4.4	22
Physiological capacities		
basic data	7.5.0	14
body mechanics	7.3.0	13
special environmental capacities	12.1.0	19
Physiological methods and equipment	1.2.4	1
	7.4.0	14
	7.5.1	14
Physique	7.2.0	13
	7.2.1	13
Pictorial displays	3.7.0	5
Pilots		
aging	13.5.4	22
disorientation	6.3.2	13
performance	7.7.2	14
	7.7.3	15
reaction times	7.6.4	14
stress	13.3.4	21
	13.4.4	22
Pitch		
characteristics of short tones	4.6.0	10
	4.9.1	10
discrimination	4.9.1	10
-intensity functions	4.9.1	10
	4.9.2	11
shifts	4.9.5	11
Plane of controls relative to operator	9.3.0	16
Plethysmograph	1.2.4	1
Plotting boards	3.5.2	4
	3.7.1	5
Pneumatic life preserver	11.5.4	19
Point		
biserial coefficients	1.2.1	1
source projection	3.6.0	5
	3.7.1	5
Pointer alignment position, check reading	3.8.5	5
Pointer-Drum Altimeter	3.8.6	5
Pointers, design factors	3.8.2	5
Polar bibliography	12.1.0	19
Polarization	3.2.0	3
	3.3.4	4
Pollution, atmospheric	12.3.0	19
Population		
differences in hearing	4.9.10	11
entropy	1.2.1	1
	2.2.1	2
Portability in equipment design	10.8.0	17
Portable trainers	14.1.0	22
Position coding controls	3.12.0	6
	5.5.2	12
	8.4.1	15
	9.4.0	16
Positioning (see also Layout)		
movements, speed and accuracy	7.6.1	14
of components on panels and consoles	9.4.0	16
of controls relative to operator	8.5.0	15
Positive acceleration	12.4.1	20
Postprandial lassitude	13.5.2	22
Posture	5.6.0	12
	7.3.0	13
	7.3.3	14
Power		
output in man	7.3.3	14
spectra	1.2.2	1
PPI displays	3.5.0	4
	3.5.1	4

Search Term	Code Category	Page
Preadaptation, vision	3.15.3	7
Predetermined time standards, productivity of subsystems	2.2.1	2
	2.3.0	2
	2.3.2	2
Prediction, general problems	1.2.0	1
Preferences		
acceptability	13.3.2	21
display-control relations	8.7.3	16
general studies of	13.3.2	21
research methodology	1.2.2	1
Prehension hooks	11.5.5	19
Preplanning technique, trouble shooting	2.3.4	3
	2.3.5	3
Presbycusis	4.9.10	11
Presbyopia	3.15.1	7
Pressure (see also Touch and Vibration)		
breathing	12.5.1	20
	12.5.2	20
chamber	12.9.0	20
suits	11.2.2	18
suits, effect on work space	11.6.0	19
Prevention, accident	10.9.0	17
Printed materials		
check lists, labels, instruction cards	3.10.3	6
comparisons of types of	3.10.4	6
general information	3.10.0	6
graphs and tables	3.10.1	6
maps and charts	3.10.2	6
photographs	3.10.5	6
Prism vergence	3.15.8	7
Probability		
in communications	2.2.1	2
	2.3.3	3
in decision theory	2.2.2	2
learning theories	14.1.0	22
of seeing functions	3.15.3	7
statistics	1.2.1	1
Probit method, application to fitting an ogive	1.2.1	1
Problem-solving		
group	2.3.2	2
	15.2.0	22
individual	13.2.3	21
rigidity-flexibility	13.2.1	21
	13.2.3	21
	13.3.1	21
Procedural analysis	1.2.2	1
	2.2.0	2
Production		
scheduling	2.3.1	2
	2.3.5	3
systems	2.3.0	2
	2.3.5	3
Productivity		
group	2.3.2	2
motivational factors	13.2.1	21
systems evaluation	2.2.0	2
	2.3.0	2

Search Term	Code Category	Page
Proficiency		
tests	1.2.2	1
	2.3.0	2
	7.5.0	14
training	14.1.0	22
Profile classification, motor vehicle operators	10.9.1	17
Programmed learning	14.1.0	22
Programming, linear	2.2.2	2
Projection equipment, human engineering evaluation of	10.10.0	18
Prolonged performance		
acceleration exposure	12.4.1	20
cold exposure	12.2.1	19
operation of controls	8.6.0	15
vigilance	7.7.1	14
visual work	3.5.0	4
	3.9.3	6
	3.14.0	7
work	13.3.3	21
	13.4.1	21
Prone position		
body measurements	7.2.2	13
effect on location of controls and displays	8.5.0	15
	9.3.0	16
effect on visual performance	3.14.0	7
in layout of cockpits	10.10.1	18
Proprioception	5.5.0	12
Proprioceptive cues	5.5.2	12
	6.3.2	13
Prosthetics	11.5.5	19
Protanomalous vision	3.15.1	7
Protanopia	3.15.1	7
Protective		
clothing ensembles and components	11.2.0	18
	11.3.0	18
devices, auditory	11.5.1	19
devices, visual	3.13.2	7
shelters	11.7.0	19
Proximity warning devices, aircraft	3.12.2	6
Pseudophone, electronic	4.9.12	11
Psychoacoustics	4.1.0	8
Psychogalvanic responses	7.5.0	14
	7.6.6	14
Psychogalvanometer	1.2.4	1
	7.5.1	14
Psychological measures (see Psychological tests)		
Psychological scaling		
audition	4.9.9	11
methodology	1.2.3	1
odors	5.4.1	12
pain	5.3.1	12
taste	5.4.1	12
	5.4.3	12
vision	3.16.3	8
weights	5.5.1	12
	5.5.3	12
Psychological stress, see next page		

Search Term	Code Category	Page
Psychological stress	13.2.1	21
	13.4.4	22
Psychological tests	1.2.2	1
	1.2.5	1
Psychomotor		
learning	14.1.0	22
performance	7.7.0	14
	7.7.1	14
	7.7.2	14
	7.7.3	15
tests	7.7.4	15
Psychopharmacology	13.5.3	22
bibliography	13.1.0	20
Psychophysics		
and detection theory	2.2.1	2
mathematical and statistical methods	1.2.1	1
problems and methods	1.2.3	1
Public address systems	4.4.2	9
Pulfrich effect	3.15.9	8
Purdue peg board	7.6.7	14
Purkinje Phenomenon	3.15.3	7
Pursuit		
apparatus, dual compensatory	7.7.4	15
tracking, factors affecting	7.7.2	14
Push-and-pull forces	7.3.3	14
Pushbutton controls, design of	8.3.2	15
Pyrotechnics	3.3.2	4
Q-Sort	1.2.2	1
Quality control	1.2.1	1
	2.3.5	3
Quartermaster clothing and equipment	11.1.0	18
Questionnaire, survey method	1.2.2	1
	1.2.5	1
Queueing process	2.2.0	2
	2.2.2	2
	2.2.4	2
Quickening		
controls	8.7.4	16
displays	8.7.5	16
general concept	8.7.0	15
in man-machine systems	2.3.1	2
	8.7.5	16
tracking	7.7.2	14
Radar		
air traffic control	2.3.6	3
displays	3.5.0	4
equipment	3.5.1	4
operator training	14.1.0	22
range and bearing aids	3.5.2	4
room lighting	3.3.3	4
	3.5.3	4
Radar, cont.		
screen, physical variables of	3.5.1	4
	3.5.3	4
signal detection	3.5.0	4
	3.5.1	4
	3.12.0	6
simulators	2.2.3	2
	3.16.4	8
	14.1.0	22
Radarscope		
interpretation	3.5.0	4
photography	3.5.0	4
	3.10.5	6
Radial acceleration	12.4.1	20
Radiant heat	5.2.1	12
	12.2.2	19
Radiation		
cosmic	12.6.0	20
detection equipment, human engineering evaluation of	10.10.0	18
	12.9.0	20
nuclear	12.6.0	20
protection, clothing	11.2.0	18
	11.2.3	18
protection, gloves	11.3.4	18
	12.6.0	20
protection, shelters	11.7.0	19
safety design and accident protection	10.9.0	17
sickness and injury	12.6.0	20
space flight	12.7.0	20
thermal	12.2.2	19
Radio		
equipment components	4.3.0	9
input devices	4.3.1	9
intelligibility	4.4.2	9
interphone (AN/URC-7)	4.4.2	9
meter	12.9.0	20
output devices	4.3.3	9
range	4.5.1	9
systems, nonverbal communication	2.3.3	3
	4.5.0	9
systems, speech communication	2.3.3	3
	4.4.0	9
transmission devices	4.3.2	9
Radioactive materials	12.6.0	20
Radioactivity of human body	12.6.0	20
Radiobiology	12.6.0	20
Radiological hazards	12.2.2	19
	12.6.0	20
Radiotelephony distress signals	4.6.0	10
Radon, radioactive air concentration	12.6.0	20
Railway transportation systems	2.3.4	3
Random		
distributions	1.2.1	1
noise, Gaussian	4.2.0	8
signal generator, tracking research equipment	7.7.4	15
Range, etc., see next page		

Search Term	Code Category	Page
Range		
effect, tracking	7.7.0	14
	7.7.2	14
finders	3.13.1	7
information aids, scales	3.5.2	4
rings	3.5.2	4
Rate		
-aided control	8.7.4	16
patterns, movement	7.6.2	14
versus velocity tracking	7.7.2	14
Rating scales	1.2.2	1
Ratio scales (see Psychological scaling)		
Rations	13.5.2	22
Reach distance		
arm and leg	7.3.1	13
work place design	9.3.0	16
	10.2.2	17
Reaction time	7.6.4	14
Readability of printed materials (see also Legibility)	3.10.4	6
Reading		
machines	11.5.1	19
span	3.14.0	7
	3.15.0	7
	3.15.8	7
	3.15.11	8
Reafferent stimulation	6.3.2	13
Rear-end collisions	10.9.1	17
	12.4.1	20
Rear lighting, instruments	3.4.2	4
Rearward seating, aircraft	10.3.2	17
	10.9.2	18
Rebreathing apparatus, multipurpose	11.3.3	18
Recognition		
and recall	14.1.0	22
form, contour, pattern	3.15.10	8
letters, numerals, symbolic forms	3.9.0	5
photographic detail	3.10.5	6
thresholds, visual	3.15.10	8
Reconnaissance, visual	3.2.0	3
	3.12.0	6
Recruitment phenomena	4.9.2	11
	4.9.3	11
Rectilinear oscillation of body, perception of	5.6.1	12
	12.4.2	20
Recurrence equations	1.2.1	1
	2.2.4	2
Readout	12.4.1	20
Reduced stimulation, effect on performance	12.8.0	20
Reduction coding	9.4.0	16
Redundancy		
communication systems and tasks	2.3.3	3
	4.6.0	10
	4.8.6	10
Redundancy, cont.		
information theory	2.2.1	2
problem-solving	13.2.3	21
visual	3.14.0	7
References, general (see Bibliographies)		
Reflectance	3.15.0	7
	3.15.5	7
Reflex		
acoustic	4.9.5	11
involuntary	7.6.6	14
psychogalvanic	7.5.0	14
Refractory period, psychological	7.6.4	14
Reinforcement, learning theory	14.1.0	22
Reliability, statistical	1.2.1	1
Remembering	14.1.0	22
Remote controls	8.3.3	15
Repetitive		
movements	7.6.2	14
work	13.4.3	21
Replication, influence of error	1.2.1	1
Requirement setting, methodology	1.2.2	1
Rescue equipment		
aircraft	10.10.2	18
sea and landcraft	10.10.3	18
"Resonance" in tracking	7.7.2	14
Resonance synthesizer	4.8.7	10
	4.9.12	11
Respiration	7.5.0	14
effect of special environmental conditions	12.1.0	19
Respiratory		
closed support systems	12.5.2	20
	12.7.0	20
measurement devices	1.2.4	1
	7.5.1	14
protective masks	11.3.3	18
reaction time	7.6.4	14
resistance	7.5.0	14
	12.5.1	20
Response		
predictability	1.2.1	1
readiness	13.2.4	21
Rest		
driving efficiency	7.7.3	15
motivational effects	13.2.1	21
periods, work efficiency	13.4.1	21
Restraint systems	11.3.1	18
Retention	14.1.0	22
Retinal		
light distribution	3.16.3	8
	5.6.1	12
sensitivity	3.15.3	7
Reviews, heterogeneous human engineering	1.1.0	1
Reward	13.2.1	21
Rhythm perception, auditory	4.9.8	11
Rifle (see also Marksmanship)		
evaluation	10.10.4	18

Search Term	Code Category	Page
Rifle, cont.		
practice	7.7.3	15
	14.1.0	22
recoil	13.4.4	22
sights	3.13.1	7
Road		
layout	10.9.1	17
signs	3.9.0	5
	3.10.3	6
Rocket		
fuel resistant clothing	11.2.3	18
noise	4.2.4	9
storage	10.2.3	17
Rods and cones	3.15.0	7
Room		
acoustics	4.2.0	8
	4.2.2	8
	10.2.0	17
fenestration	3.2.1	3
thermal environment	12.2.0	19
Rotary		
movement controls	8.3.1	15
oscillation of body, perception of	5.6.1	12
	6.3.2	13
	12.4.1	20
pursuit tracking	7.7.2	14
Rotating chair	5.5.3	12
	12.9.0	20
Rucksacks	11.5.3	19
Rudder bars, design of	8.3.2	15
Running, speed and velocity	7.3.3	14
Runways		
lighting systems	3.3.2	4
markers	3.12.0	6
role in safety	10.9.2	18
Saccadic eye movements	3.15.8	7
Safety		
air	10.9.2	18
clothing components, belts, shoes, etc.	11.3.1	18
	11.3.2	18
	11.3.3	18
	11.3.4	18
	11.3.5	18
clothing protection	11.2.0	18
design for	10.9.0	17
	10.9.1	17
	10.9.2	18
education	10.9.0	17
environmental hazards	12.1.0	19
industrial	10.9.0	17
manuals	10.9.0	17
motor vehicle	10.9.1	17
shelters	11.7.0	19
SAGE, semiautomatic ground environment, system	2.3.0	2
	2.3.4	3
Sample theory	1.2.1	1
Satellite, manned	12.7.0	20
Scales (see also Psycho-physical scales)		
and indicators	3.8.0	5
bearing and range information	3.5.2	4
comparisons of types	3.8.6	5
counters	3.8.1	5
divisions and markings	3.8.4	5
of sensation, construction	1.2.3	1
pointer design	3.8.2	5
qualitative reading	3.8.5	5
Scheduling		
job shop	2.3.5	3
maintenance	2.3.5	3
operations research	2.2.0	2
techniques	2.2.2	2
	2.2.4	2
Scientific method in operations research	2.2.0	2
Scotoma, central-in night vision	3.2.2	3
	3.3.4	4
	3.15.1	7
Scotopic		
thresholds	3.15.2	7
vision	3.2.2	3
	3.15.0	7
Scott noise level analyzer	4.2.1	8
Scramblers	4.3.2	9
Screen-Maddox Rod Test	3.16.2	8
Sea		
accidents	10.9.0	17
markers	3.12.1	6
	3.12.2	6
survival equipment	11.5.4	19
water, ingestion of	13.5.2	22
Seacraft, evaluation	10.10.3	18
Seadrome lighting	3.3.2	4
	10.10.3	18
Search lights	3.3.2	4
glare	3.3.4	4
Seasickness	12.4.3	20
Seating arrangement	10.3.2	17
Seat(s)		
acceptability	13.3.2	21
belts and harnesses	11.3.1	18
cushion assemblies	10.3.1	17
design	10.3.1	17
ejection	10.3.1	17
pans	10.3.1	17
reference point	10.2.0	17
	10.3.0	17
	10.3.1	17
suspension	10.3.1	17
Seeing (see Vision)		
Selection procedures and tests	1.2.2	1
	2.3.0	2
	15.1.0	22
Self-esteem	13.2.1	21
Self-organizing system	2.3.0	2
Self-pacing performance	13.4.2	21

Search Term	Code Category	Page
Self-rating techniques	1.2.5	1
Self-sufficient collision warning system		
design factors	3.5.0	4
	3.12.2	6
	10.9.2	18
in air safety	10.9.2	18
Semantic		
constraints	2.2.1	2
	2.3.3	3
	4.8.6	10
information theory	1.2.0	1
	2.2.1	2
	2.3.3	3
Sensitivity (see various sensory modalities: Audition, Vision, Taste, etc.)		
Sensory		
aids	3.13.2	7
	11.5.1	19
deprivation	12.8.0	20
input channels, comparisons	6.2.0	13
interaction effects	6.3.0	13
overload	6.2.0	13
	6.3.1	13
Sequence diagram	2.2.0	2
Sequencing aircraft for landing	2.3.2	2
	7.7.3	15
Sequential		
decision theory	2.2.2	2
performance	7.7.3	15
response tendencies	1.2.3	1
Serial performance	7.7.3	15
Servo system, man as an element	2.3.1	2
Servomechanisms, bibliography	1.1.0	1
	2.1.0	2
Set		
affective	13.2.1	21
cognitive	13.2.3	21
	13.3.1	21
perceptual	13.2.4	21
	13.3.1	21
psychophysical thresholds	1.2.3	1
	13.3.1	21
Shallow water		
diving black-out	12.5.1	20
rescue apparatus	11.5.4	19
Shape coding		
tactile	5.1.2	12
visual	3.12.1	6
Shelters	11.7.0	19
fallout	11.7.0	19
	12.6.0	20
temperatures	12.2.1	19
Shielding		
acoustic	4.2.2	8
radiation	11.2.3	18
	12.2.2	19
Ships		
communications systems, evaluation of	4.4.1	9
	4.4.2	9
evaluation of	10.10.3	18
noise	4.2.5	9
Shivering, in man	5.2.1	12
	7.6.6	14
Shoes	11.3.5	18
Shuttle process	2.2.4	2
Sights, optical aids	3.13.1	7
Signalling devices (see Warning devices)		
Signal(s)		
auditory	4.5.1	9
	4.6.0	10
detecting	1.2.3	1
	2.2.1	2
	2.2.2	2
flags	3.9.0	5
gustatory	5.4.2	12
launchers, evaluation of	10.10.0	18
lights	3.12.2	6
olfactory	5.4.2	12
rate of presentation	13.4.1	21
	13.4.3	21
thermal	5.2.1	12
traffic light patterns	10.9.1	17
visual	3.12.0	6
	3.12.2	6
Signal-to-noise ratio determination, whistle-point method	4.8.3	10
	4.9.12	11
Signs, motor vehicle driving	3.9.0	5
	3.10.3	6
	10.9.1	17
Silhouettes	3.9.1	6
Simple reaction time	7.6.4	14
Simulation techniques	1.2.5	1
	2.2.0	2
	2.2.3	2
	14.1.0	22
Simulator(s)		
air traffic control	2.3.6	3
automobile driving	1.3.0	2
	3.16.4	8
	10.9.1	17
flight	2.2.3	2
techniques of design	2.2.3	2
training	14.1.0	22
types and use in visual research	3.16.4	8
Single stimuli, psychophysical method	1.2.3	1
Sirens	4.5.1	9
Size		
anthropometric measurements	7.2.0	13
clothing specifications	11.4.0	19
coding	5.1.2	12
	8.4.1	15
perception	3.15.9	8
Skiascope, infrared	3.16.3	8

Search Term	Code Category	Page
Skilled		
motor performance	7.6.0	14
	7.6.2	14
	7.6.3	14
Response Test	1.2.2	1
	7.7.4	15
Skin-fold technique (see Anthropometry, methods and equipment)		
Skin stimulation (see Tactile stimulation)		
Sky		
brightness values	3.2.0	3
sweeper equipment, human engineering evaluation of	10.10.0	18
Slant		
perception	3.15.11	8
visibility	3.2.0	3
	3.15.0	7
	3.15.11	8
Slave manipulator	8.3.3	15
Sled pulling test	7.5.1	14
Sleep	13.5.1	22
deprivation	13.5.1	22
Sleeping bags	11.5.2	19
Small group effectiveness, assessment	2.3.2	2
Smell (see Olfaction)		
Smog constituents	12.3.0	19
Smoking, effects of	13.5.3	22
Sneezing	7.6.6	14
Social		
communication, elements in	2.2.1	2
	2.3.3	3
	15.2.0	22
groups	15.2.0	22
Sociometric assessment	1.2.2	1
	2.2.0	2
	2.3.2	2
Socks	11.3.5	18
Solar radiation	12.2.2	19
Somatic responses, involuntary	7.6.6	14
Somatotypes	7.2.1	13
Somatotyping	7.4.0	14
Somesthesis	5.3.1	12
	5.5.1	12
	5.5.2	12
Sonar		
listening	4.6.0	10
	4.7.0	10
systems	4.5.3	10
training	14.1.0	22
Sonic vibrations, effect on man	4.2.6	9
	12.4.2	20
Sonographic analysis	4.9.12	11
Sound		
absorb helmet	11.3.3	18
absorber	4.2.2	8
control	4.2.2	8
field, minimum detectable	4.9.4	11
Sound, cont.		
localization	4.9.7	11
localization, visual-auditory interactions	6.3.0	13
	6.3.1	13
proofing	4.2.2	8
reproducing equipment	4.9.12	11
spectograph	4.9.12	11
Space		
cabins	10.10.1	18
capsule	10.10.1	18
environments	12.7.0	20
exploration, bibliography	12.1.0	19
myopia	3.15.9	8
perception	3.15.9	8
travel	12.7.0	20
Space flight		
decompression	12.5.1	20
diets	13.5.2	22
re-entry acceleration	12.4.1	20
simulator	12.9.0	20
suits	11.2.0	18
systems	2.3.4	3
vision	3.14.0	7
work-rest patterns	13.4.1	21
Space requirements		
effect of body size	7.2.2	13
	10.2.2	17
	10.4.0	17
effect of clothing	11.6.0	19
Spacing		
between controls, ease of discrimination	9.3.0	16
	9.4.0	16
scale divisions	3.8.4	5
Span		
of attention	13.2.4	21
of perception	3.15.0	7
	3.15.11	8
	6.1.0	13
	13.2.4	21
Spatial		
dynamics, panel layout	9.4.2	16
orientation	6.3.2	13
Speaker		
anomalies	4.8.5	10
intelligibility differences	4.8.5	10
Special techniques of assessment	1.2.5	1
Spectral		
analysis	1.2.1	1
	3.6.0	5
density analysis, tracking behavior	7.7.2	14
sensitivity function	3.15.4	7
Spectrographic analysis, noise	4.9.12	11
Specular reflections, visibility	3.3.4	4
Speech (see also Speech production and perception)		
air traffic control communications	2.3.6	3

Search Term	Code Category	Page
Speech, cont.		
air traffic control communications	4.4.2	9
analyzer, automatic	4.8.6	10
	4.9.12	11
audiometry tests, construction of	4.8.6	10
band compression systems	4.8.7	10
Batelle reader for the blind	4.8.6	10
	11.5.1	19
coding apparatus	4.9.12	11
communication systems, analysis	2.3.3	3
communication systems, human engineering evaluations	4.4.0	9
	4.4.1	9
	4.4.2	9
compression system	4.8.7	10
	4.9.12	11
hearing loss for	4.8.2	10
information analysis	2.2.1	2
	4.8.0	10
intercommunication systems	4.4.1	9
phonemic and phonetic analysis	4.8.1	10
power	4.8.1	10
radio systems communications	4.4.2	9
sounds, basic characteristics	4.8.1	10
spectra	4.8.1	10
telephone systems	4.4.1	9
test signal	4.8.2	10
	4.8.6	10
typewriter	4.9.12	11
Speech intelligibility (see also Speech production and perception)	4.8.3	10
amplitude modulation	4.8.4	10
effect of high altitudes	4.8.4	10
	12.5.1	20
effect of oxygen mask	4.8.4	10
	11.3.3	18
frequency distortion	4.8.4	10
individual differences	4.8.5	10
interactions between source and receiver	4.8.3	10
noise masking	4.8.3	10
side-tone amplification and delay	4.8.4	10
transmission and confirmation of messages	4.8.3	10
	14.1.0	22
Speech production and perception, basic data	4.8.0	10
articulation testing	4.8.2	10
audiometry	4.8.2	10
characteristics of speech	4.8.1	10
distortion	4.8.4	10

Search Term	Code Category	Page
Speech production and perception, basic data, cont.		
individual differences in listening, speaking, interpreting	4.8.5	10
language design	4.8.6	10
masking	4.8.3	10
mathematical and statistical methods	1.2.1	1
	4.8.0	10
	4.9.12	11
signal-to-noise ratio	4.8.3	10
span of attention	13.2.4	21
synthetic speech	4.8.7	10
training in voice communication	14.1.0	22
Sperry Zero Reader, quickening instrument	2.3.1	2
	8.7.5	16
Sphygmomanometer	1.2.4	1
Stabilometer	7.6.7	14
Standardization		
controls and displays	8.2.0	15
	10.9.0	17
panels and consoles	9.2.0	16
safety color codes	3.12.1	6
tests and measurements	1.2.0	1
Startle reactions	7.6.6	14
Starvation	13.5.2	22
Statistical		
analysis (see Statistical analysis)		
data presentation	1.2.1	1
decision functions	1.2.1	1
	2.2.2	2
linguistics	1.2.1	1
	4.8.6	10
quality control	1.2.1	1
techniques	1.2.1	1
Statistical analysis	1.2.1	1
aircraft accidents	10.9.2	18
configural aspects of test scores and responses	1.2.1	1
error data	1.2.1	1
game theory	1.2.1	1
	2.1.0	2
	2.2.2	2
operator in closed-loop system	1.2.1	1
	2.1.0	2
	2.3.1	2
Stature	7.2.0	13
Steadiness		
measurements	7.3.3	14
tests	7.4.0	14
	7.6.7	14
Steering control devices	8.3.0	15
Step		
function displacements, tracking performance	7.7.2	14
test	7.5.1	14

Search Term	Code Category	Page
Stereophonic sound	4.9.7	11
Stereophotogrammetry	3.10.2	6
	3.10.5	6
	3.16.0	8
Stereoscope	3.16.0	8
Stereoscopic		
acuity	3.15.9	8
depth perception	3.15.9	8
instruments	3.13.1	7
Stereotypes, motion	8.7.3	16
Stick		
controls, design of	8.3.2	15
forces	8.7.2	16
Stimulus		
compatibility, input channels	6.3.1	13
order and spacing, psychophysical thresholds	1.2.3	1
Stochastic		
methods	1.2.1	1
model	1.2.1	1
	2.2.0	2
Stowage, design for	10.2.3	17
Strabismus	3.15.1	7
Street		
lighting	3.3.2	4
noise	4.2.3	9
Strength, bibliography of tests	7.1.0	13
Stress		
accelerative	12.4.1	20
auditory	4.2.6	9
combat	13.4.4	22
heat	12.2.1	19
indices of	13.3.4	21
	13.4.4	22
isolation	12.8.0	20
psychological	12.8.0	20
	13.4.4	22
vibration	12.4.2	20
visual	3.3.4	4
	3.14.0	7
work related	13.4.4	22
Structure, workgroup	2.3.2	2
Stuttering	4.8.5	10
artificial	4.8.4	10
Subjective magnitudes, scaling	1.2.3	1
Subjects, choice of experimental	1.2.0	1
Sublanguages	4.8.6	10
Subliminal perception		
audition	4.8.2	10
	4.9.4	11
psychophysical	1.2.3	1
visual	3.15.2	7
	3.15.7	7
Submarine		
atmospheres	12.5.2	20
control and display integration	8.2.0	15
	9.2.0	16
Submarine, cont.		
escape devices	11.5.4	19
human engineering evaluation	10.10.3	18
medicine, bibliography	1.1.0	1
noise	4.2.5	9
safety	10.9.0	17
systems problems	2.3.0	2
	2.3.4	3
Subsystem performance, effect on over-all system	2.3.1	2
	2.3.2	2
Suits		
antiradiation	11.2.3	18
asbestos	11.2.1	18
chemical protection	11.2.3	18
coldbar	11.2.1	18
decontamination	11.2.3	18
electrically heated	11.2.1	18
pressure	6.3.1	13
space	11.2.0	18
ventilated	6.3.1	13
Sulphur dioxide—smoke, air, toxic effects	12.3.0	19
Sun radiation	12.2.2	19
Sunglare	3.2.4	3
Sunglasses	3.13.2	7
Supine position		
accelerative forces	12.4.1	20
effect on location of controls	8.5.0	15
	9.3.0	16
effect on visual performance	3.14.0	7
effect on work space design	10.6.0	17
in layout of cockpits	10.10.1	18
Supersonic aircraft (see Aircraft)		
Supply systems	2.3.5	3
Support systems, space flight	2.3.5	3
	12.7.0	20
Surface electrodes	1.2.4	1
Surveillance		
systems	2.3.0	2
	2.3.3	3
	2.3.4	3
visual	3.12.0	6
Survival		
accidents	10.9.0	17
	10.9.1	17
	10.9.2	18
arctic	12.2.0	19
	12.2.1	19
climatic conditions	12.2.0	19
	12.2.1	19
crash	12.4.1	20
equipment	10.10.2	18
	11.5.4	19
group performance	2.3.2	2
kits	11.5.4	19
radiation	12.6.0	20
rations	13.5.2	22
tropics	12.2.0	19
	12.2.1	19

Search Term	Code Category	Page
Survival, cont.		
water balance	7.5.0	14
	13.5.2	22
Sweat loss	12.2.1	19
Swing		
sickness	12.4.3	20
test	1.2.5	1
	12.9.0	20
Switchboards, evaluation of	10.10.0	18
Switches	8.3.1	15
	8.3.2	15
Symbol recognition, masking	3.9.3	6
Symbolic displays	3.7.0	5
Symbolic forms		
color of symbol and background	3.9.2	6
contrast of symbol and background	3.9.2	6
legibility of	3.9.0	5
viewing conditions	3.9.3	6
Symbols, legibility	3.9.0	5
Symposia, heterogeneous human engineering	1.1.0	1
Synthetic speech	4.8.7	10
Systems of men and machines		
air traffic control	2.3.6	3
communication	2.3.3	3
communication and information theory	2.2.1	2
design and evaluations, principles and techniques	2.2.0	2
general works and bibliographies	2.1.0	2
groups as systems components	2.3.2	2
linear programming	2.2.2	2
man as a system component	2.3.1	2
personnel selection	2.3.0	2
production, maintenance, and supply	2.3.5	3
queueing theory	2.2.4	2
reliability	2.3.0	2
requirements, analysis of	2.2.0	2
	2.3.0	2
self-organizing	2.2.0	2
	14.1.0	22
simulation and computers	2.2.3	2
transportation	2.3.4	3
weapons, aircraft and missiles	2.3.4	3
work measurement techniques	2.2.4	2
Tables, printed	3.10.1	6
TACAN system, short-range, tactical, omnibearing distance measuring system	2.3.0	2
Tachistoscopes	3.16.3	8
Tactile (see also Touch and vibration)		
Tactile, cont.		
coding	5.1.2	12
	8.4.1	15
identification	5.1.1	11
	5.1.2	12
localization	5.1.2	12
sensitivity, distribution of	5.1.1	11
stimulation	5.1.3	12
Tactual (see Tactile)		
Tank crew		
problems, assessment	1.2.2	1
	2.3.2	2
training	14.1.0	22
Tanks, evaluation of	10.10.3	18
Tapley Performance Meter	10.9.1	17
Tapping	7.6.2	14
Target degradation, effects on visual search	3.14.0	7
Target designator, radar	3.5.2	4
Target detectability		
auditory	4.6.0	10
effects of natural ambient lighting	3.2.0	3
radar	3.5.1	4
sonar	4.5.3	10
visual search	3.12.0	6
	3.12.1	6
	3.12.2	6
Tartini tones	4.9.6	11
Task (see also Work)		
assessment, techniques of	1.2.2	1
conditions of work	13.4.1	21
duration of work periods	13.4.1	21
levels of complexity	13.4.3	21
load, work organization for systems	2.3.1	2
methods of work	13.4.2	21
physical stress	13.4.4	22
rest periods	13.4.1	21
Taste		
basic data	5.4.1	12
bibliographies	5.4.0	12
equipment and research methods	5.4.3	12
identification	5.4.1	12
mechanisms of	5.4.1	12
signals	5.4.2	12
test	5.4.3	12
Taylor Manifest Anxiety Scale	1.2.5	1
Taylor-Pracejus illumination recorder	3.16.0	8
Teaching machines	14.1.0	22
Team effectiveness	2.2.1	2
	2.3.0	2
	2.3.2	2
Telegraphic		
listening	4.7.0	10
systems	4.4.1	9
training	14.1.0	22
Telemetry, methods of measurement	1.2.4	1
	7.5.1	14

Search Term	Code Category	Page
Telemetry, methods of measurement, cont.	11.8.0	19
Telephone systems, evaluation of	4.4.1	9
Telephonic speech	4.4.1	9
	4.8.7	10
Telescopes and telescopic sights	3.13.1	7
Telespectacles	3.13.2	7
Television		
displays	3.6.0	5
photography	3.10.5	6
Temperature sensitivity		
basic data	5.2.1	12
bibliographies	5.2.0	12
equipment and research methods	5.2.2	12
thermal signals	5.2.1	12
Temporal		
auditory patterns	4.9.8	11
characteristics of light codes	3.12.2	6
correlation techniques	1.2.1	1
discrimination	5.7.0	12
factors in visual performance	3.14.0	7
finger maze	5.1.4	12
Temporary threshold shift	4.9.5	11
Tension	13.3.3	21
Tents	11.7.0	19
Terminal system, Air Traffic Control	2.3.2	2
	2.3.6	3
Terrain Test	3.16.1	8
Test		
construction, statistical aspect of	1.2.1	1
efficiency, statistical aspect of	1.2.1	1
Texts, heterogeneous human engineering	1.1.0	1
Texture		
clothing fabrics	11.2.4	18
coding	3.12.1	6
	5.1.2	12
depth perception cue	3.15.9	8
of photographs	3.10.5	6
Thematic Apperception Test	1.2.5	1
Thermal		
balance in man	7.5.0	14
protection ensembles	11.2.1	18
protective fabrics	11.2.4	18
radiation	12.2.2	19
sensitivity	5.2.0	12
	5.2.1	12
stress	12.2.1	19
Thermonuclear radiation	12.2.2	19
Thought processes	13.2.3	21
effects of aging on	13.5.4	22
Thresholds		
auditory	4.9.4	11
Thresholds, cont.		
comparison, visual and auditory	6.2.1	13
kinesthetic	5.5.1	12
motion	5.6.1	12
olfactory	5.4.1	12
pain	5.3.1	12
psychophysical measurement	1.2.3	1
speech	4.8.2	10
tactile	5.1.1	11
taste	5.4.1	12
temperature	5.2.1	12
vibration	5.1.1	11
visual	3.15.2	7
Tilt	5.6.1	12
postural	5.5.1	12
table, chair	12.9.0	20
Timbre	4.9.3	11
Time		
and motion studies, techniques	1.2.2	1
	7.6.7	14
	13.4.2	21
and unit scheduling, railway transportation	2.3.0	2
	2.3.4	3
constants, aided tracking	7.7.2	14
	8.7.4	16
constants, control operation	8.7.4	16
-delay constants	8.7.4	16
estimations	5.7.0	12
lag, controls	8.7.4	16
pattern, voluntary movement	7.6.0	14
	7.6.2	14
perception	5.7.0	12
sequential analysis	1.2.2	1
	1.2.5	1
	2.2.0	2
sharing	2.2.3	2
	3.8.5	5
	7.7.1	14
-study engineers, in-plant training	1.2.2	1
	14.1.0	22
Tobacco	13.5.3	22
Toggle switches, design of	8.3.2	15
Tolerance		
acceleration	12.4.1	20
altitude and depth	12.5.0	20
body vibration	12.4.2	20
climate	12.2.0	19
pressure breathing	12.5.1	20
Tonal		
gaps	4.9.1	10
patterns	4.9.8	11
Tone		
auditory	4.9.1	10
difference and summation	4.9.6	11
in map design	3.10.2	6
surface color	3.9.2	6
Tools	10.5.0	17

Search Term	Code Category	Page
Torque		
control loading	8.7.2	16
handwheels and knobs	8.3.1	15
Touch and vibration		
basic data	5.1.1	11
bibliographies	5.1.0	11
coding	5.1.2	12
equipment and research methods	5.1.4	12
texture	5.1.2	12
use as stimuli	5.1.3	12
Toxic		
environments	12.3.0	19
substances, threshold limit values	12.3.0	19
Tracing performance, steadiness	7.3.3	14
	7.6.1	14
Tracking		
aided controls	8.7.4	16
auditory	4.7.0	10
bibliography	7.1.0	13
comparison of auditory and visual	6.2.1	13
performance	7.7.2	14
quickened displays	8.7.5	16
research equipment	7.7.4	15
skill	7.7.2	14
types of control	8.3.0	15
types of task	7.7.2	14
visual	3.15.8	7
	7.7.2	14
Traffic		
air safety	10.9.2	18
aircraft	2.3.4	3
	2.3.6	3
aircraft control problems	2.2.4	2
	2.3.2	2
	2.3.6	3
flow problem, analysis	2.2.4	2
motor vehicle	2.3.0	2
	2.3.4	3
motor vehicle safety	10.9.1	17
signal lights	3.3.2	4
	3.12.2	6
signs, legibility	3.9.0	5
	3.10.3	6
Trainers	14.1.0	22
Training simulators	14.1.0	22
Tranquilizing drugs	13.5.3	22
Transfer functions		
human, mathematical analysis	1.2.1	1
of human operator	2.3.1	2
Transillumination	3.4.2	4
Transport units, railway transportation	2.3.0	2
	2.3.4	3
Transportation system evaluations	2.3.0	2
	2.3.4	3
Transverse acceleration	12.4.1	20
Tremography	7.6.7	14
Tremor	7.6.6	14
and fatigue	13.3.3	21
and smoking	13.5.3	22
periodic oscillation	5.1.1	11
Tridimensionality, perception of	3.15.10	8
Trigger		
rifle	8.3.2	15
rule system	2.2.1	2
Tritanopia	3.15.1	7
Tropics, effects of	12.2.0	19
Trouble shooting	2.3.5	3
	14.1.0	22
Trucks, evaluation of	10.10.3	18
Tunning, controls	8.7.1	16
Turbojet noise	4.2.4	9
Turbulence and air safety	10.9.2	18
Twilight lighting	3.2.2	3
Two-channel		
earpiece oximeter	12.9.0	20
ferrograph	4.9.12	11
listening	2.2.3	2
Two-hand coordination	7.7.0	14
Type face		
design	3.9.1	6
legibility	3.9.0	5
Typewriter keyboard	9.4.0	16
	9.4.2	16
Ultrasonic		
noise	4.2.0	8
vibrations, effect on man	12.4.2	20
Ultraviolet		
light	3.2.0	3
	3.15.2	7
	3.15.4	7
lighting of instruments	3.4.3	4
Uncertainty		
communications	2.2.1	2
decision-making	2.2.2	2
Underground, mine lighting	3.3.3	4
Underwater		
breathing apparatus	11.2.2	18
	11.3.3	18
egress from aircraft	10.4.0	17
oxygen requirements	12.5.2	20
pressure requirements	12.5.1	20
sonar listening	4.7.0	10
sound systems	4.5.3	10
swimming	12.5.0	20
Uniform illumination	3.3.1	3
Unilateral color blindness	3.15.1	7
Unique pattern technique	1.2.1	1
Universal Radar Simulator	3.16.4	8
Upright, perception of	5.6.1	12
	6.3.2	13
Utilization studies	1.2.2	1

Search Term	Code Category	Page
Validity coefficients	1.2.1	1
Value orientation	13.2.1	21
Van Allen radiation belt	12.6.0	20
Vapor		
-barrier suits	11.2.1	18
pressures, levels of	12.2.0	19
	12.2.1	19
Variability measures	1.2.1	1
Veg scale, apparent weight	5.5.1	12
	5.5.3	12
Vehicles, evaluation of	10.10.3	18
Vehicular traffic flow analysis	2.2.2	2
	2.3.0	2
	2.3.4	3
Velocity		
body mechanics	7.3.0	13
	7.3.3	14
effect on whole body	12.4.0	19
tracking	7.7.2	14
visual discrimination and perception	3.15.6	7
	3.15.12	8
Ventilation		
clothing	11.2.1	18
	11.2.3	18
cushions	10.3.1	17
environmental	12.2.0	19
	12.2.1	19
Vernier Acuity	3.15.6	7
Vertical		
acceleration	12.4.1	20
	12.9.0	20
perception of	5.6.1	12
	6.3.2	13
scales	3.8.3	5
visual perception	3.15.11	8
Vertigo, pilot	6.3.2	13
Vestibular functions		
and disorientation	6.3.2	13
basic processes and data	5.6.1	12
bibliographies and general references	5.6.0	12
equipment and methods of research	5.6.2	12
extreme motion forces	12.4.0	19
Vests		
ballistic	11.3.2	18
life	11.5.4	19
Vibration (see also Touch and vibration)		
visual displays	3.9.3	6
whole body	12.4.2	20
Vibratory communication system	5.1.3	12
Vibrotactile displays	5.1.3	12
Vigilance		
individual factors	13.2.4	21
man as a system component	2.3.1	2
prolonged performance	13.4.1	21
task performance	7.7.1	14
Visibility		
and safety	10.9.0	17
	10.9.1	17
	10.9.2	18
artificial ambient illumination conditions	3.3.0	3
	3.3.1	3
	3.3.2	4
	3.3.3	4
	3.3.4	4
light signals	3.12.2	6
moving objects	3.15.6	7
	3.15.12	8
natural ambient lighting conditions	3.2.0	3
	3.2.1	3
	3.2.2	3
	3.2.3	3
	3.2.4	3
radar screens	3.5.1	4
range, determination of	3.2.0	3
	3.2.1	3
restricted visual fields	3.14.0	7
signal objects	3.12.1	6
work places	3.4.0	4
	10.2.1	17
Visible speech	4.2.2	8
Vision, basic data		
accommodation	3.15.9	8
acuity	3.15.6	7
adaptation	3.15.3	7
angle, perception of	3.15.11	8
anomalies	3.15.1	7
brightness discrimination	3.15.5	7
color perception	3.15.4	7
contour, perception of	3.15.10	8
convergence	3.15.9	8
depth perception	3.15.9	8
deviations	3.15.1	7
direction, perception of	3.15.11	8
distance, perception of	3.15.9	8
effects of aging	13.5.4	22
exposure time, effects of	3.15.7	7
eye movements	3.15.8	7
fixation, effects of	3.15.7	7
form, perception of	3.15.10	8
general and theoretical	3.15.0	7
individual differences	3.15.1	7
movement, perception of	3.15.12	8
number, perception of	3.15.11	8
pattern, perception of	3.15.10	8
size, perception of	3.15.9	8
space perception	3.15.9	8
threshold visibility	3.15.2	7
Vision, equipment and methods		
basic research problems	3.16.3	8
color vision tests	3.16.1	8
general	3.16.0	8
heterogeneous tests	3.16.2	8
simulators	3.16.4	8
Visors	3.13.2	7

Search Term	Code Category	Page
Visual		
accomodation, tests	3.16.2	8
acuity and motor vehicle accidents	10.9.1	17
aids	3.13.0	6
	3.13.1	7
coding	3.12.0	6
coding, light	3.12.2	6
coding, object characteristics	3.12.1	6
detection	3.2.0	3
	3.12.0	6
	3.14.0	7
displays	3.7.0	5
	3.7.3	5
enhancement	3.13.1	7
fatigue	3.3.1	3
	3.14.0	7
	13.3.3	21
field	3.15.0	7
field, empty	3.15.9	8
field, restriction of	3.14.0	7
form field, mapping of	3.16.3	8
illusions	3.15.7	7
masking	3.14.0	7
noise	3.14.0	7
noise, technique for simulation	3.16.3	8
number, discrimination of	3.12.1	6
	3.15.11	8
perception	3.15.0	7
perception, position of viewer	3.14.0	7
performance, tests of	3.16.1	8
	3.16.2	8
protective devices	3.13.2	7
pursuit, eye movements	3.15.8	7
range	3.15.0	7
	3.15.1	7
search	3.12.0	6
search, eye movement patterns	3.15.8	7
search, outdoor	3.2.0	3
search, radar	3.5.0	4
sensitometer	3.16.2	8
standards	3.15.0	7
Vital capacity	7.5.0	14
Vocality	4.9.3	11
Voice		
communication, intelligibility testing	4.8.2	10
communication systems	4.4.0	9
communication training	14.1.0	22
quality	3.13.1	7
	4.8.5	10
recorders, evaluation of	4.3.0	9
transmission	4.8.3	10
	4.8.4	10
Volume, tonal	4.9.3	11
Vortex wakes	10.9.2	18
Vowels, speech	4.8.1	10
VTOL (vertical takeoff and landing), aircraft	10.10.3	18

Search Term	Code Category	Page
Waiting line theory (see Queueing)		
War		
games	2.2.2	2
	2.2.3	2
gases	12.3.0	19
Warmth discrimination	5.2.1	12
Warning devices (see also Signals)		
auditory	4.5.1	9
bells, sirens, clicks	4.5.1	9
colors	3.12.1	6
Geiger counter	4.5.1	9
lights	3.12.2	6
Watchkeeping (see also Vigilance and Monitoring)	7.7.1	14
Water		
environment	12.5.0	20
immersion	12.5.0	20
	12.9.0	20
protective clothing	11.2.1	18
survival	12.5.0	20
temperature	1.3.0	2
Weapon systems		
evaluation of	2.3.4	3
	10.10.0	18
techniques for design and evaluation	2.2.0	2
Weight, body	7.2.1	13
Weight-lifting capacity, males	7.3.3	14
Weightlessness	12.7.0	20
spatial orientation	6.3.2	13
Wheel controls, design of	8.3.1	15
White noise	4.2.1	8
Whiteness constancy	3.15.4	7
Whiteout	3.15.1	7
Whole body vibration	12.4.2	20
Windblast	12.2.1	19
Windchill	12.2.1	19
Windscreen		
evaluation of	3.13.0	6
	10.10.0	18
for ear	11.5.1	19
Windshield		
aircraft	3.13.2	7
	10.9.2	18
motor vehicle	3.13.2	7
	10.9.1	17
motor vehicle, glazed area standards	10.9.1	17
Word(s)		
articulation	4.8.2	10
English, internal information	2.2.1	2
	4.8.6	10
frequency tables	4.9.12	11
operational	4.8.6	10
phonetically balanced (PB)	4.8.6	10
recognition, visual	3.9.0	5
speaker intelligibility differences	4.8.5	10
Work, etc., see next page		

Search Term	Code Category	Page
Work (see also Task)		
and aging	13.5.4	22
area limits, panels and consoles	9.3.0	16
attitudes	13.3.2	21
capacity	7.3.3	14
conditions	13.4.1	21
cycle	1.2.2	1
	7.7.3	15
	13.4.1	21
decrement	13.3.3	21
efficiency	13.4.0	21
layout	1.2.2	1
	2.3.1	2
	2.3.2	2
	10.2.0	17
levels of complexity	13.4.3	21
measurement system and techniques	2.2.4	2
	11.2.0	18
organization	2.3.1	2
performance, assessment	1.2.2	1
	2.2.4	2
productivity, group	2.3.2	2
	13.4.0	21
rationalization	2.3.1	2
sampling techniques	1.2.2	1
self-pacing versus forced-pacing	13.4.2	21
shelters	11.7.0	19
space, design requirements	10.2.0	17
	10.6.0	17
space, dimensions	10.2.0	17
space, lighting	3.3.3	4
space, measuring devices	10.1.0	16
space, morphological criteria	10.2.0	17
space, techniques of assessment	10.1.0	16
study (see Work performance, assessment)		
surfaces	10.3.3	17
Wrapping materials, evaluation of	10.10.0	18
X-ray	12.6.0	20
anthropometry	7.4.0	14
pictures	3.10.5	6
radiation	12.6.0	20
spectacles, red glass	3.13.2	7
Zero gravity (see Weightlessness)		
Zodiacal light	3.2.0	3
Zone(s)		
color	3.15.4	7
comfort	10.1.0	16
	11.1.0	18
Zone(s), cont.		
comfort	12.1.0	19
markings, instrument	3.12.1	6
	9.4.1	16

PART IV
CITATIONS AND ABSTRACTS

The format of citations on the immediately succeeding pages is generally in keeping with the recommendations of the Publication Manual of the American Psychological Association (1957). In some instances, however, variation in the amount and type of information in the original document has introduced some variation in the final citation. It should be noted that the content of the citation tries to maximize such information (e.g., author's name, contract number, contracting agency, and in some cases the author's institutional or geographical location) as is needed to permit the user to acquire a copy of the document.

The "descriptive" abstracts on the following pages have been prepared with the intent of answering only two questions for the user: "Does information exist on my problem?" and "What would I have to read to obtain such information?" It was the intention of the project staff not to provide any summary of findings or conclusions in the abstracts in order that the user might not be tempted to use such findings without the context of qualification which the original and complete document provides. Another distinctive feature of the abstract is the descriptive code of letters and numbers found at the end of the abstract. The T, I, G, and R designations indicate that the document contains: T-tables, I-illustrations, G-graphs, and R-references cited in the article or document (e.g., R 17 means that 17 references were cited by the author). The availability of such code information should facilitate the user's decision to examine specific documents in particular detail.

Documents cited are not available from the Office of Naval Research, the U. S. Air Force Office of Scientific Research, the U. S. Army Office of Research and Development, or from Tufts University. However, the documents cited are held in repository at the HEIAS and may be examined on the project's premises.

Key to Abbreviations found in Abstracts

a.c.	alternating current
APA	American Psychological Association
C	Centigrade
CAB	Civil Aeronautics Board
cc	cubic centimeter (s)
cff	critical flicker frequency (s)
CIE	Council of the Illuminating Engineering Society
cm	centimeter (s)
cps	cycles per second
crt	cathode ray tube (s)
cu. ft.	cubic foot (feet)
db	decibel (s)
d.c.	direct current
ECG	Electrocardiogram (s)
EEG	Electroencephalogram (s)
e.g.	for example
EKG	Electrocardiogram (s)
EMG	Electromyogram (s)
ERG	Electroretinogram (s)
et al.	and others
etc.	and so forth
F	Fahrenheit
ft.	foot, feet
ft.-c	foot-candle (s)
ft.-L	foot-Lambert (s)
ft.-lbs.	foot-pounds
ft./sec.	feet per second
g	gravity
GCA	Ground Control Approach
GSR	Galvanic Skin Response (s)
IBM	International Business Machines
ICI	International Commission on Illumination
i.e.	that is
IFR	Instrumental Flight Rules
j.n.d.	just noticeable difference (s)
kc	kilocycle (s)
kg	kilogram (s)
L	Lambert
lb. (s)	pound (s)
Ma	milliampere (s)
mc	megacycle (s)
mg	milligram (s)
min.	minute (s)
mL	millilambert (s)
mm	millimeter (s)
MMPI	Minnesota Multiphasic Personality Inventory
mph	miles per hour
msec.	millisecond (s)
mu	millimicron (s)
musec. (usec.)	microsecond (s)
OCS	Officers Candidates School
PB	Phonetically Balanced
PGR	Psychogalvanic Skin Response (s)
PPI	Planned Position Indicator (s)
r	roentgens
RCA	Radio Corporation of America
ROTC	Reserve Officers Training Corps
rpm	revolutions per minute
RT	reaction time
S, Ss	subject, subjects
SAGE	Semi Automatic Ground Environment
SAM	School of Aviation Medicine
sec.	second (s)
SPL	Sound Pressure Level
TTS	temporary threshold shift (s)
USA	United States Army
USAF	United States Air Force
USCG	United States Coast Guard
USMC	United States Marine Corps
USN	United States Navy
VFR	Visual Flight Rules
VOLSCAN	Air Traffic Control Center
VTOL	Vertical Take-off and Landing Aircraft

Key to Abbreviations of Military and Government Organizations

AFCCDD	Air Force Command and Control Development Division, Bedford, Mass.
AFCRC	Air Force Cambridge Research Center, Cambridge, Mass.
AFPTRC	Air Force Personnel and Training Research Center, Lackland AFB, Tex.
AMRL	Army Medical Research Laboratory, Fort Knox, Ky.
ARDC	Air Research and Development Command, Washington, D.C.
CAA	Civil Aeronautics Administration, Washington, D.C.
CEPE	Central Experimental and Proving Establishment, Royal Canadian Air Force, Cold Lake, Alberta, Canada
CHABA	Armed Forces-NRC Committee on Hearing and Bio-Acoustics, Central Institute for the Deaf, St. Louis, Mo.
CONARC	Continental Army Command, Fort Monroe, Va.
FAA	Federal Aviation Agency, Washington, D.C.
FPRC	Flying Personnel Research Committee, London, England
MRC	Medical Research Council, London, England
NACA	National Advisory Committee for Aeronautics, Washington, D.C.
NADC	Naval Air Development Center, Johnsville, Penn.
NAMC	Naval Air Material Center, Philadelphia, Penn.
NASA	National Aeronautics and Space Administration, Washington, D.C.
NATO	North Atlantic Treaty Organization, Paris, France
NDRC	National Defense Research Council, Washington, D.C.
NRC	National Research Council, Washington, D.C.
NRL	Naval Research Laboratory, Washington, D.C.
ONR	Office of Naval Research, Washington, D.C.
OSR	Office of Scientific Research, Washington, D.C.
OSRD	Office of Scientific Research and Development, Washington, D.C.
OSU	Ohio State University Research Foundation, Columbus, Ohio
RAF	Royal Air Force, Farnborough, Hants, England
RCAF	Royal Canadian Air Force, Ottawa, Ontario, Canada
RNPRC	Royal Naval Personnel Research Committee, London, England
SAM	School of Aviation Medicine, Fort Washington, N.Y.
WADC	Wright Air Development Center, Wright-Patterson AFB, Ohio
WADD	Wright Air Development Division, Wright-Patterson AFB, Ohio

CITATIONS AND ABSTRACTS

937
Krendel, E.S. THE SPECTRAL DENSITY STUDY OF TRACKING PERFORMANCE. PART 2. THE EFFECTS OF INPUT AMPLITUDE AND PRACTICE. Contract AF 33(038) 10420, RDO 694 39, WADC TR 52 11, Jan. 1952, 16pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio. (Franklin Institute Laboratories, Philadelphia, Penn.).

937
The application of spectral density analysis to the study of performance in a perceptual-motor task was illustrated. Using two Ss in a simple tracking task, the amplitude part of the frequency response was computed for statistical inputs of two different mean amplitudes and for two different stages of practice. It was hoped that this analysis would indicate whether a rough linear time invariant approximation could be used to describe the tracker's behavior. The results indicated need for further research.
G. I.

1562
Chambers, E.G. MEASUREMENT SCALES: THE PREREQUISITES OF BIOLOGICAL STATISTICS. APU 148/51, 1951, 5pp. Applied Psychology Research Unit, MRC, Cambridge, England.

1562
The concept of measurement is discussed and the following definition accepted for purposes of this paper: "Measurement in its widest sense may be defined as the assignment of numerals to things so as to represent facts or conventions about them." Four types of measurement scales falling under this definition are described: nominal scale, ordinal scale, interval scale, and ratio scale. Finally, the statistical methods allowable for each type of scale are discussed.

3996
Senders, Virginia L. THE EFFECT OF NUMBER OF DIALS ON QUALITATIVE READING OF A MULTIPLE DIAL PANEL. Contract AF 18(600) 50, Tech. Rep. 52 182, Nov. 1952, 34pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio. (Antioch College, Yellow Springs, Ohio).

3996
To determine the functional relation between the number of dials to be monitored (visually) and the time required to monitor them, three experiments were conducted. In the first experiment, Ss were required to locate a misaligned pointer on a panel of dials when all other pointers were aligned at the nine o'clock position. The number of dials varied from 1 to 45; two conditions of illumination (white and red light) were used; time to locate misalignment was the datum. In the second experiment, the task was to find the one pointer that was not within a 45 degree sector marked by a red line on outside rim of dial; positions of sectors were randomized. A third study tested the effect of unused dials surrounding those which were "operative."
T. G. I. R 8

4369
Daniels, G.S., Meyers, H.C. & Churchill, E. ANTHROPOMETRY OF MALE BASIC TRAINEES. Contract AF 18(600) 30, WADC TR 53 49, July 1953, 99pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio. (Antioch College, Yellow Springs, Ohio).

4369
Body size data for 60 measurements of over 3,000 USAF male basic trainees are presented for use by aircraft and equipment designers. The statistics reported for each measurement are the mean, standard deviation, coefficient of variation, standard errors of these statistics, range, and selected percentiles from the first to the 99th. In general, the statistics are reported in both the metric and English values. A complete description of the anthropometric techniques used is included.
T. I. R 4

4376
Crook, M.N., Hanson, J.A. & Weisz, A. LEGIBILITY OF TYPE AS DETERMINED BY THE COMBINED EFFECT OF TYPOGRAPHICAL VARIABLES AND REFLECTANCE OF BACKGROUND. Contracts W33 038 AC 14559 & AF 33(616) 2018, WADC TR 53 441, March 1954, 24pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio. (Institute for Applied Experimental Psychology, Tufts University, Medford, Mass.).

4376
The third of three experimental reports on factors that affect the legibility of type under conditions such as might be encountered in reading aeronautical charts under cockpit illumination was presented. The present report covered an investigation of the interactions of letter size, letter spacing, stroke width, and reflectance of background. The type used was Gothic style capital letters (in the main experiment), regular letter width, and medium and wide spacing, all of which had been previously determined to be optimum. The test, composed of 12 lines of 30 scrambled letters, was read orally by the S under 0.082 ft.-c of red illumination. Speed and accuracy data were recorded and analyzed.
T. G. R 5

4382
Hirsh, I.J. STUDIES ON AUDITORY MASKING, FATIGUE, AND SPEECH INTELLIGIBILITY. Contract AF 11(600) 131, WADC TR 54 203, June 1954, 12pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio. (Central Institute for the Deaf, St. Louis, Mo.).

4382
To specify more precisely the kind of impairment suffered during exposure to loud noise, four experiments were performed. In the first study the threshold of intelligibility (level at which 50 percent of the words in a list are recognized) for spondaic words as a function of the level of 11 bands of noise was measured. In the second study the definition that a critical band of noise should have the same absolute threshold as a pure tone in the center of the band was tested. The third experiment studied masking of different speech materials (four 200-item lists) with the same speakers and listeners. Finally, the effect of filtering on different speech materials was studied. Incomplete research was discussed, and recommendations were included.
R 13

4391
Gerathewohl, S.J. CONSPICUITY OF FLASHING LIGHT SIGNALS. EFFECTS OF VARIATION AMONG FREQUENCY, DURATION, AND CONTRAST OF THE SIGNALS. Proj. 21 1205 0012, Rep. 1, June 1954, 7pp. USAF School of Aviation Medicine, Brooks AFB, Tex.

4391
To test the conspicuity (signal effectiveness) of flashing light signals in a complex situation designed to simulate that of a person engaged in present-day practical signal problems, two experiments were conducted. A multiple reaction test in which the observer had to respond successively to a complex pattern of light and sound signals over a relatively long period of time was used. In the first experiment, conspicuity of signals of a relatively slow frequency and long duration were compared with that of a relatively fast frequency and short duration at different brightness contrasts. In the second experiment, the separate and joint effects of flash frequency, duration, and brightness contrasts were evaluated.
T. G. R 8

4713B
Fitts, P.M. VISUAL ENGINEERING: THE DESIGN OF EQUIPMENT AND TASKS FOR EFFICIENT USE OF HUMAN VISUAL CAPACITY. Engng. Exp. Station News, Oct. 1953, XXV(4), 9-13. (Aviation Psychology Lab., Ohio State University, Columbus, Ohio).

4713B
The specialty of visual engineering within the human engineering field was defined. Five goals (or dividends) attained by visual engineering were discussed with examples from industry as follows: 1) improved worker efficiency, 2) fewer accidents, 3) reduced training costs, 4) improved manpower utilization, and 5) user acceptance.
R 12

4713C
Fry, G.A. EFFECT OF BRIGHTNESS DISTRIBUTION IN THE ENTIRE FIELD OF VIEW UPON THE PERFORMANCE OF A TASK. Engng. Exp. Station News, Oct. 1953, XXV(4), 22-28. (Institute for Research in Vision, Ohio State University, Columbus, Ohio).

4713C
The focus of this paper is upon tasks that are primarily dependent upon central vision, such as reading a micrometer. The current concept that maximum performance can be achieved when the surround is uniformly bright and has the same value as the average brightness in the central portion is examined for its validity. The problem is appraised by considering the mobile and immobile eyes and fixed and changing environments. Deleterious effects on visual performance that accrue from raising or lowering surround brightness or from introducing nonuniformities into the surround are specified.
G. I. R 19

4713D
Mitten, L.G. ENGINEERING DESIGN AND VISION. Engng. Exp. Station News, Oct. 1953, XXV(4), 13-15. (Ohio State University, Columbus, Ohio).

4713D
This paper points out some aspects of man's visual apparatus which are important when designing a system using the eyes as one component. No specific quantitative data on the performance characteristics of the eye are included; the discussion is confined to the general characteristics and principles of operation of the human visual apparatus and some problems in selection.

4713E
Prince, J.H. OPTIC NERVE AND EYESIGHT TESTING. 1. OPTIC NERVE INVESTIGATIONS. 2. VISUAL ACUITY EXPERIMENTS. Engng. Exp. Station News, Oct. 1953, XXV(4), 52-54. (Ophthalmology Dept., Ohio State University, Columbus, Ohio).

4713E
Two experimental programs in the field of vision are described briefly. The first concerns investigations of the sheathing cells in the optic nerve in vertebrate mammals. The second program deals with the development of better testing charts for visual acuity.
I.

4713F
Ratoosh, P. SOME ASPECTS OF BRIGHTNESS DISCRIMINATION. Engng. Exp. Station News, Oct. 1953, XXV(4), 48-52. (Psychology Dept., Ohio State University, Columbus, Ohio).

4713F
Brightness discrimination is defined; the methods used to determine the difference thresholds or detection of a change in brightness and some typical results are discussed. Some practical suggestions for the illumination engineer are offered. Finally, the relation of brightness discrimination to visual acuity and some neurophysiological considerations are discussed.
G. I.

4713G
Renshaw, S. OBJECT PERCEIVED-SIZE AS A FUNCTION OF DISTANCE. Engng. Exp. Station News, Oct. 1953, XXV (4), 44-48. (Psychology Dept., Ohio State University, Columbus, Ohio).

4713G
Results of a series of studies on size-constancy were summarized in this paper. In all the studies visual conditions were kept as nearly normal as possible. In one series, the target was viewed in an outdoor situation at various distances and phenomenal size matches were made by adjusting a pair of drill rods to make a square which exactly contained the target. Other tests were run using stereo instruments. The data were analyzed in terms of perceived size as a function of distance.
T. G.

4713H
Rosebrook, Wilda M. SCHOOL ACTIVITIES AND VISION. Engng. Exp. Station News, Oct. 1953, XXV(4), 15-17. (Bureau of Special and Adult Education, Ohio State University, Columbus, Ohio).

4713H
A brief summary of a longitudinal study testing the hypothesis that children with visual problems are not able to make progress through the elementary school in keeping with their ability was presented. Children were studied throughout their first six grades in a given school. Records of visual tests, of group intelligence tests, and of group achievement tests were obtained for 74 children; of these, 22 had specific visual problems (high esophoria, high exophoria, tropias, and poor vision). Comparisons of performance of the 22 visually handicapped with the 52 normal were made.

4713I
Sherman, H.L. THE VISUAL DEMONSTRATION CENTER. Engng. Exp. Station News, Oct. 1953, XXV(4), 17-22. (School of Fine and Applied Arts, Ohio State University, Columbus, Ohio).

4713I
The Visual Demonstration Center (Ohio State University) described here has 27 demonstration units dealing with the origin and nature of perception. Many are duplicates of those developed at Hanover, N.H., by Adelbert Ames, Jr. and his associates. The use of the facilities at the center by a wide range of university disciplines is discussed.
I.

5269A
Hoppe, D.R. & Lauer, A.R. FACTORS AFFECTING THE PERCEPTION OF RELATIVE MOTION AND DISTANCE BETWEEN VEHICLES AT NIGHT. Bull. 43, Nov. 1951, 1-17. Highway Research Board, Washington, D.C.

5269A
Studies were undertaken to obtain certain quantitative data relating to a driver's reactions to various conditions of visibility and perceptual value of a vehicle being overtaken on the road at night. Time and difficulty for perception of the direction of speed differential and estimates of distance between the vehicles were obtained. Size, contrast, and over-all illumination were used as independent variables for changing the perceptual cues of the lead vehicle. Two experiments used actual road conditions and one used laboratory conditions. Special apparatus was used to record time for perception and time for a judgment response.
T. G. I. R 4

5269B
Uhlaner, J.E. & Woods, I.A. A STUDY OF THE RELATIONSHIP BETWEEN PHOTOPIC AND SCOTOPIC VISUAL ACUITY. Bull. 43, Nov. 1951, 17-32. Highway Research Board, Washington, D.C. (USA Human Factors Research Branch, Adjutant General's Research and Development Command, Washington, D.C.).

5269B
To determine the relation between photopic and scotopic visual acuity in order to ascertain the feasibility of a single instrument for measuring both, 202 soldiers after 30 min. dark adaptation, were given the Army night-vision tester, ANVT-RZX, modified Landolt ring, Army Snellen, quadrant variable contrast chart, line resolution, and Orthorater tests. Light under scotopic conditions varied between 3.51 and 5.26 micromicrolamberts and, under photopic conditions, was 10.5 ft.-c on charts and between 6 and 10.5 ft.-c in the booth. Photopic and scotopic measures were correlated and the practical implications of the findings were discussed.
T. G. I. R 22

5269C
Havens, J.H. & Peed, A.C., Jr. FIELD AND LABORATORY EVALUATION OF ROADSIDE SIGN SURFACING MATERIALS. Bull. 43, Nov. 1951, 32-45. Highway Research Board, Washington, D.C.

5269C
Physical and optical characteristics of sign materials and design and application of a reflectometer devised by the Kentucky Department of Highways are discussed. Accelerated weathering procedures and specification standards are described. Field studies paralleling laboratory work and a possible correlation between the two are described. The field work includes several thousand observations covering 30 different sign surfaces made during night visibility conditions. Ordinary sealed-beam headlamps, polarized headlamps, and viewers are used.
G. I. R 3

5269D
Lauer, A.R. FILTER STUDY OF THE EFFECT OF CERTAIN TRANSMISSION FILTERS ON VISUAL ACUITY WITH AND WITHOUT GLARE. Bull. 43, 1951, 45-51. Highway Research Board, Washington, D.C.

5269D
To determine the effect of filters on visual acuity throughout the spectral range, 20 representative filters were selected for study. Eleven Ss of near-normal vision made 15 separate sets of observations using one eye at a time. Each S's visual acuity without filters was measured first, and then acuity with the filters was obtained with an opposing light and under normal conditions of vision. The relation between acuity and filter transmission factors and decrement due to filter were calculated.
T. G. R 3

5299
Irwin, I.A., Milauckas, E.W. & Levy, B.I. A PROCEDURE FOR EVALUATING INSTRUCTOR TECHNIQUE DURING CRITIQUES OF CREW PERFORMANCE. Proj. 7713, Task 77233, AFPTRC TN 56 32, Feb. 1956, 32pp. USAF Crew Research Lab., Randolph AFB, Tex.

5299
The characteristics of effective instructor behavior in critiques were first outlined. A critique-scoring procedure was then designed to measure how well instructors conformed to the model. Critiques of 32 student crews were scored by specially trained observers; most of these crews were observed twice. The reliability of the measurement procedure was tested by calculating correlation coefficients for interobserver agreement, interrelationships of critique items, and consistency of measures from first to second observation. Also examined were relationships between critique score and student reaction, instructor perception of student reaction, student attitude change, end-of-training attitude, and instructor ratings of crew effectiveness. T. R 9

6513
Day, W.F. & Beach, Barbara R. A SURVEY OF THE RESEARCH LITERATURE COMPARING THE VISUAL AND AUDITORY PRESENTATION OF INFORMATION. Contract W33 038 AC 21269, AF TR 5921, Nov. 1950, 14pp. USAF Air Material Command, Wright-Patterson AFB, Ohio. (University of Virginia, Charlottesville, Va.).

6513
This review was oriented around two questions: 1) "Is material more easily understood when presented visually or aurally? 2) Under what conditions and to what extent is each of the methods more efficient with respect to the comprehension of material?" The findings were grouped according to the type of material presented, e.g., nonsense syllables, meaningful prose. From these data, several conclusions were drawn which point out the specific conditions under which each of the systems is superior. Implications for future communications research were outlined in five general areas: type of material, characteristics of human receiver, method of presentation, measure of intelligibility, and conditions of reception.
R 34

9347
Gibbs, C.B. TRANSFER OF TRAINING AND SKILL ASSUMPTIONS IN TRACKING TASKS. Quart. J. exp. Psychol., Aug. 1951, III(Part 3), 99-110. (Applied Psychology Research Unit, MRC, Cambridge, England).

9347
Transfer of training was studied using a compensatory tracking and a serial pursuit task. For the first task, 70 Ss divided into groups learned to track on the standard and one of four modified arrangements of the handle-winding apparatus. These modifications were: pointer direction, pointer size, winding direction, and handwheel size. For the second task, ten females and ten males learned to track on both an easy and difficult course. Learning scores on all pairs of task conditions and sequences were compared by t-tests. The results were considered in terms of task difficulty, expectations based on previous experience, and different levels of required ability.
T. R 14

13,202
Ruff, G.E., Levy, E.Z. & Thaler, V.H. STUDIES OF ISOLATION AND CONFINEMENT. J. Aerospace Med., Aug., 1959, 30(8), 599-604. (USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio).

13,202
A series of experimental studies of isolation and confinement, carried out to be used as sources of inferences about what to expect in space flight, are summarized. Two types of experiments are covered. 1) Simulated operational conditions with groups of five men over a period of five days as they lived in a compartment 17 by 7 by 6 ft. were studied; measures of group and individual behavior, of physiological, biochemical, and medical status were taken. 2) Isolation of individuals under a variety of unusual conditions, such as reducing sensory inputs to a minimum, was studied. Implications of the findings for space flight were discussed.
R 4

13,304
Armington, J.C. CHROMATIC AND SHORT TERM DARK ADAPTATION OF THE HUMAN ELECTRORETINOGRAM. J. opt. Soc. Amer., Dec. 1959, 49(12), 1169-1175. (USA Walter Reed Army Institute of Research, Washington, D.C.).

13,304
To study the spectral sensitivity of the human ERG as modified by chromatic adaptation, the ERG was elicited by test flashes that followed 2.5 sec. after the termination of a colored adaptation. Three colors of adaptation (red, blue, and purple) and test flashes from 400 to 700 mu were used. The heights of the various components of the ERG were measured (one S, six repetitions of each flash and adaptation) and averaged; plots relating the amplitude of a component to test flash luminance were made. From these, the relative spectral sensitivities of response components were determined.
G. I.

14,184
Kugris, Violette A. DEVELOPMENT OF PROTOTYPE PROFICIENCY TESTS FOR SAGE OPERATORS: TRACK MONITOR. Contract AF 41(657) 95, Proj. 1975, Task 76892, ARCRC TN 58 64 & ERC Proj. 46, Aug. 1958, 19pp. Educational Research Corporation, Cambridge, Mass.

14,184
A proficiency test was constructed for the position of Track Monitor at the Experimental SAGE Sector in order to provide estimates of operator's ability to solve typical problem situations by applying specific knowledges and procedures. The test items were of two types: 1) decision-making required by the job, and 2) areas of job knowledge essential to such decision-making. The test was administered to 80 individuals including both experienced operators and graduating students of the SAGE Training Department. An item analysis was made. Recommendations for further development were included.
T. I. R 3

14,325
Altman, I. & McGrath, J.E. A CONCEPTUAL FRAMEWORK FOR THE INTEGRATION OF SMALL GROUP RESEARCH INFORMATION. Contract AF 49(638) 256, Supplemental Agreement 1(58 446), AFOSR TN 59 252, & HSR TN 59/1 GN, Feb. 1959, 115pp. Human Sciences Research, Inc., Arlington, Va.

14,325
This is a report of the second phase of a research program designed to integrate existing research knowledge about small groups. The approach used is data-oriented, thus dealing with empirical research results in detail, and the classification system is based on the form or syntax of empirical data which permits a logically complete framework. The basic approach and resulting integrative framework are described; results of its application to a sample of small group research studies are presented; some major potential applications of the research to basic and operational problem areas are discussed. A coder instruction manual is appended.
T. G. I. R 7

14,743
Melton, A.W. HUMAN FACTORS PROBLEMS OF COMBAT SURVEILLANCE IN MOBILE WARFARE. Presented at: Fourth Annual Army Human Factors Engineering Conference 9-11 Sept. 1958, USA Chemical Center, Md., p. 61. USA Office of Research & Development, Washington, D.C. (University of Michigan, Ann Arbor, Mich.).

14,743
An unclassified abstract of Dr. Melton's SECRET presentation at an USA Human Factors Engineering Conference (September 9-11, 1958) is given. The paper considers some characteristics of military operations under the PENTANA concept, the surveillance requirements that must be met for such operations, and some characteristics of the surveillance system along with such subsystems as sensor and information processing.

14,850
Reese, W.G. & Dykman, R.A. ORIENTING BEHAVIOR AS A (POSSIBLE) DIAGNOSTIC TEST OF (1) CEREBRAL PATHOLOGY AND (2) EMOTIONAL STABILITY. ARMY PROGRESS REPORT. Contract DA 49 007 MD 746, Jan. 1958, 33pp. Psychiatry Dept., Medical Center, University of Arkansas, Little Rock, Ark.

14,850
The response of a healthy organism to even mild, simple stimuli (lights, tones, breezes, etc.) was called here the orienting response (OR). The preliminary findings from a research study of OR in medical students and in psychiatric and neurological patients were reported. The Ss were presented with a series of auditory signals of conversational intensity and recordings made of heart rate, respiration, skin resistance, and muscle potentials. The student data were used to study 1) adaptation, 2) effect of psychological states such as anxiety and monotony, and 3) various methods of quantifying autonomic data. The patient data will be used to evaluate the diagnostic possibilities of OR.
T. G. R 1

14,892
Bradley, J.V. STUDIES IN RESEARCH METHODOLOGY. I. COMPATABILITY OF PSYCHOLOGICAL MEASUREMENTS WITH PARAMETRIC ASSUMPTIONS. Proj. 7184, Task 71581, WADC TR 58 574(I), Sept. 1959, 20pp. USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio.

14,892
The compatibility of typical psychological measurements with the assumptions of common, parametric, statistical tests is examined. Empirically obtained distributions of time scores and mathematically derived error distributions are used to illustrate conditions which give rise to serious violations of assumptions.
T. G. R 5

15,043
Dreyer, J.F. FEASIBILITY STUDY AND DESIGN OF A SELF-ATTENUATING LIGHT VALVE. Contract AF 33(616) 5469, Proj. 7165, Task 71839, WADC TR 59 81, Oct. 1959, 15pp. USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio. (Polacoat Incorporated, Blue Ash, Ohio).

15,043
Investigation of the phototropic phenomenon to determine the feasibility of phototropic material as a protective, self-attenuating light valve against the energy yields of high-intensity light sources has been accomplished. The practical utilization of such materials as a protective eye device against atomic flash and as a sunglass was explored.
T. G. R 14

15,052
Liverant, S. & Scodel, A. INTERNAL AND EXTERNAL CONTROL AS DETERMINANTS OF DECISION MAKING UNDER CONDITIONS OF RISK. Contract AF 49(638) 317, 1959, 14pp. Ohio State University, Columbus, Ohio.

15,052
A test was made of the hypothesis that individuals approaching a situation that involves decision-making under conditions of risk differ on a dimension of internal-external control (those who believe they can exert some modicum of control versus those who do not). An internal-external control test of 60 forced-choice items was administered to 85 Ss, each of whom engaged in a risk-taking situation in which he was required to bet on the outcome of a pair of dice 30 times. Four amounts of money and seven alternative outcomes with known objective probabilities could be selected. The differences in selection of high, intermediate, and low probabilities, in payoff values, in amounts of money spent were analyzed with relation to internally and externally oriented Ss. T. R 15

15,354
Ramo, S. THE GUIDED MISSILE AS A SYSTEMS ENGINEERING PROBLEM. Canad. Aeronaut. J., Jan. & Feb. 1957, 3(1 & 2), 3-9, 37-43. (Ramo-Wooldridge Corp., Los Angeles, Calif.).

15,354
This paper first discusses systems engineering rather broadly, indicating the common characteristics of complex engineering systems and the factors that usually must play a large part in system invention and design. Particulars are then added in the exploration of systems engineering by reference to the guided missile art. Finally, the way to improve our ability to invent and design engineering systems is discussed.

15,374
Loveless, N.E. ATTENTION TO INDIVIDUAL CHANNELS IN A BISENSORY PRESENTATION. FPRC Memo 129, Sept. 1959, 5pp. Flying Personnel Research Committee, London, England. (Nuffield Department of Industrial Health, University of Durham King's College, Newcastle-on-Tyne, England).

15,374
An earlier experiment showed that a higher rate of signal detection was obtained when signals were simultaneously presented through vision and audition than were obtained from either channel alone. Some Ss were reported to have had initial difficulty in using the bisensory presentation. This experiment attempted to determine whether the difficulty lay in attending to both signal sources at once. The same apparatus was used as before by which signals in the two channels were derived from a common source and were of equal signal level; signals in each channel could be seeprately controlled. Three groups of Ss served under one of the following conditions: visual or auditory signals alone and both single and double signals. Rates of signal detection were compared. T. R 3

15,394
Smedal, H.A., Stinnett, G.W. & Innis, R.C. A RESTRAINT SYSTEM ENABLING PILOT CONTROL UNDER MODERATELY HIGH ACCELERATION IN A VARIED ACCELERATION FIELD. NASA TN D 91, May 1960, 19pp. National Aeronautics and Space Administration, Washington, D.C. (Ames Research Center, Moffett Field, Calif.).

15,394
A pilot restraint was described which was used in a centrifuge program. The pilot was subjected to varied and relatively high accelerations up to seven g from two- to five-min. duration in the vehicle simulator while he performed complex tracking problems. In order to conduct these tests, it was necessary to design a special restraint system which combined a modified posterior mold or couch with an anterior restraint fabricated from nylon straps and nylon netting and incorporated head and face supports.
G. I. R 5

15,412
Guilford, J.P., Berger, R.M. & Christensen, P.R. A FACTOR-ANALYTIC STUDY OF PLANNING. I. HYPOTHESES AND DESCRIPTION OF TESTS. Rep. 10, July 1954, 28pp. Psychological Lab., University of Southern California, Los Angeles, Calif.

15,412
The first phase of an attempt to isolate and define abilities that may be important in the domain of planning was reported. Upon the basis of a review of the literature, four hypotheses were formulated as to factors to be expected in terms of the classes of activities involved in the various stages of planning. These were 1) orientation, 2) prediction, 3) elaboration, and 4) ordering. Two additional qualitative factors were posed: 5) ingenuity, and 6) evaluation. Tests were constructed, adapted, or selected to test the hypotheses; 31 tests were so chosen. A later report will give the results of administration and analysis of the tests.
I. R 15

16,103
Corbin, H., Carter, J., Reese, E.P. & Volkmann, J. (Eds.). EXPERIMENTS ON VISUAL SEARCH 1956-1957. FINAL REPORT. I. AIDS TO THE IDENTIFICATION OF CONVERGING GROUPS. Contract AF 19(604) 1713, Task I, AFCRC TR 57 59, July 1958, 11pp. Psychophysical Research Unit, Mount Holyoke College, South Hadley, Mass.

16,103
This is the third in a series of experiments concerned with the speed and accuracy of identifying converging groups of objects. Ss were shown series of displays of dots; on each successive display, every dot was displaced slightly; certain dots converged on the last display while others moved on random courses. Previous experimentation showed this to be a difficult task; this experiment was designed to test possible aids: 1) markings made by S on plastic overlay, 2) destination points marked in the display, 3) rings drawn around point of convergence, and 4) arrows attached to each dot indicating direction of movement. Applications of the results to practical identification problems were suggested.
G. I. R 1

16,104
Corbin, H., Carter, J., Reese, E.P. & Volkmann, J. (Eds.). EXPERIMENTS ON VISUAL SEARCH 1956-1957. FINAL REPORT. II. SPEED AND ACCURACY OF SEARCH FOR TARGETS IN A HORIZONTAL ARRAY. Contract AF 19(604) 1713, Task II, AFCRC TR 57 59, July 1958, 10pp. Psychophysical Research Unit, Mount Holyoke College, South Hadley, Mass.

16,104
Three experiments were accomplished on the ability of observers to spot targets that appear suddenly on the scene. The basic task in all studies was to search for a small dot of light which might appear anywhere on a curved "horizon" line in the visual field. In the first study, Ss searched for targets over five values of stimulus range (5, 40, 80, 120, and 158 degrees) with three levels of target-to-background brightness. The second study varied the time between ready signal and appearance of a moderate, constant brightness target over a 158-degree range. Last, the search performance was studied by controlling the head and eye movements pursuant to search.
G. I. R 2

16,106
Ericksen, S.C. A REVIEW OF THE LETERATURE ON METHODS OF MEASURING PILOT PROFICIENCY. Contract AF 33(038) 23183, Proj. 508 016 0003, Res. Bull. 52 25, Aug. 1952, 24pp. USAF Pilot Training Research Lab., Goodfellow AFB, Tex. (American Institute for Research, Pittsburgh, Penn.).

16,106
A review of literature on methods of measuring pilot proficiency is presented as a general summary of the research contributions that should be recognized when dealing with problems in this area. The studies surveyed include the years through 1951. Following an historical review, these topics are dealt with: 1) selection without criteria, 2) early studies with a psychological orientation, 3) evaluation of subjective measures, 4) studies done in USN aviation, and 5) recent studies involving civilian pilot data. In addition to the major topic there is a discussion of some studies that provide a comparison between subjective and objective grading methods.
R 53

16,143
Kahn, A. THE RESPONSE CHARACTERISTICS OF THE HUMAN BODY TO LOW FREQUENCY VERTICAL VIBRATION. Human Factors Data Bull. 47, Feb. 1960, 2pp. Westinghouse Electric Corporation, Baltimore, Md.

16,143
To determine the transmitting characteristics of the living human body for low frequency vertical vibration, data were obtained from ten seated Ss. The chair was attacked to a vibration generator and traveling gantry which could provide a continuous variable frequency from 6 to 150 cps. In this experiment a peak vibrational acceleration of one g (measured at seat) was not exceeded. Accelerometers were mounted at the hip, shoulder, and seat (reference). Transmissibility (ratio of peak vibrational acceleration at a particular part of the body to the peak recorded at the seat) for hip and shoulder were given.
G. R 1

16,145
Kahn, A. EFFECT OF OPTIMUM SCOPE BIAS ON TARGET DETECTION. Human Factors Data Bull. 48, March 1960, 3pp. Westinghouse Electric Corporation, Baltimore, Md.

16,145
This bulletin summarized a study performed to determine the relationship between crt bias (scope intensity), ambient illumination, and system noise (appearing on grid of crt) on target detectability. The equipment simulated was interceptor fire control, AN/APQ-50 Radar. The radarscope was mounted in a simulated cockpit; a target appeared in any one of nine positions. The task was to press a button stopping the sweep and call out a number identifying target position. Different variables introduced were intensity, receiver noise, and target position; two conditions of ambient illumination (complete blackout and "flood light") were used. Detectability thresholds were given in db above scope minimum detectable signal. The optimum scope bias for target detection was discussed. I. R 1

16,166
Wortz, E.C., McTee, A.C. & Cole, D.L. CONTROL-DISPLAY RELATIONSHIPS IN MANNED CONTROL LOOPS. Rep. AZG 001, 60pp. Convair-Astronautics, General Dynamics Corporation, Groton, Conn.

16,166
The results of tests conducted to determine optimal control-display relationships in a generalized tracking task were described. Each of 24 Ss performed the tasks (both pursuit and compensatory) while seated in a mocked-up aircraft seat facing a dual beam cathode-ray oscilloscope. The target spot was controlled by a stick located at the right of the seat. Four control displacement-display displacement functions, three control-display lag constants, and three target movement rates (including a step function) were independent variables. The analysis in this report was concerned only with the integrated errors for the last two min. of every three-min. tracking period.
T. G. I.

16,168
Roby, T.B. & Lanzetta, J.T. CONSIDERATIONS IN THE ANALYSIS OF GROUP TASKS. Psychol. Bull., March 1958, 55(2), 88-101. (Tufts University, Medford, Mass. & University of Delaware, Newark, Del.).

16,168
This report proposes a paradigm that may be useful in preliminary attempts to isolate and define important group-task characteristics. Based on the paradigm, several classes of relatively molecular differentiating properties of tasks are discussed. Then the concept of "critical demands" task properties at a higher level of abstraction is introduced. Such demands will serve as useful intervening variables between molecular task properties and task performance measures. Finally, an attempt is made to apply both the molecular and critical demand analyses to a widely used task and to show how the usefulness of this task could be further extended.
T. I.

16,198
Roby, T.B., Harleston, B.W. & Eyde, Lorraine D. RESEARCH INVOLVING COMMUNICATION PROCESSES IN TASK ORIENTED GROUPS. Proj. NONR 494(15), Tech. Rep. 2, Nov. 1959, 12pp. Institute for Applied Experimental Psychology, Tufts University, Medford, Mass.

16,198
This annual report describes investigations accomplished or started in the year just past on communication processes in task-oriented groups. Five broadly defined subfunctions of group performance serve as a set of research topics: vigilance, phasing, storage, patterning, and addressing. These topics are described and defined in relation to the on-going investigations.
R 3

16,219
Meixsell, L.M. THE APPLICATION OF STATISTICAL DECISION MAKING TECHNIQUES TO THE EVALUATION OF SURVEILLANCE AND WARNING SYSTEM PERFORMANCE. Contract AF 19(604) 5200, May 1960, 10pp. Lincoln Laboratory, Massachusetts Institute of Technology, Lexington, Mass.

16,219
A thorough evaluation of surveillance and warning system capabilities requires the adoption of some specific alarm criterion. The problems involved in the choice of an alarm criterion are examined in this paper and attempts are made to develop an optimum criterion by means of appropriately modified techniques of sequential analysis.
G.

16,248
Braun, L., Jr. & Truxal, J.G. ON ADAPTIVE CONTROL SYSTEMS. Contract DA 30 069 ORD 1560, OOR Rep. 1338 10 & Res. Rep. R 735 59, PIB 663, April 1959, 82pp. Microwave Research Institute, Polytechnic Institute of Brooklyn, Brooklyn, N.Y.

16,248
Methods of realizing control systems that exhibit adaptation are considered. A philosophy is first developed for such systems by considering the behavior of a human being acting as a controller in situations that require adaptation. Two major problems are defined: identification and excitation. Three specific techniques for solving the identification problem are described: 1) the Maclaurin series expansion of the impulse response, 2) representation of the impulse response as the sum of a set of preselected exponential functions, and 3) the impulse response expansion in a series of orthonormal functions. A solution to the excitation problem appropriate to each technique is described.
G. I. R 13

16,285
Welter, N.E. THE DERIVATION OF A COUPLING NETWORK FOR THE DYNAMIC SIMULATOR PLATFORM. Contract NONR 1670(00), Rep. D228 430 007, Aug. 1959, 19pp. Bell Helicopter Corporation, Fort Worth, Tex.

16,285
An interim solution to the problem of scaling dynamic simulator platform motions (as in helicopters) is presented which derives the filter network between the airframe computer and the platform servo system to give minimum acceleration error subject to the constraint that the platform motion is confined to limited values. The constants of this optimal coupling filter are given as a function of the expected rms velocity for the various degrees of freedom of the system.
I. R 2

16,425
Wood, W.D. & Basore, B.L. A COMMUNICATION CHANNEL WITH LEARNING. Contract AF 30(602) 1890, Proj. 4519, Task 45541, RADC TN 59 363, Sept. 1959, 17pp. Dikewood Corporation, Albuquerque, N.M.

16,425
This technical note covers initial work on a generalization of information theory to include learning by the receiver. Assuming that the receiver can recognize the elements of the message set but is unfamiliar or inexperienced with their probabilities of occurrence, a modified "entropy" concept can be defined using subjective "probabilities" for measuring the element of surprise to the receiver. The entropy of the message set as seen by the receiver is proved to be greater than or equal to the true entropy of the message set and intuitively satisfactory examples of learning steps are shown to reduce this difference.
I. R 1

16,460
Bartow, J.E., Krassner, G.N. & Riehs, R.C. DESIGN CONSIDERATIONS FOR SPACE COMMUNICATION. IRE Trans., Dec. 1959, CS-7(4), 232-240. (USA Signal Research and Development Lab., Fort Monmouth, N.J.).

16,460
With the advent of artificial earth satellites, the use of such vehicles for communication purposes has been the subject of considerable study by both military and commercial organizations in the communications field. This paper describes the problems involved in space communication, the assumptions that must be made, and the technical limitations which determine the communication system that should be used for a particular time frame. Some characteristics for an optimum system are stated and some technical characteristics of the first successful satellite communication system are given.
G. I. R 4

16,481
Pribram, K.H. CEREBRAL MECHANISMS AND DECISION PROCESSES. FINAL REPORT. Contract DA 49 007 MD 763, Dec. 1959, 9pp. Stanford University, Stanford, Calif. (Institute of Living, Hartford, Conn.).

16,481
This report summarized the second stage of a research program of neuropsychological research. In the first stage, two major psychological categories were distinguished through neurobehavioral analysis: discriminative and preferential. In the second stage, tests of the validity of these distinctions were made and problems of "preference" were studied by use of techniques developed in decision theory. Tests of the distinction between discrimination and preference were accomplished in the laboratory. Brain lesions were then made to determine whether differential effects could be obtained. A theoretical discussion of the results was presented.
R 13

16,482
Wolin, B.R. METHODOLOGY NOTE: ON THE DESIGN AND REDESIGN OF SYSTEMS. Contract AF 19(604) 2635, AFCRC TN 59 70, SDC FN 2600, Nov. 1959, 33pp. System Development Corporation, Santa Monica, Calif.

16,482
This paper discusses some characteristics of complex, man-computer information processing systems and an approach to the design and improvement of such systems. The contents stem directly from experience of a group performing research and development on the SAGE Air Defense System and represent an attempt to abstract from this experience those techniques that have proved useful in answering such questions as 1) does or will a system have problems? 2) what are they? 3) where is the basic source of any problem? and 4) how does one go about solving them? Major sections deal with contingency analysis, specific design techniques, and optimizing man-computer relationships.

16,485
Malmo, R.B. CERTAIN PHYSIOLOGICAL CORRELATES OF PSYCHOMOTOR FUNCTIONING. Contract DA 49 007 MD 626, Jan. 1960, 10pp. McGill University, Montreal, Quebec, Canada.

16,485
A progress report on a program of investigation concerned mainly with the activation dimension in behavior was presented. During the period covered here, work interest was focused on the brain mechanisms mediating activation level; two possible determiners of this level were investigated: 1) task complexity (difficulty) and 2) induced muscle tension. These experiments were described in summary form. A study employing a monopolar method for recording palmar conductance in conjunction with a stain method for measuring palmar sweating was outlined.
R 11

16,487
Kappauf, W.E. PROGRESS REPORT OF RESEARCH ON CONTEXT EFFECTS IN PSYCHOPHYSICAL JUDGMENTS. 1 JULY 1957 TO 1 JANUARY 1960. Contract DA 49 007 MD 877, Jan. 1960, 5pp. Psychology Dept., University of Illinois, Urbana, Ill.

16,487
A brief summary of work accomplished on the project is presented. The following items are included: 1) research planning based upon a review of literature in the area of context effects and sequential dependencies between responses; 2) the development of apparatus, including equipment for automatic programming of certain of the psychophysical experiments planned; 3) a quantitative, rational analysis and comparison of three psychophysical methods (constant stimuli, limits, and up-and-down); and 4) a series of research studies using the up-and-down method.

16,488
Gardner, R.A. PERCEPTION OF RELATIVE FREQUENCY AS A FUNCTION OF THE NUMBER OF RESPONSE CATEGORIES. Proj. 6X95 25 001 02, Task 02, Rep. 408, Dec. 1959, 10pp. USA Medical Research Lab., Fort Knox, Ky.

16,488
Choice behavior in an uncertain situation where the only basis for choice was the perceived relative frequency of events in a series was studied. The number of available response categories, or choices, was varied independently of the number of stimulus-event categories in the series by adding dummy-choices (choices that could not result in hits) on the response panel. The data were analyzed to ascertain whether increasing the number of response categories tended to increase the response bias in favor of the most frequently presented category. An interpretation of the multiple-choice effect in decision-making was offered.
T.

16,604
Blechta, R.F., Forrest, J., Carter, W.K. & Wade, E.A. COMFORT EVALUATION OF THE C-124A PILOT SEAT (WEBER). ONE OF A SERIES OF STUDIES PERTAINING TO THE DESIGN EVALUATION OF PILOT AND CREW STATION EQUIPMENT. Contract AF 33(616) 3068, Proj. 7215, Task 71724, WADC TR 58 314, Nov. 1959, 14pp. USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio. (Bio-Mechanics Lab., Dept. of Sociology, Tufts University, Medford, Mass.).

16,604
Certain design characteristics of the C-124A Pilot Seat (Weber) were evaluated for adequacy in the maintenance of human comfort. Tests were carried out using 18 Ss of variable weight and stature wearing anti-g suits. Each S was required to remain in the seat until his discomfort reached a point where he felt compelled to leave or until a period of seven hours had been completed. Questionnaires were presented hourly during the sitting period to follow the S's comfort and opinion of the seat; a posttest required a rating of the seat's comfort. The data included time of voluntary sitting, comfort ratings (both hourly and final), and subjective comments on the seat. Recommendations for design improvements were made.
T. G. I. R 1

16,608
Saw, J.G. A NON-PARAMETRIC COMPARISON OF TWO SAMPLES ONE OF WHICH IS CENSORED. Contract DA 36 034 ORD 2184, DA Proj. 5B99 01 004, ORD Proj. TB2 0001 & OOR Proj. 1597, Tech. Rep. 12, June 1960, 26pp. Dept. of Biostatistics & Statistics, University of North Carolina, Chapel Hill, N.C.

16,608
This technical report arises from a research project on estimation and testing of parameters by order statistics. It is assumed that x and y are random variables with continuous cumulative distribution functions F(x) and G(y). It is desired to test the null hypothesis of the form $H_0: F \equiv G$ when one of the samples G is censored; i.e., both the smallest and largest observations are not available for statistical purposes. The properties of a statistic T, defined to be the total number of times an x-observation is less in magnitude that a y-observation, are investigated. The distribution of T, its consistency against alternatives of the form $H_1: F \neq G$ and its asymptotic power relative to the Mann-Whitney U statistic for complete samples are considered. T. R 4

16,610
Sherman, H. THE CHARACTERIZATION OF DATA. Contract AF 19(604) 5200, Group Rep. 25G 0009, July 1960, 22pp. Lincoln Lab., Massachusetts Institute of Technology, Lexington, Mass.

16,610
Attention is specifically directed at the characterization of digital data (by contrast with audio and video signals) as this might influence the design of modulation systems. The major concern is with modifications to be made in the natural structure of the data delivered to the communicator and the factors that influence such structural changes. Problems of source structure, pertinent source parameters, natural structure removal before transmission, transmission costs, cost of erroneous and lost data, the use of natural structure for error detection and correction, synchronization and timing are discussed.
I. R 17

16,622
Aalund, N. ON THE WIENER PREDICTION PROBLEM AND THE PROBLEM OF THE OPTIMIZED, NOISEFREE AUTOMATIC CONTROLLER. Contract AF 49(638) 586, AFOSR TN 59 1100, Tech. Note 400 2, Oct. 1959, 16pp. College of Engineering, New York University, New York, N.Y.

16,622
Solutions of the Wiener prediction problem in the sampled, nonstationary case and the problem of minimizing a generalized loss-function defined for a sampled, noise-free automatic controller are presented. The concept of orthogonal projection is fundamental for the solutions of both problems and is shown to account for the structural resemblances of the final results. On the other hand, the principal difference between the two problems is also emphasized by the methods used.
R 6

16,626
Box, G.E.P. FITTING EMPIRICAL DATA. Contract DA 11 022 ORD 2059, MRC Tech. Sum. Rep. 151, May 1960, 44pp. USA Mathematics Research Center, University of Wisconsin, Madison, Wisc.

16,626
The dual problems of design—how one chooses to generate data—and analysis—extracting all the information concerning questions which are of interest—are developed. The second problem is considered first with some attention given to the properties of the likelihood function. The use of linear least squares and nonlinear least squares is described with an example given for fitting a set of simultaneous differential equations by least squares. The choice of an experimental design for generating data is discussed with particular attention given to designs for fitting graduating polynomials, for minimizing error variance, for minimizing bias as well as variance error and for fitting "theoretical functions" nonlinear in the parameters. T. R 23

16,631
Duncan, D.B. A SIMPLE BAYES SOLUTION TO A COMMON MULTIPLE COMPARISONS PROBLEM. Contract AF 48(638)261 & Contract NONR 855(06), Mimeo. Series 223, April 1959, 38pp. Institute of Statistics, University of North Carolina, Chapel Hill, N.C.

16,631
The multiple comparison problem with which this paper is concerned arises often in connection with n random samples drawn from n normal populations with means $\mu_1, \ldots, \mu_n$ and a common variance. The problem is that of making $n(n-1)/2$ simultaneous two-sided symmetric t-tests of the $n(n-1)/2$ hypotheses $H_{ij}: \mu_i = \mu_j$; $i, j = 1, \ldots, n$; $i < j$. A comprehensive Bayes analysis leading to a simple solution with well-defined properties that appear to be appropriate to an appreciable class of practical problems has been made. The more mathematic aspects of this analysis and solution are presented herein.
T. G. I. R 23

16,652
Olkin, I. & Tate, R.F. MULTIVARIATE CORRELATION MODELS WITH MIXED DISCRETE AND CONTINUOUS VARIABLES. Contract NONR 225(52), Proj. NR 342 022, Tech. Rep. 58, Aug. 1960, 35pp. Applied Mathematics & Statistics Labs., Stanford University, Stanford, Calif.

16,652
A model that frequently arises from experimentation in psychology is one that contains both discrete and continuous variables. The concern in such a model may be with finding measures of association or of inference. The simplest model contains a discrete variable x that takes the values 0 or 1 and a continuous variable y. The present paper considers a multivariate correlation model (an extension of the simple form), in which x has a multinomial distribution and the conditional distribution of y for fixed x is multivariate normal. A summary of procedures developed throughout the paper together with examples of situations in which they would be appropriate is presented.
R 15

16,693
Smith, W.E. APPLICATIONS OF A'POSTERIORI PROBABILITY TO THE ANALYSIS OF THE FREQUENCY OF DEMAND AND TO THE EFFICIENT MINIMIZATION OF A FUNCTION. Management Sciences Research Project, Res. Rep. 56, Sept. 1958, 15pp. University of California, Los Angeles, Calif.

16,693
Following an outline of the philosophy and method of a posteriori probability, two distinct problems are considered: 1) the analysis of the frequency of demand and 2) a method of efficient computational minimization of a function that depends on the cost of the computation involved in evaluating the function.
T. G. R 10

16,695
Sukhatme, S. RESEARCH IN MULTIVARIATE ANALYSIS. NON-PARAMETRIC TESTS FOR LOCATION AND SCALE PARAMETERS IN A MIXED MODEL OF DISCRETE AND CONTINUOUS VARIABLES - I. Contract DA 20 018 ORD 14737, DA Proj. 5 B 99 01 004, ORD Proj. T B 2 001 & OOR Proj. 1599, OOR Rep. 1840 14, Interim Tech. Rep. 16, March 1960, 38pp. Michigan State University, Ann Arbor, Mich.

16,695
This is a technical report from a research project in multivariate analysis. It considers several two-sample nonparametric tests that have been proposed for testing location and differences in dispersion of scale parameters in a mixed model of discrete and continuous variables. The tests are: 1) two-sample median test, 2) two-sample Wilcoxon test, and 3) Mood's rank test (dispersion differences).
R 18

16,717
Chernoff, H. SEQUENTIAL TESTS FOR THE MEAN OF A NORMAL DISTRIBUTION. Contract NONR 225(52), Proj. NR 342 022, Tech. Rep. 59, Aug. 1960, 26pp. Applied Mathematics and Statistics Labs., Stanford University, Stanford, Calif.

16,717
"The problem of sequentially testing whether the drift of a Wiener process is positive or negative, given an a priori normal distribution, is reduced to the solution of a free boundary problem involving a diffusion equation." Some issues relevant to general application of the solution were considered: truncation rules, discrete problems, other regret functions and costs of sampling, and application of the diffusion equation to bounds. A brief historical section concluded the paper.
R 16

16,732
Katz, M., Jr. & Thomasian, A.J. A NOTE ON THE LAW OF LARGE NUMBERS FOR DISCRETE MARKOV PROCESSES. Contract NONR 222(53), Series 60, Issue 291, July 1960, 5pp. Electronics Research Lab., University of California, Berkeley, Calif.

16,732
"An exponential bound is obtained for the law of large numbers for $S_n=\sum_{k=1}^{n} f(X_k)$ where $(X_k; k=1, 2, \ldots)$ is a discrete parameter Markov process satisfying Doeblin's condition and f is a bounded, real-valued, measurable function."
R 2

16,749
Obermayer, R.W., Swartz, W.F. & Muckler, F.A. HUMAN OPERATOR CONTROL SYSTEMS: I. THE INTERACTION BETWEEN MODES OF INFORMATION DISPLAY AND CONTROL SYSTEM DYNAMICS WITH A SINE WAVE COURSE. Contract AF 33(616) 5472, Proj. 6190, Engng. Rep. 11,494, Sept. 1960, 59pp. The Martin Company, Baltimore, Md.

16,749
This experiment examined the interaction of following and compensatory types of information display and position, rate, and acceleration control dynamics. Nine Ss tracked a sine wave course which had a frequency of two and two-ninths cycles per minute and amplitude of two inches in the vertical display dimension only. Three primary indices of performance were obtained: average absolute error, root mean square error, and time on target. A treatment times treatment times subject model of the analysis of variance was employed to examine the data. The findings were related to the general problem of open-loop display and control system design.
T. G. I. R 10

16,760
Saw, J.G. "ESTIMATION AND TESTING OF PARAMETERS OF DISTRIBUTIONS BY ORDER STATISTICS." ESTIMATION OF THE NORMAL POPULATION PARAMETERS GIVEN A TYPE I CENSORED SAMPLE. Grant DA ORD 7, OOR 2776 3, Interim Tech. Rep. 3, Aug. 1960, 20pp. University of North Carolina, Chapel Hill, N.C.

16,760
This technical report is one of a series on the estimation and testing of parameters of distributions by order statistics. Simple and efficient estimators are derived and presented for the normal population parameters (mean and standard deviation) for a type I censored population sample.
T. R 4

16,761
Saw, J.G. "ESTIMATION AND TESTING OF PARAMETERS OF DISTRIBUTIONS BY ORDER STATISTICS" BIAS OF THE MAXIMUM LIKELIHOOD ESTIMATES GIVEN A TYPE II CENSORED NORMAL SAMPLE. Grant DA ORD 7, Interim Tech. Rep. 2, Aug. 1960, 10pp. University of North Carolina, Chapel Hill, N.C.

16,761
This technical note is one of a series on the estimation and testing of parameters of distributions by order statistics. Since the usual solution to the maximum likelihood estimates of a type II censored normal sample is tiresome, some attempts have been made to facilitate computations by using a fairly simple systematic technique. This paper investigates the bias of the maximum likelihood estimates for samples of greater than 20.
T. R 4

16,767
Konikoff, J.J. MAN VS. SPACE ENVIRONMENT: CLOSED CYCLE ECOLOGICAL SYSTEMS. From: "Proceedings of the Pilot Clinic on the Instrumentation Requirements for Human Comfort and Survival in Space Flight. Ohio State University, Columbus, Ohio. October 26-27, 1959." April 1960, 17-26. Foundation for Instrumentation Education and Research, New York, N.Y.

16,767
In order for man to survive in space, it is necessary to duplicate the ecological system existing on the earth's surface. Problems involved in extended flight (from two weeks to a year) and indefinite flight (over a year) are discussed and compared. Emphasis is on the latter where separate means of supplying food and/or oxygen are necessary. The possibility of using algae for both purposes is discussed. Instrumentation sensors to tell how any system that may be devised is another problem discussed here.

16,768
Young, R.S. SECURING THE DATA: PRACTICAL EXPERIMENTS IN SPACE BIOLOGY. From: "Proceedings of the Pilot Clinic on the Instrumentation Requirements for Human Comfort and Survival in Space Flight. Ohio State University, Columbus, Ohio. October 26-27, 1959." April 1960, 27-35. Foundation for Instrumentation Education and Research, New York, N.Y.

16,768
Some of the instrumentation problems that have been encountered by biologists in their experiments in space-type vehicles are presented and discussed. Such problems center around the vehicle itself and its environment. Two basic types of biological studies are being conducted: 1) effects of space flight on a living system and evaluation of the system as far as man is concerned, and 2) study of these effects simply as a scientific research effort. Illustrative examples of present research are given.
I.

16,769
McLennan, M.A. A DATA SYSTEM FOR SELECTIVELY MONITORING PHYSIOLOGICAL SIGNALS. From: "Proceedings of the Pilot Clinic on the Instrumentation Requirements for Human Comfort and Survival in Space Flight. Ohio State University, Columbus, Ohio. October 26-27, 1959." April 1960, 41-50. Foundation for Instrumentation Education and Research, New York, N.Y. (USAF Biomedical Lab., Wright-Patterson AFB, Ohio).

16,769
The "Viability Monitor" telemetry system for selective monitoring of physiological signals is described. The point is made that it is impractical to extend present telemetry practices to cover long-term physiological experiments in the space field because the continuous registry of all signals becomes too cumbersome. The basic principles for a system that would eliminate non-informative signals are stated.
I.

16,770
Lipetz, L.E. EFFECT OF RADIATION UPON THE NERVOUS SYSTEM AND SENSES. From: "Proceedings of the Pilot Clinic on the Instrumentation Requirements for Human Comfort and Survival in Space Flight. Ohio State University, Columbus, Ohio. October 26-27, 1959." April 1960, 51-60. Foundation for Instrumentation Education and Research, New York, N.Y. (Ohio State University, Columbus, Ohio).

16,770
A report is given on what is known about the effects of radiation upon the nervous system and the senses. How the known amounts of radiation in space compare with tolerable doses of radiation and the limits within which humans can work, which are not optimum, are questions discussed with reference to the limited available data.
T.

16,771
Paiewonsky, B. THE USE OF HUMAN AND AUTOMATIC PILOTS IN SPACE NAVIGATION. From: "Proceedings of the Pilot Clinic on the Instrumentation Requirements for Human Comfort and Survival in Space Flight. Ohio State University, Columbus, Ohio. October 26-27, 1959." April 1960, 94-105. Foundation for Instrumentation Education and Research, New York, N.Y.

16,771
Two classes of space navigation are discussed: interplanetary flight and planetary approaches. The problems involved in navigation, the tasks available or required and means to achieve the required accuracies are analyzed and discussed. The roles of the human pilot and the automatic pilot are related to this analysis.
G.

16,773
Sibila, A.I. NEW CONCEPTS IN SIMULATING MAN-IN-SPACE ENVIRONMENT. From: "Proceedings of the Pilot Clinic on the Instrumentation Requirements for Human Comfort and Survival in Space Flight. Ohio State University, Columbus, Ohio. October 26-27, 1959." April 1960, 139-148. Foundation for Instrumentation Education and Research, New York, N.Y.

16,773
In considering the over-all role of simulation in man-machine integration, with special reference to man-in-space, is presented in terms of the need for simulation, the various approaches that have been taken in simulation, and how to combine these various approaches to obtain a solution to simulation concepts.
T. G. I.

16,796
Basore, B.L. & Wood, W.D. A MODEL FOR COMMUNICATION WITH LEARNING. Contract AF 30(602) 1890, Proj. 4519, Task 45541, RADC TN 60 154 & TN 2 1004, May 1960, 28pp. Dikewood Corporation, Albuquerque, N.M.

16,796
This paper attempts to apply a slight modification of C.E. Shannon's information theory model to the situation in which learning occurs. Primarily the change involves the introduction of a new probability distribution, that of the conditional probability that the received signal is recognized. This distribution comprises the elements of a recognition matrix which is described and derived. Included are some examples of how the modified model is applied to a learning-type communication link.
I. R 5

16,809
Chipman, J.S. STOCHASTIC CHOICE AND SUBJECTIVE PROBABILITY. Contract NONR 2582(00), Task NR 042 200 & Proj. AF 49(638) 33, Tech. Rep. 2, Sept. 1958, 40pp. School of Business Administration, University of Minnesota, Minneapolis, Minn.

16,809
An axiom in the theory of behavior under uncertainty (that a numerical probability can be attached to every uncertain event) is examined in this paper. Two basic concepts are considered: 1) the stochastic nature of choice, and 2) the characterization of events in terms of the nature and amount of information associated with them. A model is presented of the preference structure of choice and evidence from a choice or decision experiment is presented and compared with the model. Further assumptions needed in order to obtain a good theory to describe the behavior observed in the experiment are proposed.
T. G. R 35

16,854
Thune, L.E. & Ericksen, S.C. STUDIES IN ABSTRACTION LEARNING: IV. THE TRANSFER EFFECTS OF CONCEPTUAL VS. ROTE INSTRUCTION IN A SIMULATED CLASSROOM SITUATION. Contract 2149(01), Tech. Rep. 6, April 1960, 96pp. Vanderbilt University, Nashville, Tenn.

16,854
This study was conducted to evaluate the retention and transfer effects of perceptual and abstraction learning. Ninety-six undergraduates were taught to operate an automatic calculator under one of four conditions: rote instruction, concept instruction, instructional control, and transfer control. A random replicative (four replications) design was employed. Proficiency tests were administered immediately after training and again after 24 hours. Immediately after the retention test all Ss were given brief training on a different calculator. Following this, two transfer of training tests were given. The retention and transfer scores were examined statistically by analyses of variance. The implications for education and training were discussed.
T. G. R 7

16,865
Holding, D.H. RATES OF HANDLING CONTINUOUS INFORMATION. FPRC 1068, April 1959, 10pp. Flying Personnel Research Committee, London, England.

16,865
This study was done to determine the amount of information transmitted by experienced Ss in a pursuit tracking task. Nine Ss tracked using a low-friction joystick, a horizontally moving target whose course was random visual noise at different amplitudes and bandwidths. Error scores were obtained and information rates were computed. Information rate was then evaluated as a function of frequency bandwidth and course amplitude.
T. G. I. R 16

16,870
Yntema, D.B. & Mueser, G.E. REMEMBERING THE PRESENT STATES OF A NUMBER OF VARIABLES: II. KEEPING TRACK OF VARIABLES WITH FEW OR MANY STATES. Contract AF 19(604) 5200, Rep. 58 G-0010, July 1960, 19pp. Lincoln Lab., Massachusetts Institute of Technology, Lexington, Mass.

16,870
Three experiments were performed on remembering the current states of several variables. Specifically the problem dealt with the relationship between the number of alternative states of each of three or six variables and the number of message interruptions correctly responded to. The procedure involved reading S a series of messages, each of which told him the state of a variable. The S recorded each message, but could not see the record. At random intervals interrupting questions required S to recall the last message about a particular variable. Parametric and nonparametric analyses were performed on the data. Implications for the coding of displays in control centers were included.
T. G. R 6

17,199
Culbert, S.S. INSTRUMENT READING ERRORS UNDER STARTLE CONDITIONS. Percept. Mot. Skills, Dec. 1960, 11(3), p.276. (University of Washington, Seattle, Wash.).

17,199
To check the observations of a previous study that Ss under stress tended to omit entires when reading displays and control Ss tended to guess incorrectly, two groups of two Ss interpreted modified aircraft instruments in a cockpit mock-up. The cycle for all Ss was: 1) prepresentation interval, 2) presentation of instrument setting, and 3) interval during which clipboard light came on and S made recording. Experimental Ss were presented startle stimuli simultaneously: "fire-warning" lights, diagonal bars of light circling cockpit, 110 db bell, and seat vibration. Data presented were error scores and a comparison of percentages of responses omitted by the groups.
T.

17,242
Pierson, W.R. & Rasch, P.J. GENERALITY OF A SPEED FACTOR IN SIMPLE REACTION AND MOVEMENT TIME. Percept. Mot. Skills, Oct. 1960, 11(2), 123-128. (College of Osteopathic Physicians & Surgeons, Los Angeles, Calif.).

17,242
To investigate the relationship of simple reaction time and movement time, these measurements were made on 32 Ss for the following: arm extension, arm flexion, leg extension, leg flexion, and over-all body speed. Scores for both right and left limbs were recorded. The data were analyzed by correlational and analysis of variance methods for the possibility of a general speed factor in all body movements.
T. R 31

17,245
Delit, M. AUTOMATIC SIGNAL SELECTION FOR AIRBORNE DIRECTION FINDERS. Percept. Mot. Skills, Oct. 1960, 11 (2), p. 138. (System Development Corporation, Santa Monica, Calif.).

17,245
Using a modified, manually-operated loop antenna direction finder, a series of experiments was performed to determine the psychophysical actions in taking aural null direction finding bearings in the presence of interfering noise. Three to 23 Ss were tested. Upon the basis of the findings, suggestions for taking direction finding bearings were made. No data were presented in this brief summary note.

17,246
Guertin, W.H. EFFECTS OF SAMPLING ON DIMENSIONALITY: A DISCUSSION OF "PERCEPTUAL AND MOTOR SPEED IN AN EXTENDED AGE GROUP: A FACTOR ANALYSIS." Percept. Mot. Skills, Oct. 1960, 11(2), 189-190. (US Veterans Administration Hospital, Knoxville, Iowa).

17,246
This note presents a methodological explanation of the effects of sampling on the number of factors that will be obtained from an intercorrelation matrix.
R 4

17,247
Alluisi, E.A. ON THE USE OF INFORMATION MEASURES IN STUDIES OF FORM PERCEPTION. Percept. Mot. Skills, Oct. 1960, 11(2), 195-203. (Emory University, Emory University, Ga.).

17,247
The major generalizations concerning man's perception of form are reviewed and the way in which these generalizations suggest the use of various information measures is shown. For example, it is suggested that the "simplicity" of a shape or pattern is related to the uncertainty of that pattern as a stimulus. Some of the more recent studies of form perception are reviewed to illustrate further the influence and use of information measures. Some of the "new findings" from this approach are presented.
R 23

17,250
Rimoldi, H.J.A. & Devane, J.R. SOME CONSIDERATIONS ON SCALING PROCEDURES. Percept. Mot. Skills, Oct. 1960, 11(2), 207-213. (Loyola University, Chicago, Ill.).

17,250
A transformation of interval limits (in scaling methods that require assignment of objects to a system of ordered categories) is sought that will simultaneously normalize all the experimentally obtained distributions. The authors of this article infer the constants for such transformations and suggest experimental formats that are more likely to yield normal response distributions than the conventional successive intervals format.
R 2

17,252
Pierce, B.F. A TECHNIQUE FOR DETERMINING AND REPRESENTING THE MOBILITY ENVELOPE OF A SUPINE OPERATOR. Percept. Mot. Skills, Oct. 1960, 11(2), 215-219. (Convair, General Dynamics Corporation, San Diego, Calif.).

17,252
A simple and inexpensive method for ascertaining the reach limits of an S is presented. Some preliminary data under some of the conditions to be experienced in space flight (semisupine position and wearing a lightweight, full-pressure, high-altitude suit) were obtained on one S representative of a fifth percentile reach. The manner of presenting the data in a meaningful form to the design engineer is demonstrated.
G. I. R 2

17,253
Kuttner, R. PRIMITIVE COLOR PERCEPTION. Percept. Mot. Skills, Oct. 1960, 11(2), p. 220. (Institute of Living, Hartford, Conn.).

17,253
Linguistic evidence for the perceptual primacy of red in ancient man is presented and discussed. It is suggested that psychological traits associated with primitivity contributed to the earlier conceptualization and naming of "redness."
R 5

17,255
Goldstein, A.G. & Brooks, R. A RED-GREEN COLOR VISION TEST EMPLOYING TRANSPARENCIES. Percept. Mot. Skills, Oct. 1960, 11(2), 229-230. (University of Missouri, Columbia, Mo.).

17,255
To investigate the feasibility of using photographic transparencies to administer a color vision test, the 14 red-green diagnostic plates of the AO H-R-R color vision test were photographed. Both the original plates and the transparencies (in a different orientation) were administered to 18 color deficient Ss and nine normal Ss. Comparative data were presented. Suggestions for further development of the test procedures were made.
T. R 2

17,263
Fegel'man, L.S. SOME ASPECTS OF FUTURE PLANT DESIGN. Soviet Rev., Sept. 1960, 1(2), 57-64.

17,263
The author speculates as to the probable design of the machine-tool plant of the future (15 to 20 years). Expected new developments include 1) specialization--establishments specializing in the production of a small number of products, 2) coordination--efficient disbursement of parts and materials to factories needing same, 3) mechanization and automation--employment of such techniques where possible, and 4) environment--most favorable working conditions. A few comments on the major architectural features are included.

17,267
Andreasson, B.O. MINIMUM MANUAL CONTROLS: STEPPING STONE TO THE "ELECTRIC STICK." Space Aeronautics, March 1960, 33(3), 87-96. (Convair, General Dynamics Corporation, San Diego, Calif.).

17,267
A minimum manual control system which will serve as a backup for future electric control systems in supersonic jet aircraft was described in detail. The system consists of a miniature controller, a small mixer, and the push-pull and torque tubes, and bell cranks needed to connect the controller with the hydraulic valves operating the elevons. Both simulated and actual flight tests served to evaluate the system.
I.

17,284
Hasbrook, A.H. "CRASH-SAFE" DESIGN CAN MAKE MANY ACCIDENTS SURVIVABLE. Space Aeronautics, Sept. 1960, 34(3), 79-87.

17,284
This article reviews some statistics from a ten-year study (1942 to 1952) of approximately 900 lightplane accidents. The main tabulation presents number of people injured and degree of injury as a function of: overall accident damage, impact speed, cabin damage, and structural damage in the seat area. These figures are related to design for "survivability" and some general recommendations are made.
T.

17,286
Wright, H.N. MEASUREMENT OF PERSTIMULATORY AUDITORY ADAPTATION. J. acoust. Soc. Amer., Dec. 1960, 32(12), 1558-1567. (Central Institute for the Deaf, St. Louis, Mo.).

17,286
This paper was aimed at explaining the discrepant results of perstimulatory auditory adaptation studies. Method of measurement was first considered—possible variations were categorized and analyzed. The assumption of minimal or constant adaptation of the control ear was then examined—three experiments were conducted to measure the adaptation by 1) modified method of fixed intensity, 2) constant method, and 3) moving phantom. Frequency effects were similarly examined. From the results the author was able to offer an explanation for the disagreement among previous findings.
T. G. R 13

17,287
Burris-Meyer, H. & Mallory, V. PSYCHO-ACOUSTICS, APPLIED AND MISAPPLIED. J. acoust. Soc. Amer., Dec. 1960, 32(12), 1568-1574. (Walker Building, Washington, D.C.).

17,287
This paper was an historical survey of the attempted application of psychoacoustic phenomena, both commonly observed and those resulting from research, during and immediately after World War II. These efforts to discover the effect of sound on man were given impetus by the National Defense Research Committee. First to be investigated was a body of rumors about the effects of noise in a variety of situations. Other projects included the production of uniform signals for aircraft warning sirens and the development of a long distance sound projection system. Considerable time was also devoted to the functional application of music in a range of situations. The present status of applied psychoacoustics was described as in need of both research and financial support. I. R 16

17,288
Harris, J.D. SCALING OF PITCH INTERVALS. J. acoust. Soc. Amer., Dec. 1960, 32(12), 1575-1581. (USN Medical Research Lab., New London Submarine Base, Conn.).

17,288
The present study was aimed at discovering: "1) precise effects the several constant errors as enumerated by Stevens had on the mel scale, 2) the extents of individual differences and similarities for the several procedures, and 3) the nature of the relations among the several available mel scales." A number of experiments were conducted using the half-pitch and bisection judgments and some variants of the method of equal-appearing intervals. Several Ss participated. Pitch scales were generated from the data and examined for discrepancies. These findings were then discussed in terms of the pitch interval.
T. G. R 7

17,295
Domey, R.G., McFarland, R.A. & Chadwick, E. THRESHOLD AND RATE OF DARK ADAPTATION AS FUNCTIONS OF AGE AND TIME. Hum. Factors, Aug. 1960, 2(3), 109-119. (Harvard School of Public Health, Boston, Mass.).

17,295
A mathematical derivation of a model for representing dark adaptation as a function of age and time was presented. Data on dark adaptation were obtained from an age sample of 240 male Ss with 30 Ss drawn from each of eight decades ranging from 16 through 89 years. Using these data search for a general integrative equation was made. A model was constructed which made possible the accurate prediction of the mean level of adaptation for any point on the time continuum as a function of age.
T. G. R 2

17,296
Steedman, W.C. & Baker, C.A. TARGET SIZE AND VISUAL RECOGNITION. Hum. Factors, Aug. 1960, 2(3), 120-127. (USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio).

17,296
This report was one of a series coming from a research program investigating recognition of targets such as those displayed on air-to-ground radar and infrared sensing systems. The study reported here investigated the speed and accuracy of form recognition as a function of size of target forms for various amounts of detail resolution. The stimulus forms were generated by filling in, on a statistical basis, some of the cells of a 90,000 matrix. The task of the 16 Ss was to locate a given target on a display containing numerous other forms. Search time and errors were analyzed for effect of target size and resolution. Target orientation and practice effects were also examined. The implications of the findings for equipment design were discussed. T. G. I. R 2

17,298
Learner, D.B. A SYSTEM MEASURE OF DRIVER PERFORMANCE. Hum. Factors, Aug. 1960, 2(3), 136-140. (Batten, Barton, Durstine & Osborne, Inc., New York, N.Y.).

17,298
A general review of measures of driving performance leads to a discussion of criteria requirements within a system measurement approach. A general measure for determining system performance that has application for all vehicular man-machine systems is described. Specific suggestions for measuring the psychomotor, intellectual, and perceptual processes of the driver are made.
T. R 3

17,299
Resnick, A. & Savage, Terry R. A RE-EVALUATION OF MACHINE-GENERATED ABSTRACTS. Hum. Factors, Aug. 1960, 2(3), 141-146. (IBM Research Center and IBM Advanced Systems Development Division, Yorktown Heights, N.Y.).

17,299
This was a second evaluation study of the usefulness of machine-generated abstracts in answering pertinent content questions and in determining the relevancy of the document for a specific purpose. Five matched groups of five Ss were each given a different type of lexical indicator of content (titles, three types of abstracts, and complete texts) for 75 documents. The task was to answer a set of questions derived from 15 of the documents and to evaluate the relevance of each document in answering the examination. Performance (correct answers) was analyzed for differences due to type of lexical indicator.
T. G. R 2

17,300
Hertzberg, H.T.E. DYNAMIC ANTHROPOMETRY OF WORKING POSITIONS. Hum. Factors, Aug. 1960, 2(3), 147-155. (USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio).

17,300
This paper presents an introduction to the principles, data, and sources comprising the anthropological aspects of human engineering with particular reference to work space design. It emphasizes that work space design includes both objective factors (body size, muscle force capability, and mobility) and subjective factors (individual preferences, fatigue, etc.). The objective factors are dealt with here as being of primary importance to engineers. The "design limits concept" method of workspace design is discussed and general methods of gathering body size and strength data are outlined. Some comments on the biomechanics of weightlessness are included.
T. G. R 26

17,301
Baker, P.T., McKendry, J.M. & Grant, G. VOLUMETRIC REQUIREMENTS FOR HAND TOOL USAGE. Hum. Factors, Aug. 1960, 2(3), 156-162. (HRB-Singer, Inc., State College, Penn.).

17,301
A quantitative description of the volume required to use common hand tools for four basic types of dynamic maintenance actions was presented. The volume, or "space envelope," described was for the tool-using hand of right-handed Ss. The data were collected on six Ss whose hand sizes were at or above the 95th percentile of the military population. A photographic process employing time exposures for each action was used to obtain the data. The implications of the data for maintenance requirements were discussed.
T. G. I. R 4

17,302
Burrows, A.A. ACOUSTIC NOISE, AN INFORMATIONAL DEFINITION. Hum. Factors, Aug. 1960, 2(3), 163-168. (Life Sciences Group, Douglas Aircraft Company, Inc., El Segundo, Calif.).

17,302
The various ways in which acoustic noise has been defined in the past were considered and a definition proposed relating acoustic noise to its environmental source and the informational content of the specific task in which it occurs. An experiment designed to examine the differential effects of low-level sound on performance in consideration of its information content was described. A simple manual tracking task was carried out wherein touching the side of the path with the tracking stylus (an error) caused persistent sound to be either switched off or on for 0.05 min. The task was also carried out in quiet, in continuous sound, and in random intermittent sound. Speed and accuracy were assessed for these conditions.
G. R 11

17,303
Ross, S. & Aines, A.A. HUMAN ENGINEERING-1911 STYLE. Hum. Factors, Aug. 1960, 2(3), 169-170. (American Psychological Association, Washington, D.C.).

17,303
A brief note is given on a 1911 journal called Human Engineering to show an early use of this term. The content and methodology of "human engineering" as used today differ from the earlier usage.

17,304
Conrad, R. EXPERIMENTAL PSYCHOLOGY IN THE FIELD OF TELECOMMUNICATIONS. Ergonomics, Oct. 1960, 3(4), 289-296. (Applied Psychology Research Unit, MRC, Cambridge, England).

17,304
One aspect of the work of the psychologist was concerned with applying theoretical concepts to the practical problems of work. Four examples were cited from the field of telecommunications: instrument design, dialing codes, staffing a telephone exchange, and post office letter sorting. 1) The decay theory of immediate memory was used to predict the relative merits of the telephone dial and an alternate design of ten pushbuttons; experimental tests were run to test predictions. 2) Laboratory experiments were run to investigate factors relevant to design of long telephone codes for easy remembering. 3) The effects of varying traffic loads on operator's performance was investigated in a field experiment. 4) The time to sort letters by key pressing was investigated in a practical situation. T. G. R 3

17,305
Grieve, June I. THERMAL STRESS IN A SINGLE STOREY FACTORY. Ergonomics, Oct. 1960, 3(4), 297-306. (Physiological Unit, Post Office Research Station, Dollis, Hill, London, England).

17,305
Environmental conditions in a single story factory (telecommunications repair) were investigated as a result of staff complaints in summer when the external temperature rose to 74 degrees F. The Hedford corrected effective temperature scale was used to assess the thermal conditions from measurements made in a variety of locations throughout the factory. Energy costs of the work were measured in two areas of the factory to determine whether all work belonged to the "light work" category; both direct and indirect measurements were made. Thermal stresses were calculated from these data. Chief sources of the thermal load were discussed with suggestions of alterations to the building and ventilating system made.
T. G. I. R 5

17,306
Fox, R.H. HEAT STRESS AND ATHLETICS. Ergonomics, Oct. 1960, 3(4) 307-314. (Human Physiology Div., National Institute for Medical Research, Mill Hill, London, England).

17,306
Certain aspects of man's response on exposure to a hot climate are reviewed. The application of the concepts of thermal exchange analysis to evaluate the severity of a particular heat stress situation is discussed. The possible effects of the Rome climate on a marathon runner competing in the 1960 Olympic Games is used as an illustration. The value of the collection of data under field conditions of athletic events is discussed.
T. I. R 19

17,307
Wachsler, R.A. & Learner, D.B. AN ANALYSIS OF SOME FACTORS INFLUENCING SEAT COMFORT. Ergonomics, Oct. 1960, 3(4), 315-320. (General Motors Research Labs., Detroit, Mich.).

17,307
To demonstrate the applicability of the techniques of factor analysis and correlation to experimental data in order to achieve a general clarification of a complex set of relations, data were taken from a study (Slechta, et al., 1957) of six different aircraft pilot and crew seats and evaluated by 18 Ss with regard to the comfort provided. The data were reanalyzed by the technique named above thereby deriving a more precise definition of some of the variables influencing the over-all impression of seat comfort. It was suggested that the results should be applicable to any general type of seats. Further research in this area was indicated.
T. R 1

17,308
Roberts, D.F. FUNCTIONAL ANTHROPOMETRY OF ELDERLY WOMEN. Ergonomics, Oct. 1960, 3(4), 321-328. (Human Anatomy Dept., University of Oxford, Oxford, England).

17,308
A pilot anthropometric study of elderly women (78) was undertaken. Means and standard deviations of body measurements relevant to problems of domestic design were presented. From a study of the data, it was suggested that the elderly are a specialized population and that it is important to apply ergonomic principles when designing for them.
T. I. R 10

17,309
Krendel, E.S. DESIGN REQUIREMENTS FOR MAN GENERATED POWER. Ergonomics, Oct. 1960, 3(4), 329-338. (Franklin Institute, Laboratories for Research and Development, Philadelphia, Penn.).

17,309
A scheme is presented for designing man-powered devices (as opposed to control devices) for optimal power transfer from human operator to mechanism. A mathematical description of human dynamics in terms of components capable of storing and releasing energy is given. From the description, it is possible to gain some ides about the information required for the engineering design of man-machine systems and also a possible direction for needed research. The experimental data on which the above description is based is reviewed.
G. R 15

17,310
Siegel, A.I. & Crain, K. EXPERIMENTAL INVESTIGATIONS OF CAUTIONARY SIGNAL PRESENTATIONS. Ergonomics, Oct. 1960, 3(4), 339-356. (Applied Psychological Services, Wayne, Penn.).

17,310
To investigate optimum methods for presenting cautionary warning information, four experiments were performed. In each experiment, multiple compensatory tracking was the primary task and response to cautionary warning signals was a collateral task. 1) The effects of a centrally located master signal on response to peripherally located cautionary indicators were studied. 2) and 3) The effectiveness of various types of visual, auditory, and combinations of both master warning signals were studied under various levels of task complexity. 4) The design of lensed, legend cautionary warning signals was investigated. Suggestions for design of cautionary warning signals were derived from the findings.
T. R 14

17,311
Elliott, E. PERCEPTION AND ALERTNESS. Ergonomics, Oct. 1960, 3(4), 357-364. (Admiralty Research Laboratory, Teddington, England).

17,311
This paper points out the discrepancy often found between the published results of laboratory studies of vigilance and what occurs in practical watchkeeping tasks. Several examples are given. Current ideas of perceptual organization in watchkeeping are then reformulated and attempts are made to explain why there are discrepancies of the kind mentioned above. Particular emphasis is placed upon the type of investigation which needs to be undertaken in order to resolve present difficulties.
R 7

17,312
Singleton, W.T. AN EXPERIMENTAL INVESTIGATION OF SPEED CONTROLS FOR SEWING MACHINES. Ergonomics, Oct. 1960, 3(4), 365-376. (College of Aeronautics, Cranfield, England).

17,312
A series of experiments was carried out to assess the adequacy of controlling the speed of an industrial (shoe) sewing machine by conventional methods (operator presses treadle to stitch and releases to stop the machine which stitches at a constant rate). A new method using a variable speed control was then devised. The skill requirements of the task were examined and the new control was tested both in the laboratory and in the factory. The justification for experimentation of this type was discussed.
T. G. I. R 2

17,320
Severy, D.M. AUTOMOBILE COLLISIONS ON PURPOSE. Hum. Factors, Nov. 1960, 2(4), 186-202. (Institute of Transportation and Traffic Engineering, University of California, Los Angeles, Calif.).

17,320
A brief discussion was presented of some of the findings from 48 full-scale automobile collision experiments. The experiments have provided data on physical factors relating to vehicular dynamics and attending motorist injuries. Both human Ss and anthropometric dummies have been used to secure specific data on 1) deceleration patterns for different locations on the driver and car structure, 2) the relation of impact speed to deformation and repair costs, 3) the performance of motorist restraining devices, and 4) the interaction of the driver with the car's interior and external environment during collisions. Public acceptance of safety devices and design changes known to reduce injury was discussed.
G. I. R 8

17,321
Day, R.H., Baxter, J.R. & Lane, J.C. THE PSYCHOPHYSICAL TESTING OF AN AIRCRAFT VISUAL APPROACH AID. Hum. Factors, Nov. 1960, 2(4), 203-210. (Psychology Dept., University of Sydney, Sydney, Australia).

17,321
A ground based visual approach aid for aircraft landings known as the Precision Visual Glidepath is described. The aid is based on the perception of a misalignment between bars of light on the ground. Psychophysical tests to establish its sensitivity at long range and under various viewing conditions are discussed. Both laboratory simulation and field tests are included.
T. G. I. R 4

17,322
Weltman, G. ESTIMATION OF THE CENTER OF SIMULATED PLANETARY BODIES. Hum. Factors, Nov. 1960, 2(4), 211-220. (Biotechnology Lab., Engineering Dept., University of California, Los Angeles, Calif.).

17,322
To investigate an operator's ability to determine the center of an observed planetary body, a display situation which might result from a periscope-type lens coupled to a viewing screen in a satellite was simulated. Planetary body representations (uniformly high contrast white disk) appeared against a black background in various sizes and shapes representing planetary phase. Six Ss were required to center the disk under edge-lit cross hairs in both a circular and a rectangular viewing area. Positioning errors were analyzed for effect of size and shape of stimulus, shape of viewing area, and for individual differences. The findings were discussed in relation to requirements for attitude control during re-entry of a satellite vehicle. T. G. I. R 5

17,323
Dzendolet, E. MANUAL APPLICATION OF IMPULSES WHILE TRACTIONLESS. Hum. Factors, Nov. 1960, 2(4), 221-227. (USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio).

17,323
To determine what types of impulses could be applied by an S while tractionless, 20 naive Ss were tested on an air-bearing "scooter" and a strain gauge transducer or force bar. The task was to push the plunger, with one motion, as far as it would go in the tube while sitting on the scooter and grasping a handhold with the left hand. The task was performed with air blowing through the air-bearing pads of the scooter making the S tractionless, and under normal frictional conditions. Forces against which, and travel distances through which the plunger was pushed were varied. Both quantitative and qualitative results were presented.
T. G. I. R 3

17,324
Davis, R.H. & Behan, R.A. A STUDY OF VISUAL PREDICTION BEHAVIOR. Hum. Factors, Nov. 1960, 2(4), 228-234. (System Development Corporation, Santa Monica, Calif.).

17,324
To determine the accuracy of prediction behavior, a visual tracking task was used in which the appearance time of a radar target prior to its disappearance was varied (3, 6, 12, and 24 sweeps). After the viewing period, the blip was removed from the scope and the Ss (16 USAF airmen) were required to dead-reckon it for ten min. A report of estimated range and azimuth was made once a min. These reported positions were compared with true range and azimuth of the blip at that time and errors were calculated as functions of time and length of viewing. The effect of practice was noted.
T. G. R 4

17,329
Miller, S. USAF ORDERS PILOT BIO-INSTRUMENTATION. Aviat. Wk., Dec. 1960, 73(26), 71-73.

17,329
A brief description is presented of pilot bio-instrumentation orders placed by the Air Force. It is expected that the program will provide microminiature biological instruments for monitoring physiological responses of pilots during airborne and space flights. A chart is given of the typical parameters to be monitored and of the characteristics of transducers available for these functions.
I.

17,330
Kolcum, E.H. SIMULATOR TO AID SPACECRAFT GROUND-TEST. Aviat. Wk., Dec. 1960, 73(26), 75-77.

17,330
A simulator designed to improve spacecraft reliability through realistic ground testing in an integrated space environment is described. The simulator is being constructed by General Electric's Missile and Space Vehicle Department at their Valley Forge (Penn.) Research Laboratory. Design problems involved and expected benefits of the facility are discussed.
I.

17,337
Snowdon, C. WHAT'S NEEDED FOR AUTOMATIC VTOL LANDINGS? Space Aeronautics, July 1960, 34(1), 58-60. (Short Bros. & Harland, Ltd., Belfast, Northern Ireland).

17,337
The major requirements for blind landing VTOL aircraft are discussed. These include a semiautomatic control system whose main components are an autostabilizer and a semiautomatic aid to control lift throttle and a data display which allows immediate assessment of the over-all situation. Some general suggestions for instrumentation are offered.
I.

17,338
Space Aeronautics. FINDING A FIGURE OF MERIT FOR MAINTAINABILITY. Space Aeronautics, July 1960, 34(1), 135-138. (Conover-Mast Publications, Inc., New York, N.Y.).

17,338
Some statistics from an RCA study of USAF ground electronics which was designed to increase equipment availability and cut support costs are considered as they relate to the problem of measuring or defining the requirements for maintainability. Relationships among support costs, reliability or mean time to failure, and maintenance manpower are presented graphically. The types of equipment failure directly chargeable to maintenance are enumerated with general recommendations for reducing each. Finally, the need for further investigation of maintenance factors is expressed.
G. I.

17,342
Rosman, R.R. THE TILTING-CHAIR TILTING-ROD TASK: A METHODOLOGICAL NOTE. Percept. Mot. Skills, Feb. 1960, 10(1), 9-10. (College of Medicine, University of Illinois, Urbana, Ill.).

17,342
This methodological note describes an unexpected source of error that appeared with the use of the Tilting-Chair Tilting-Rod task. It is shown that the location of the apparatus in the room, even though in perfect darkness, can bias the results of the experiment. The intent of this note is to acquaint investigators using the task of this source of error.
R 4

17,343
Leahner, S.S. EFFECTS OF ASPIRATION AND ACHIEVEMENT ON MUSCULAR TENSIONS. J. exp. Psychol., Feb. 1961, 61(2), 133-137. (Jewish Employment and Vocational Service, Philadelphia, Penn.).

17,343
To test the prediction that different levels of muscular tension would result from the combined effects of realistic or nonrealistic aspirations and success and failure, four groups of 12 Ss each were tested on a series of three equivalent tasks. Fictitious scores and norms were established for reporting and controlling relative achievement. Four conditions of reporting (expect-success, hope-success, expect-failure, and hope-failure) were created by instructions. The response observed was muscle action potentials from S's forearm muscles throughout the testing period.
G. R 11

17,344
Evans, W.O. TWO FACTORS AFFECTING STIMULUS GENERALIZATION ON A SPATIAL DIMENSION. J. exp. Psychol., Feb. 1961, 61(2), 142-149. (Duke University, Durham, N.C.).

17,344
This series of four experiments attempted to demonstrate the existence of two factors of stimulus similarity as bases of spatial stimulus generalization and to investigate the condition under which each type of gradient occurs. The general method used has been described in a previous study. Comparisons made here were between gradients formed when different distances of stimulus separation were used, when discrimination between individual stimuli became difficult, when comparisons among stimuli were allowed only during early trials, and when conditions permitted discrimination in various degrees of difficulty. The findings were discussed in terms of implications for theories of stimulus generalization.
T. G. R 11

17,345
Taub, H.A. & Myers, J.L. DIFFERENTIAL MONETARY GAINS IN A TWO-CHOICE SITUATION. J. exp. Psychol., Feb. 1961, 61(2), 157-162. (University of Massachusetts, Amherst, Mass.).

17,345
To study the effects of differential monetary rewards in a two-choice situation, 32 Ss were tested in a two-light guessing game. Four conditions of gain ratios (ratio of amount gained by correct prediction of the less frequent light to that gained by correct prediction of the more frequent light) of one chip to one, two to one, three to one, and four to one were used. Frequencies were 60 percent and 40 percent or 80 percent and 20 percent, with the lower frequency yielding the higher gain. The instructions made clear that this was a gambling game and the object was to make money (chips). The responses were studied in the light of various quantitative models which might be used for prediction.
T. G. R 6

17,346
Raab, D.H., Fehrer, Elizabeth & Hershenson, M. VISUAL REACTION TIME AND THE BROCA-SULZER PHENOMENON. J. exp. Psychol., March 1961, 61(3), 193-199. (Brooklyn College, Brooklyn, N.Y.).

17,346
To determine whether reaction time can be used to measure the Broca-Sulzer phenomenon (the phenomenal brightness of a stimulus can be diminished by the unchanged continuation of the stimulus itself), a series of experiments was conducted. In the first study, stimulus durations (10, 25, 50, 100, 250, and 500 msec.) were presented in random sequence in order to eliminate attitudinal factors; the foreperiod was also varied (0.5, 1.0, or 1.5 sec.); and three luminances (0.30, 30, and 3000 ft.-L) were used. In the second experiment, one group of Ss responded to flash durations presented in a block while another group again received mixed presentation. Reaction times were analyzed for effect of flash duration, foreperiod duration, and manner of presentation. T. R 16

17,347
Adams, J.A. & Webber, C.E. THE ORGANIZATION OF COMPONENT RESPONSE ERROR EVENTS IN TWO-DIMENSIONAL VISUAL TRACKING. J. exp. Psychol., March 1961, 61(3), 200-212. (University of Illinois, Urbana, Ill.).

17,347
To test the generality of the independence law which asserts that time-on-target (TOT) response events of each component task of a multidimensional tracking task are statistically independent on one another, a two-dimensional tracking task was performed under two conditions. One group of Ss had unsystematic input signals; the other had input signals specially designed to induce inapplicability of the law. Additional variables were width of TOT scoring zone and amount of practice. TOT measures were tested by applying the independence law and were further analyzed for dependencies among one another. A different approach to describing complex tracking behavior was proposed.
T. G. I. R 14

17,348
Restle, F., Rae, J. & Kiesler, C. THE PROBABILITY OF DETECTING SMALL NUMBERS OF DOTS. J. exp. Psychol., March 1961, 61(3), 218-221. (Michigan State University, East Lansing, Mich.).

17,348
The classical problem of span-of-apprehension is approached here as a problem in simultaneous detection of several isolated targets. In two experiments, the S attempted to detect isolated dots under low illuminations and with short exposures. From zero to four dots at positions top, left, bottom, and right were presented, and the locations of the dots were reported. False alarms and the probability of detecting any particular dot as affected by the number of other dots present were observed. The results were discussed with reference to the "probability" theory of span-of-apprehension.
T. R 5

17,349
Ekman, G., Goude, G. & Waern, Yvonne. SUBJECTIVE SIMILARITY IN TWO PERCEPTUAL CONTINUA. J. exp. Psychol., March 1961, 61(3), 222-227. (University of Stockholm, Stockholm, Sweden).

17,349
The mechanisms of subjective similarity were investigated for the perceptual continua of darkness and subjective visual area. Similarity estimates were obtained from five Ss for each perceptual continua and ratio scales were constructed for each. It was shown that similarity between two percepts is equal to the ratio between the lowest scale value and the average of the scale values of the two percepts. Some possible implications of the results for scaling theory were discussed.
T. G. R 7

17,351
Klemmer, E.T. THE PERCEPTION OF ALL PATTERNS PRODUCED BY A SEVEN-LINE MATRIX. J. exp. Psychol., April 1961, 61(4), 274-282. (IBM Research Center, Yorktown Heights, N.Y.).

17,351
To gain insight into the reasons why certain patterns are easier or more difficult to see than others and to determine the importance of training and experience in such perceptions, two experiments were conducted which required the reproduction of linear visual patterns following brief exposures. The patterns were produced by randomly selecting lines from a seven-line matrix in the form of a block figure "8"; a reasonably good set of arabic numerals and 118 other patterns were thus produced. Some tests utilized a poststimulus cue which denoted one of four patterns for reproduction while other tests required complete reproduction. Performance was measured in terms of line segments and of patterns reproduced correctly as well as amount of information perceived. T. G. I. R 7

17,352
Beck, J. JUDGMENTS OF SURFACE ILLUMINATION AND LIGHTNESS. J. exp. Psychol., May 1961, 61(5), 368-375. (University of Pennsylvania, Philadelphia, Penn.).

17,352
The ways in which judgments of surface illumination and lightness varied with different surface textures and the presence of a background were studied in a series of seven experiments. Binocular matching using the method of adjustment was employed with the standard and comparison surfaces being viewed simultaneously, each with monocular vision and a motionless head, in a dark room. Illumination matches were compared with one or more of the following measures according to the experiments the illuminance of the comparison field which equates 1) the average brightness, 2) points of average brightness, 3) background brightness, and 4) illuminance of standard and comparison surfaces.
T. I. R 11

17,353
Heinemann, E.G. THE RELATION OF APPARENT BRIGHTNESS TO THE THRESHOLD FOR DIFFERENCES IN LUMINANCE. J. exp. Psychol., May 1961, 61(5), 389-399. (Vassar College, Poughkeepsie, N.Y.).

17,353
To test the hypothesis that luminance difference sensitivity is proportional to the rate of change of brightness with respect to luminance, experiments were performed dealing with the situation in which area of test field, its location on retina, and spectral composition of the light were constant, but test field was subject to influence of an inducing field. First, measurements were made of variations in the luminance difference threshold as a function of test field illuminance for a series of different fixed luminances of the surrounding field. Second, a series of functions were determined showing the luminance required to maintain a constant level of apparent brightness in the test field as a function of the luminance of the surrounding field. G. I. R 14

17,354
Schmid, Ethel. TEMPORAL ASPECTS OF CUTANEOUS INTERACTION WITH TWO-POINT ELECTRICAL STIMULATION. J. exp. Psychol., May 1961, 61(5), 400-409. (US Veterans Administration Hospital, West Haven, Conn.).

17,354
The effect of a conditioning electric shock at one skin location on the threshold for electrocutaneous stimulation at a neighboring location was studied as a function of the temporal separation of the two stimuli. The conditioning stimulus was administered both before and after the test stimulus; the range was from 40 msec. prior to 30 msec. following. Two additional parameters were explored: intensity of the conditioning stimulus and spatial separation of the two stimuli. The results were discussed in relation to relevant physiological experiments, the psychophysical literature and recent biophysical experiments on travelling waves on the skin.
T. G. I. R 18

17,355
Shuford, E.H. PERCENTAGE ESTIMATION OF PROPORTION AS A FUNCTION OF ELEMENT TYPE, EXPOSURE TIME, AND TASK. J. exp. Psychol., May 1961, 61(5), 430-436. (University of North Carolina, Chapel Hill, N.C.).

17,355
To provide some information concerning the processes by which people derive percentage estimates of proportions, two experiments were conducted. The effect of element type, exposure time, and task were studied. The stimuli were photographs of 20 by 20 matrices made up of randomly arranged red and blue squares or vertical and horizontal bars. The tasks were to estimate the percentage of elements of the type specified by the experimenter or to estimate the percentage of the more frequent (or less frequent) type. Estimates from 636 Ss were analyzed and interpreted in terms of a hypothetical sampling process and various response biases.
G. I. R 6

17,356
Bahrick, H.P. & Noble, M. ON STIMULUS AND RESPONSE DISCRIMINABILITY. J. exp. Psychol., June 1961, 61(6), 449-454. (Ohio Wesleyan University, Delaware, Ohio & Kansas State University, Manhattan, Kan.).

17,356
To study the relative effects of stimulus and response similarity upon response distributions, Ss were trained to exert scaled amounts of force on a semirigid control stick in response to scaled lengths of lines presented on a memory drum. Four task versions were used representing two degrees each of stimulus and response discriminability. The response distributions obtained to each stimulus were interpreted as gradients of primary response generalization and similarity effects were analyzed.
T. G. R 4

17,357
Kaufman, H. & Becker, G.M. THE EMPIRICAL DETERMINATION OF GAME-THEORETICAL STRATEGIES. J. exp. Psychol., June 1961, 61(6), 462-468. (Electric Boat Div., General Dynamics Corporation, Groton, Conn. & University of California, Los Angeles, Calif.).

17,357
Strategies chosen by players in a real game situation were compared to those given by game theory in order to determine how readily, if at all, naive persons adopt "optimal" rational solutions. The players were forced to select a set of moves (strategy) and in return received monetary rewards, the average amount varying with the closeness of their strategy to the optimum strategy. Each player participated in several games in which optimal strategies differed but the expected payoff was held constant. An "integrated error" score was used to measure over-all correspondence of performance to optimal strategy; trials to achieve a steady-state response was another measure.
T. R 4

17,358
Deane, G.E. HUMAN HEART RATE RESPONSES DURING EXPERIMENTALLY INDUCED ANXIETY. J. exp. Psychol., June 1961, 61(6), 489-493. (Harpur College, Endicott, N.Y.).

17,358
To discover some of the controlling conditions of the two cardiac effects (acceleration upon shock instructions and deceleration prior to and during time of shock) found during anxiety induced by signals of shock-to-come, four groups of Ss were tested under varying conditions of instruction and shock. Base-level measurements of cardiac activity were obtained and heart rate was subsequently recorded throughout the tests. Since two groups never received shock, although instructed to anticipate it, comparisons were made of anticipatory effects and the real shock effects. Interpretation of the findings was offered.
T. G. R 5

17,359
Teichner, W.H., Reilly, R. & Sadler, E. EFFECTS OF DENSITY ON IDENTIFICATION AND DISCRIMINATION IN VISUAL SYMBOL PERCEPTION. J. exp. Psychol., June 1961, 61(6), 494-500. (University of Massachusetts, Amherst, Mass.).

17,359
To investigate some aspects of performance on a task which requires both search and identification of more than one symbol on a briefly exposed display, 24 Ss viewed a series of 200 slides presented with a one-sec. exposure. The slides varied in number of different categories (letters) contained and density of categories. Letter location was varied randomly on all slides. Half of the Ss identified the categories and half reported the number of categories. An analysis of performance on both types of tasks was made as functions of number of categories and of density. Comparisons of the two were made.
T. G. I. R 6

17,360
Dunn, B. & Leibowitz, H. THE EFFECT OF SEPARATION BETWEEN TEST AND INDUCING FIELDS ON BRIGHTNESS CONSTANCY. J. exp. Psychol., June 1961, 61(6), 505-507. (University of Wisconsin, Madison, Wisc.).

17,360
To provide a test of the relationship between brightness contrast and brightness constancy by manipulation of the separation between test and inducing fields, luminance matches were obtained between a one-degree square "grey" test field viewed under various levels of luminance and a photometric field of the same size. The test field was viewed against a "black" background and with a "white" inducing field either contiguous to the test field or separated from it by 6 and 12 degrees. The results were interpreted with respect to mechanisms underlying brightness constancy.
T. G. R 14

17,361
Bakan, P., Thompson, R. & Wildes, Gail. SUPPLEMENTARY REPORT: DIRECTIONAL EFFECTS AND SEX IN KINESTHETIC AFTEREFFECTS. J. exp. Psychol., June 1961, 61(6), 509-510. (Michigan State University, East Lansing, Mich.).

17,361
To investigate directional effects in the kinesthetic aftereffect (change in apparent width of a standard stimulus after exposure to an inspection (I) stimulus, wider or narrower than standard), a comparison of the effect of both a wider and narrower I-stimulus was made when the absolute difference between I-stimulus and standard was held constant. A group of 172 Ss, both male and female, were assigned to eight groups and judgments of width of standard stimulus were obtained. The mean kinesthetic aftereffect was analyzed for directional and for sex effects.
T. R 8

17,362
Drazin, D.H. EFFECTS OF FOREPERIOD, FOREPERIOD VARIABILITY, AND PROBABILITY OF STIMULUS OCCURRENCE ON SIMPLE REACTION TIME. J. exp. Psychol., July 1961, 62(1), 43-50. (Oxford University, Oxford, England).

17,362
In two parallel experiments, the foreperiod of a simple reaction test (visual) was varied at random within a rectangular frequency distribution. In a total of 14 conditions, the minimum foreperiod, range of foreperiods, and probability of stimulus occurrence were varied systematically. Two Ss served in each experiment. An interpretation of the experimental findings was offered.
T. G. R 8

17,363
Smith, Patricia C. & Smith, O.W. VERIDICAL PERCEPTIONS OF CYLINDRICALITY: A PROBLEM OF DEPTH DISCRIMINATION AND OBJECT IDENTIFICATION. J. exp. Psychol., Aug. 1961, 62(2), 145-152. (Cornell University, Ithaca, N.Y.).

17,363
Some of the stimuli for perceived depths on surfaces were tested for their effectiveness in inducing veridical judgments of cylindricality. Views of lateral edges of the test object (a cylinder) were tested independently and in combination with stimuli for depth. The "cues" tested were linear perspective, interposition, light and shade, texture, form transformations, monocular movement parallax, and binocular disparity. Distance of observation was varied. Observers were seven Ss from the laboratory and one S who had had monocular vision since early childhood. Interpretation of the findings was discussed.
R 8

17,364
Edelberg, R. THE RELATIONSHIP BETWEEN THE GALVANIC SKIN RESPONSE, VASOCONSTRICTION, AND TACTILE SENSITIVITY. J. exp. Psychol., Aug. 1961, 62(2), 187-195. (Baylor University College of Medicine, Waco, Tex.).

17,364
The relationship over short periods of time between cutaneous tactile threshold and autonomic activity, as reflected in GSR or in degree of vasoconstriction, was determined by a method allowing continuous monitoring of the S's threshold to 250 cps vibration. The 28 Ss were tested, following a period of training and equilibrium, for a minimum period of five minutes during which three autonomic responses were deliberately elicited by a loud noise or asking the S to sniff sharply or take a deep breath. In addition, the effects of variation in attention, of stretching or relaxing of the skin, and the anatomical site tested on tactile threshold were explored.
T. G. I. R 30

17,365
Leamer, B.V. EDUCATION AND TRAINING IN CIVIL AVIATION MEDICINE. Aerospace Medicine, Jan. 1961, 32(1), 1-5. (University of California Medical Center, Los Angeles, Calif.).

17,365
The problem discussed here is the education and training of the physician in practice who is interested in aviation and who is concerned with the physical examination of Class II and Class III airmen--airline transport pilots, commercial pilots, and student pilots. A program requiring that all pilots be examined by designated examiners and a program of instruction for all physicians interested in qualifying as designated examiners are urged.
R 1

17,366
Pletcher, K.E. HUMAN FACTORS IN AEROSPACE PATHOLOGY. Aerospace Medicine, Jan. 1961, 32(1), 6-11. (USAF Directorate of Flight and Missile Safety Research, Norton AFB, Calif.).

17,366
The relationship between pathology and aircraft accident prevention is discussed. Some relatively rare conditions are mentioned which are amenable to both clinical and pathologic detection and which have been definite, probable, or possible causes of either aircraft accidents or incidents: thyroiditis, sarcoidosis, latent malaria, and sickle cell disease. Some more commonly occurring conditions mentioned are myocardial infarction or coronary insufficiency, cerebrovascular accidents, inhalation of noxious fumes, stress and fatigue, smoking, drugs, and larval idiopathic and posttraumatic epilepsy. The most common conditions such as aeroembolism, hypoxia, and the like also are mentioned.

17,368
Bryan, A.C., Leach, W.G. & Stubbs, R.A. AIRCREW OXYGEN REQUIREMENTS IN HIGH ALTITUDE TRANSPORT AIRCRAFT. Aerospace Medicine, Jan. 1961, 32(1), 30-34. (RCAF Institute of Aviation Medicine, Toronto, Ontario, Canada).

17,368
To compare the ability of Ss to perform emergency procedures after a rapid decompression to either 35,000 or 40,000 ft., 108 Ss were tested under conditions of simulated altitude in a decompression chamber. The Ss, the majority of whom were airplane pilots, were taken to the designated altitude; after five sec., they were required to don the oxygen mask, select the 100 percent oxygen and emergency regulator, close four throttles and switches, and correct deviations in ILS needles. Descent was then initiated at 8,000 ft. per min. The results (success in performance and maintenancy of consciousness) were discussed in relation to the altitude at which the pilot of high altitude transport planes should start wearing an oxygen mask.
G. I. R 3

17,369
Kos, C.M. CLINICAL OTOSCLEROSIS. MANAGEMENT IN PILOTS. Aerospace Medicine, Jan. 1961, 32(1), 35-41. (Iowa City Clinic of Otology, Iowa City, Iowa).

17,369
Otosclerosis, a common cause of hearing impairment in young adults, is discussed in terms of the nature of the disability, its treatment, and its detection and management in aircraft pilots.
G. I. R 10

17,370
Zeller, A.F., Normand, G.H. & Burke, J.M. AIRCRAFT ACCIDENTS AND AIRCRAFT INSTRUMENTS. Aerospace Medicine, Jan. 1961, 32(1), 42-51. (USAF Directorate of Flight and Missile Safety Research, Norton AFB, Calif.).

17,370
The need for improvement in instruments and controls that give the aircraft pilot information and turn his decisions into action is discussed with reference to aircraft accident statistics. Many examples are given of inadequate instrumentation leading to accidents and, in the case of high-speed, high-altitude aircraft, many fatal accidents. The problems involved in standardization are considered. Finally, on the basis of accident histories, three areas are defined in which the information supplied to the pilot is inadequate. A plea is made for greater effort toward the development of the cockpit environment.
T. G.

17,371
Carbery, W.J., Steinberg, C.A., Tolles, W.E. & Freiman, A.H. AUTOMATIC METHODS FOR THE ANALYSIS OF PHYSIOLOGIC DATA. Aerospace Medicine, Jan. 1961, 32(1), 52-59. (Airborne Instruments Lab., Cutler-Hammer, Inc., Deer Park, N.Y.).

17,371
A computer facility for the rapid analysis of physiologic data from the manned space satellite is described. The details of this facility and methods for performing each of the analytic operations are discussed. Main features of the facility are 1) automatic signal recognition and measurement, 2) automatic analysis of several channels of simultaneously recorded data for early detection of significant changes, and 3) automatic analysis to determine underlying causes of these changes. Results obtained from analyses of similar types of data in the laboratory are presented to demonstrate the feasibility of the computer facility for use in experiments with manned space satellites.
G. I.

17,372
Levy, E.Z., Johnson, G.E., Serrano, J., Jr., Thaler, V.H., et al. THE USE OF SKIN RESISTANCE TO MONITOR STATES OF CONSCIOUSNESS. Aerospace Medicine, Jan. 1961, 32(1), 60-66. (USAF Biomedical Lab., Wright-Patterson AFB, Ohio).

17,372
The technique of recording the absolute level of skin resistance continuously on a highly compressed record is described as a tool for studying consciousness. Recent experimental work at the USAF Aero Medical Laboratory in isolation research and crew compartment studies in which the technique was used are described. The usefulness of the tool as a monitoring device for alertness is discussed along with its limitations in its present form.
G. R 8

17,373
von Dobeln, W. FAT FREE BODY WEIGHT OF SWEDISH AIR FORCE PILOTS. Aerospace Medicine, Jan. 1961, 32(1), 67-69. (Physiology Dept., Kungliga Gymnastiska Centralinstitutet, Stockholm, Sweden).

17,373
A method for estimating "lean body weight" (LBW) or "fat free body weight" (FFW) from anthropologic measures was described. The method was developed in Sweden using both male and female Ss. The relationship between FFW determined from density determination and as predicted by the anthropometric method was shown graphically. The method was then applied to 109 Swedish Air Force pilots and compared with available data for United States pilots. The obtained differences were discussed in terms of differing nutritional standards in the two countries.
T. G. R 5

17,374
Clark, B. & Graybiel, A. HUMAN PERFORMANCE DURING ADAPTATION TO STRESS IN THE PENSACOLA SLOW ROTATION ROOM. Aerospace Medicine, Feb. 1961, 32(2), 93-106. (San Jose State College, San Jose, Calif. & USN School of Aviation Medicine, Pensacola Air Station, Fla.).

17,374
To determine any changes in performance of Ss on a variety of tasks during a two-day period of constant rotation, one control S with effectively no vestibular function and five healthy Ss were tested. Six angular velocities (1.71, 2.22, 3.82, 5.44, and 10.00 rpm) were used on separate runs in order to sample the range proposed to generate artificial gravity on space platforms. Performance data were obtained from a practice period preceding rotation, during, and after rotation. The implications of the findings from a comparative analysis of these data were discussed in terms of life and activities on space platforms.
T. G. I.

17,375
Berry, C.A. DYSBARISM: AN INFLIGHT CASE AND A DISCUSSION OF THE PRESENT STATUS. Aerospace Medicine, Feb. 1961, 32(2), 107-112. (USAF Office of the Surgeon General, Washington, D.C.).

17,375
The case was reviewed of a USAF pilot aged 45, who developed severe neurological signs and symptoms after flying a T-33 aircraft with cabin altitude between 26,000 and 28,000 ft. for approximately one hour and twenty-five min. The incidence, etiology, and treatment of dysbarism were discussed along with the need for further and continuing research in this area.
T.

17,376
Cherniack, N.S., Hyde, A.S., Watson, J.F. & Zechman, F.W., Jr. SOME ASPECTS OF RESPIRATORY PHYSIOLOGY DURING FORWARD ACCELERATION. Aerospace Medicine, Feb. 1961, 32(2), 113-120. (USAF Biomedical Lab., Wright-Patterson AFB, Ohio).

17,376
A review of current experiments in respiratory physiology during forward acceleration was reviewed and the current concept presented. All Ss used were either members of a trained panel of centrifuge riders or highly experienced test pilots. Two types of support systems were utilized: contoured net couch, the back angle of which could be altered, and a noncontoured rigid support. Rates of onset, duration of acceleration, support system, and back angle were varied. Physiological data of various sorts were given. Areas where more work is needed were noted.
T. G. R 18

17,377
Hendler, E. & SantaMaria, L.J. RESPONSE OF SUBJECTS TO SOME CONDITIONS OF A SIMULATED ORBITAL FLIGHT PATTERN. Aerospace Medicine, Feb. 1961, 32(2), 126-133. (USN Air Crew Equipment Lab., NAMC, Philadephia, Penn.).

17,377
Some of the physiological responses of Ss wearing ventilated full-pressure suits and exposed to pressure and thermal profiles characteristic of extreme conditions of orbital flight patterns were presented. Ten Ss (NASA astronauts, test pilots, and Navy enlisted personnel) participated in 20 tests in which the entire or modified thermal and pressure profile of a typical capsular flight was compressed into a total duration of 115 min. The data presented were full thermal profiles, modified thermal profiles, skin temperature changes, rectal temperatures, heart rate, and weight loss.
T. G. I. R 4

17,378
Bennett, G. REACTIONS AND PERFORMANCE OF PILOTS FOLLOWING DECOMPRESSION. Aerospace Medicine, Feb. 1961, 32 (2), 134-136. (Medical Dept., British Overseas Airways Corporation, London Airport, England).

17,378
The reactions of a group of experienced pilots to decompression were studied by depressurizing aircraft in flight without previous warning being given the pilot under observation. Time taken to identify and assess the incident was measured and analyzed in relation to recency of indoctrination in effects of decompression. In a second experiment, the type of rapid-donning mask used in British Overseas Airways Corporation was evaluated by tests in a decompression chamber. The time taken to fit the masks satisfactorily five or ten sec. after arrival at 40,000 ft. was measured. Signs of impairment were assessed.
T.

17,379
King, B.G. PHYSIOLOGICAL EFFECTS OF POSTURAL DISORIENTATION BY TILTING DURING WEIGHTLESSNESS. Aerospace Medicine, Feb. 1961, 32(2), 137-140. (Operations Research, Incorporated, Silver Spring, Md.).

17,379
In a study of the labyrinthine function, observations on compensatory poses were made on pigeons (both normal and decerebrate) in a C-131 airplane during normal and weightless flights. Both motion and still picture records were made of responses to tilting, following rotation around the various body axes, and were compared with responses made under normal gravity conditions. The results were discussed in terms of the contribution of the utricular otolith in maintaining static posture of the body during conditions of weightlessness.
I. R 1

17,380
Graybiel, A. & Clark, B. SYMPTOMS RESULTING FROM PROLONGED IMMERSION IN WATER: THE PROBLEM OF ZERO G ASTHENIA. Aerospace Medicine, March 1961, 32(3), 181-196. (USN School of Aviation Medicine, Pensacola Air Station, Fla. & San Jose State College, San Jose, Calif.).

17,380
To evaluate changes in fitness of Ss while the effects of gravity on the body were reduced, three healthy young men were floated in tanks of physiologic saline solution for ten hours a day during a two-week period. When not immersed, they remained in bed, and great care was taken to minimize both muscular activity and sensory deprivation. A series of tests of muscular strength and coordination and of physiological function were given. Some of these were given only before and after immersion and others at periodic intervals during immersion. Analysis was made of the test data and of observations relating to psychological stresses. Implications of the findings for the zero-g state were discussed.
T. G. I. R 28

17,381
Schaefer, K.E. A CONCEPT OF TRIPLE TOLERANCE LIMITS BASED ON CHRONIC CARBON DIOXIDE TOXICITY STUDIES. Aerospace Medicine, March 1961, 32(3), 197-204. (USN Medical Research Lab., New London Submarine Base, Conn.).

17,381
The results of extensive studies on chronic carbon dioxide toxicity are summarized in an effort to arrive at reliable criteria of man's tolerance limits. A time-concentration curve for adaptation to carbon dioxide is presented which is based on the time to reach a compensation of the respiratory acidosis. Experimental evidence demonstrating significant effects of elevated carbon dioxide tensions in blood independent of pH changes is reported and related to possibilities for long-term adaptation to increased pCO_2. A concept of triple tolerance limits for carbon dioxide toxicity is proposed for three different levels of activity including one at which no significant physiologic adaptive changes to carbon dioxide occur.
T. G. I. R 33

17,383
Brown, J.L. ORIENTATION TO THE VERTICAL DURING WATER IMMERSION. Aerospace Medicine, March 1961, 32(3), 209-217. (USN Medical Research Lab., New London Submarine Base, Conn.).

17,383
To determine the extent of possible disorientation in a liquid environment when visual, tactual, kinesthetic, and buoyancy cues are largely eliminated, Ss were immersed in water at 18 or 25 ft. and then rotated in a tucked position on a rod through 3, 4, or 5 revolutions. Rotation was terminated with the head in one of four positions: upright, forward, down, or back. Ss then attempted to point in the up direction, then to nod the head and correct the direction of pointing if necessary, and, finally, to swim slowly toward the surface. The results (errors in pointing, correction after head movement, etc.) were interpreted with respect to the function of the utricles as g sensors. Suggestions were made about procedures for simulation of zero-g. T. I. R 15

17,384
Graveline, D.E., Balke, B., McKenzie, R.E. & Hartman, B.O. PSYCHOBIOLOGIC EFFECTS OF WATER-IMMERSION-INDUCED HYPODYNAMICS. Aerospace Medicine, May 1961, 32(5), 387-400. (USAF School of Aviation Medicine, Brooks AFB, Tex.).

17,384
Utilizing a technique involving whole-body immersion in water, a hypodynamic environment was produced in which normal weight sensations were removed and movement was effortless. One S was tested for a seven-day period during which time extensive biologic data were collected: metabolic and hematologic. Functional studies (orthostatic tolerance, work capacity, g-tolerance, and others) were made before and after immersion. EEG tracings were made before, after, and during the test period. Changes in psychomotor performance were also assessed. The findings were discussed in relation to effects of prolonged space flight under true weightless conditions on man.
T. G. I. R 8

17,385
Green, I.D. RESPONSE OF THE HUMAN RETINAL VESSELS TO POSITIVE PRESSURE BREATHING. Aerospace Medicine, May 1961, 32(5), 407-411.

17,385
To investigate the danger of intraocular hemorrhage occurring during positive-pressure breathing when there is no external counterpressure to the eyes, photographs of the human retinal vessels were taken during such conditions with pressure of 60 mm Hg. Changes in diameter of retinal veins were measured and interpreted in light of the theoretical considerations.
T. G. I.

17,386
Gray, R.F. & Webb, M.G. HIGH G PROTECTION. Aerospace Medicine, May 1961, 32(5), 425-430. (USN Aviation Medical Acceleration Lab., Johnsville, Penn.).

17,386
The principles of water immersion for protection against high accelerative forces are reinvestigated. Model studies are discussed concerning mechanical principles thought to be important. A study of the effects of accelerations on humans in the positive-g position when submerged to eye level in a tank of water is reported. Finally, studies involving the use of a capsule, designed to utilize the various mechanical principles discussed above, are described. The S is completely submerged in water and breathes through a tube attached to a mask. Tolerance limits for several human Ss are reported.
I. R 10

17,387
Walters, R.H. & Henning, G.B. ISOLATION, CONFINEMENT AND RELATED STRESS SITUATIONS. SOME CAUTIONS. Aerospace Medicine, May 1961, 32(5), 431-434. (Department of Psychology, University of Toronto, Toronto, Ontario, Canada).

17,387
This paper attacks the view that sensory isolation studies may supply answers to a whole set of applied problems including those of space flight, submarine warfare, imprisonment, etc. The importance of social isolation, which in most of the reported papers has not been controlled, is discussed. Some evidence is presented from a variety of studies, both in the field and in the laboratory, on the outcomes of social isolation and reactions to living in small groups. Dangers inherent in attempting to bring all these data under one theoretic tent are discussed along with the need of experimentation using real life situations.
R 46

17,388
Schaefer, H.J. CURRENT PROBLEMS IN ASTRORADIOBIOLOGY. Aerospace Medicine, May 1961, 32(5), 435-441. (USN School of Aviation Medicine, Pensacola Air Station, Fla.).

17,388
Current knowledge concerning the heavy nuclei of primary cosmic radiation is discussed and the feasibility of laboratory experimentation and study is detailed. The discussion of radiation hazards in space centers upon the newly discovered proton radiation fields of various origin in space. The greatly enhanced proton flux during and after large solar flares is of special concern and the time reserve that exists for re-entry behind the shield of the atmosphere after the onset of a large flare on the sun is analyzed.
G. I. R 6

17,389
von Diringshofen, H. CONSIDERATIONS FOR SPECIAL INSTRUMENT FLIGHT TRAINING TO MINIMIZE SPACIAL DISORIENTATION. Aerospace Medicine, May 1961, 32(5), 442-443.

17,389
The problem of the unlimited control of the high speed aircraft during instrument flight is discussed. The present practice of a combination of visual and instrument combat flying is said to be one of the main causes of spatial disorientation and vertigo. As speeds increase the danger also increases. Thus, the need for increased instrument training in blind flight is stressed in order to minimize spatial disorientation. The artificial horizon indicator and warning signals to avoid dangerous flight situations are discussed as important unsolved display problems.
R 1

17,390
Lamb, L.E. & Roman, J. THE HEAD-DOWN TILT AND ADAPTABILITY FOR AEROSPACE FLIGHT. Aerospace Medicine, June 1961, 32(6), 473-486. (USAF School of Aerospace Medicine, Brooks AFB, Tex.).

17,390
To study the circulatory reflex response in reference to adaptation to stresses imposed during +1.0g and to responses incurred following termination of stresses and exposure to -0.7g, 22 Ss underwent these conditions by means of a standard tilt table. Each S was first placed in horizontal position and a baseline heart rate obtained, then tilted feet down and given a series of stresses with heart rate and cardiac rhythm determined after stress. Then S was tilted head down at a 45-degree angle with heart rate and cardiac rhythms determined at six-sec. intervals during transition and duration of tilt. The influences of such factors as age, physical fitness, heart rate, and level of sympathetic response upon the degree of vagal inhibition and type of circulatory responses were evaluated. T. G. I. R 9

17,391
Luykx, H.M.C. & Murray, Betty L. ILLNESS AMONG FLYERS. TEMPORARY REMOVALS FROM FLYING USAF RATED OFFICERS JULY-DECEMBER, 1959. Aerospace Medicine, June 1961, 32(6), 505-515. (USAF Office of the Surgeon General, Washington, D.C.).

17,391
An analysis of quantity and types of illness among USAF flyers is presented. The data cover the first six months' accumulation of records for persons removed from flying and returned to flying duty during July to December, 1959. Only rated officers are included. Illness experience is analyzed according to 1) type of rating, 2) age, and 3) type of duty or command. The actual illnesses are divided into 17 separate categories for purposes of analysis.
T. G. R 2

17,392
Danhof, I.E. & Steggerda, F.R. GASTRIC ACID SECRETORY RESPONSES TO DISTENTION AT SIMULATED ALTITUDE. Aerospace Medicine, June 1961, 32(6), 520-523. (University of Texas Southwestern Medical School, Dallas, Tex. & University of Illinois, Urbana, Ill.).

17,392
To investigate the effect of stomach distention at simulated altitude on gastric acid secretory responses, experiments were conducted on human Ss and on animals. Three adult males (at ground level and during two separate ten-min. periods at simulated altitude of 15,000 ft.) were tested for gastric reaction (pH) and urinary pH. In some tests, room air was inhaled, in others 100 percent oxygen; also in some of the tests, 500 cc of gas (nitrogen) were administered intragastrically during the third period of measurement. Eight dogs were tested in the animal experiment.
T. R 14

17,393
Pletcher, K.E. & Neely, S.E. USAF EMERGENCY ESCAPE EXPERIENCE--1950-1959. Aerospace Medicine, June 1961, 32(6), 524-534. (USAF Directorate of Flight and Missile Safety Research, Norton AFB, Calif.).

17,393
Ten years' experience of escape from USAF tactical aircraft are reviewed in an effort to establish the actual hazards connected with emergency escape as opposed to those which experience has shown to be of less importance than the amount of attention they have received. The analysis makes use of tables and graphs to show major accident figures for the period under study, the role of escape in fatal accidents, the effect of ejection seat on escape statistics, type of emergency precipitating ejection, amount of terrain clearance, aircraft attitude, difficulties initiating ejection and after egress, water landing, and survival after ejection. Two new developments in escape are discussed: rocket catapults and capsules.
T. G. R 7

17,395
Eddowes, E.E. SURVEY OF LEISURE TIME ACTIVITY. IMPLICATIONS FOR THE DESIGN OF A SPACE VEHICLE. Aerospace Medicine, June 1961, 32(6), 541-544. (Human Factors Lab., Air Arm Div., Westinghouse Electric Corporation, Baltimore, Md.).

17,395
To determine the possibility of providing facilities that would enable a space crewman to spend his off-duty hours on a space mission in a way similar to his everyday life on earth, 80 male Ss of the engineering department personnel of the Westinghouse Air Arm Division responded to a questionnaire. Three open-ended type questions dealing with the S's activity and one biographical item were included. The analysis included rank ordering of leisure time activities, of preferred athletic activities and of those participated in most frequently, and of equipment desired for a hypothetical space journey. Some rather qualified conclusions were presented.
T. R 5

17,396
Schmidt, C.F. PHARMOCOLOGY AND AVIATION. Aerospace Medicine, July 1961, 32(7), 577-582. (University of Pennsylvania School of Medicine, Philadelphia, Penn.).

17,396
The role of pharmacological research in aviation research is discussed in this paper. The discovery of drugs with certain desired properties is admitted to be of minor importance; the search for an explanation of the effects which familiar drugs produce is the more profitable line of research. Some examples are given from research during World War II to illustrate the above point. Since there is now opening up an entire new area of stresses in space aviation, the author suggests that the past experience be reviewed to discover lines of research and methods which proved to be most profitable.
R 15

17,397
Welch, B.E., Morgan, T.E., Jr. & Ulvedal, F. OBSERVATIONS IN THE SAM TWO-MAN SPACE CABIN SIMULATOR. I. LOGISTICS ASPECTS. Aerospace Medicine, July 1961, 32(7), 583-590. (USAF School of Aviation Medicine, Brooks AFB, Tex.).

17,397
To study the reactions and performance of crew members to various potential space cabin atmospheres and environmental conditions, two pilots were maintained in a two-man space cabin simulator for 30 days and for 17 days. The 30-day flight was at an altitude of 18,000 ft. with 40 percent oxygen-60 percent nitrogen atmosphere; the 17-day flight was at 33,500 ft.-altitude with essentially a 100 percent oxygen atmosphere. Data were obtained on body weight, energy intake, average weight in lbs. per man per day for both food and container, water intake/output, and estimated oxygen requirements. The use of data such as these was discussed in reference to realistic design standards for the space cabin.
T. I. R 12

17,398
Morgan, T.E., Jr., Ulvedal, F. & Welch, B.E. OBSERVATIONS IN THE SAM TWO-MAN SPACE CABIN SIMULATOR. II. BIOMEDICAL ASPECTS. Aerospace Medicine, July 1961, 32(7), 591-602. (USAF School of Aviation Medicine, Brooks AFB, Tex.).

17,398
To study physiological responses and physical performance of space cabin Ss, two pilots were maintained in a space-cabin simulator for 30 and for 17 days at altitudes of 18,000 ft. (oxygen enriched to 40 percent) and 33,500 ft. (100 percent oxygen), respectively. In analysis of the data and discussion, special emphasis was placed on physical performance and work capacity, on problems of water balance and body composition, on changes in pulmonary function, and on the potential hazards of oxygen toxicity in experiments on man in a "space-equivalent" environment.
T. G.

17,399
McKenzie, R.E., Hartman, B.O. & Welch, B.E. OBSERVATIONS IN THE SAM TWO-MAN SPACE CABIN SIMULATOR. III. SYSTEM OPERATOR PERFORMANCE FACTORS. Aerospace Medicine, July 1961, 32(7), 603-609. (USAF School of Aviation Medicine, Brooks AFB, Tex.).

17,399
To study factors of operator performance during space flight, two pilots were maintained in a space-cabin simulator for 30 and for 17 days. A multi-element assembly of psychomotor tasks were structured to provide a system simulating those tasks that men in space might be expected to perform. The tasks were divided into four functional areas tapping such factors as monitoring, vigilance, information processing, and encoding with varying signal rates and work periods. The data yielded information relative to prolonged operator performance, the effects of time at the tasks, and effects of work load.
G. I. R 6

17,400
Flinn, D.E., Monroe, J.T., Jr., Cramer, E.H. & Hagen, D.H. OBSERVATIONS IN THE SAM TWO-MAN SPACE CABIN SIMULATOR. IV. BEHAVIORAL FACTORS IN SELECTION AND PERFORMANCE. Aerospace Medicine, July 1961, 32(7), 610-615. (USAF School of Aviation Medicine, Brooks AFB, Tex.).

17,400
To observe the effects of prolonged confinement on the interaction of a two-man crew, four flights in a space-cabin simulator by two-man crews over periods of 14, 30, 30, and 17 days were studied. Methods used for evaluating Ss and observing behavior consisted of pre-flight psychiatric and psychologic assessment, inflight observation of behavior, postflight debriefings, and psychologic testing. The results were discussed qualitatively with tentative generalizations offered with reference to 1) maintenance of morale and motivation, 2) feelings of resentment and causes, and 3) how the Ss related to each other despite underlying resentment.
T. G. R 9

17,401
Bartlett, R.G., Jr. & Phillips, N.E. OLFACTORY IDENTIFICATION OF LIQUID OXYGEN CONTAMINANTS. Aerospace Medicine, July 1961, 32(7), 621-629. (USN School of Aviation Medicine, Pensacola Air Station, Fla.).

17,401
Oxygen evolved from the liquid source frequently causes aviator complaints of bad odors and associated sickness. Extensive and repeated analysis of liquid oxygen has revealed that a number of contaminants frequently are present in small amounts. They were water vapor, methane, acetylene, carbon dioxide, ethylene, nitrous oxide, and traces of higher hydrocarbons. None of the contaminants were present at toxic levels. To explore the problem further, an experimental study was performed in which ten Ss attempted to differentiate among oxygen samples of pure oxygen and oxygen containing in known amounts one of the contaminants. Comparison data were analyzed and the findings used to formulate an explanation for the problem.
T. G. I.

17,402
Lazo, J. & Bosee, R.A. VISIBILITY FACTORS IN AIRCRAFT COLLISION AVOIDANCE. Aerospace Medicine, July 1961, 32(7), 634-638. (USN Air Crew Equipment Lab., NAMC, Philadelphia, Penn.).

17,402
A summary of the several investigations of the interrelationships of the various parameters involved in the visibility and detectability of airborne vehicles is given. The particular concern here is the reduction of the frequency of mid-air collisions and near-misses. Emphasis is placed on distance between aircraft along with respective speed and relative approach angles and on the attributes of color, brightness, and contrast of the aircraft. A continuing study program in this area is recommended.
T. G. I. R 8

17,403
Ruff, G.E. PSYCHOLOGICAL EFFECTS OF SPACE FLIGHT. Aerospace Medicine, July 1961, 32(7), 639-642. (School of Medicine, University of Pennsylvania, Philadelphia, Penn.).

17,403
Potential sources of adverse psychological change during space flight are identified in a broad, general manner and some steps which must be taken to control it are indicated. Among the sources here identified as being primarily in the psychological realm are isolation, sensory deprivation, interpersonal relationships during prolonged confinement, prolonged exposure to danger, anxieties that may arise if basic physiological needs are not gratified, and the like. It is suggested that training in some of these areas must be carried out before the mission, that steps can be taken to help the traveler during flight, and that a planned program of research after the flight should be prepared.
R 4

17,404
Bartlett, R.G., Jr. PULMONARY FUNCTION EVALUATION IN AIR AND SPACE FLIGHT. Aerospace Medicine, Aug. 1961, 32(8), 666-694. (USN School of Aviation Medicine, Pensacola Air Station, Fla.).

17,404
The velocity-volume loop, a composite pulmonary function test adaptable to inflight monitoring, is described and suggested for use for air and space flight. Continuous recording from a pneumotachograph, with only occasional attention by pilot or astronaut, permits the evaluation of a number of respiratory parameters. It is felt that the small amount of instrumentation and involvement of action is of paramount importance.
T. G. I. R 3

17,405
Konikoff, J.J. OXYGEN RECOVERY SYSTEMS FOR MANNED SPACE FLIGHT. Aerospace Medicine, Aug. 1961, 32(8), 701-712. (Missile and Space Vehicle Dept., General Electric Company, Philadelphia, Penn.).

17,405
The problem of supplying man with his oxygen requirement and uncontaminated air during prolonged confinement is discussed. The purification of air and the regeneration of oxygen are the major problem areas dealt with in this paper. Current status in both problem areas are reviewed and evaluated in terms of efficiency of techniques and load cost of the system.
T. G. I. R 5

17,406
Langdon, D.E. & Reynolds, G.E. POSTFLIGHT RESPIRATORY SYMPTOMS ASSOCIATED WITH 100 PER CENT OXYGEN AND G-FORCES. Aerospace Medicine, Aug. 1961, 32(8), 713-718. (USAF School of Aerospace Medicine, Brooks AFB, Tex. & USAF Hospital, Luke AFB, Ariz.).

17,406
To explore the problem of postflight respiratory symptoms after 100 percent oxygen and high g-force missions, a study was made of a group of student and instructor pilots whose flying mission entailed the above conditions. Questionnaires with flight surgeon follow-up revealed some frequency statistics and the flight conditions that preceded the symptoms. A series of tests followed on 35 randomly selected pilots and two of the invariably symptomatic pilots in which an effort was made to delineate the various factors involved and to pinpoint the differences between those who regularly developed symptoms and those who did not.
T. I. R 17

17,407
Whiteside, T.C.D. HAND-EYE COORDINATION IN WEIGHTLESSNESS. Aerospace Medicine, Aug. 1961, 32(8), 719-725. (RAF Institute of Aviation Medicine, Farnborough, Hants, England).

17,407
To study hand-eye coordination under conditions that would eliminate the variable of visual monitoring of performance yet with eye movement controlled, Ss were required to point at graph paper situated some 20 to 25 inches from his chest at chest level. A thimble with a point was worn on the index finger so that accurate measurements could be made. A mirror was located in such a manner that the S saw a target situated to one side but could not see his hand and arm. The aiming task was performed under normal conditions, under simulation of subgravity (immersion in water up to neck), under zero g in an aircraft flying the well-known parabola, and under acceleration (2g) on the centrifuge. Practical implications of the findings were indicated. T. G. I. R 6

17,408
Graveline, D.E. & Barnard, G.W. PHYSIOLOGIC EFFECTS OF A HYPODYNAMIC ENVIRONMENT: SHORT-TERM STUDIES. Aerospace Medicine, Aug. 1961, 32(8), 726-736. (USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio).

17,408
To study the metabolics and functional responses of the body to a state of relative muscular inactivity, four Ss were studied after 6, 12, and 24 hours of water immersion. Supported by water and a form-fitting couch, normal weight sensation was altered and movement became relatively effortless. Functional studies obtained on the Ss included tilt table and heat chamber tests as well as the responses to headward acceleration. Pertinent psychomotor tests and evaluations of muscle strength were also done. The findings were discussed with reference to protective measures needed for orbital flight to enable man to adapt to the new set of environmental demands.
T. G. I. R 1

17,409
Rogers, T.A. & Smedal, H.A. THE VENTILATORY ADVANTAGE OF BACKWARD TRANSVERSE ACCELERATION. Aerospace Medicine, Aug. 1961, 32(8), 737-740. (Physiology Dept., Stanford University, Stanford, Calif. & Ames Research Center, Moffett Field, Calif.).

17,409
To compare the effects of acceleration applied transversely to the spinal axis in the "eyeballs-in" and the "eyeballs-out" directions on respiratory function, five Ss were tested on the human centrifuge at four, six, and eight g. With the use of special respiratory equipment data were obtained on tidal volume, inspiratory capacity and expiratory reserve separately, and vital capacity. The ventilatory advantage of the eyeballs-out or backward position was discussed.
T. G. I. R 10

17,411
Rohles, F.H., Jr. & Grunzke, M.E. A MODEL FOR BEHAVIORAL RESEARCH WITH MICE IN BIOSATELLITES. Aerospace Medicine, Aug. 1961, 32(8), 751-755. (USAF Aeromedical Field Lab., Holloman AFB, N.M.).

17,411
As a model for obtaining behavioral measures with animals in outer space, sustained operant behavior was observed in a mouse that performed on a FR 100 reinforcement schedule (fixed ratio of 100 lever presses for one pellet of food) for 20 min. out of six hours for a period of 96 hours. The performance was then observed for an additional 96 hours without reward. The implications of the results for space work and other fields were discussed.
T. G. R 3

17,412
Rothe, H.F. & Nye, C.T. OUTPUT RATES AMONG MACHINE OPERATORS: III. A NONINCENTIVE SITUATION IN TWO LEVELS OF BUSINESS ACTIVITY. J. appl. Psychol., Feb. 1961, 45(1), 50-54. (Fairbanks, Morse and Company, Beloit, Wisc.).

17,412
Output rates for machine operators were obtained from one plant for two different years (1958 and 1960) and in two different levels of business activity (poor and favorable). The plant used no financial incentive system (paid an hourly rate) and did not discipline poor producers although an employee could be dismissed for substandard performance. The data were analyzed in terms of weekly average output (percentage performance of standard), for frequency distributions, and for ratios of inter- and intraindividual differences. These results were discussed in relation to previously developed hypotheses relating consistency of output to adequacy of financial incentives.
T. G. R 10

17,413
Groth, Hilde & Lyman, J. A HIERARCHY OF "PERCEPTUAL USEFULNESS" OF GEOMETRICAL CUES IN AN OVERLEARNED DIAL-READING TASK. J. appl. Psychol., April 1961, 45(2), 86-90. (University of California, Los Angeles, Calif.).

17,413
To define an hierarchy of "perceptual usefulness" of geometrical cues in an overlearned dial-reading task, 21 Ss were required to read off clock-times from dial faces representing a variety of cue configurations and backgrounds. The dial faces were varied by systematic addition and deletion of various types of geometrical signal information. The number of correct responses and number of completed responses were analyzed and rank ordered as an index of perceptual usefulness. The results were discussed in relation to an hypothesis that performance is a function of perceptual usefulness rather than amount of information, redundancy, and noise present in a given situation.
T. I. R 8

17,414
Burg, A. & Hulbert, S. DYNAMIC VISUAL ACUITY AS RELATED TO AGE, SEX, AND STATIC ACUITY. J. appl. Psychol., April 1961, 45(2), 111-116. (Institute of Transportation and Traffic Engineering, University of California, Los Angeles, Calif.).

17,414
To investigate the relationship of dynamic visual acuity (discrimination of an object when there is relative movement between observer and object) and other visual measures on a heterogeneous group of Ss, 236 Ss (110 males, 126 females) have been tested and 96 of them at least twice. The age range was from 16 to 67 years; all Ss were drivers. Each S's monocular and binocular static acuity, near and far lateral phoria, cff, and dynamic visual acuity were determined. Test-retest reliability coefficients for each test and various correlations between test scores were calculated. Age and sex differences were analyzed. Further investigations were discussed.
T. I. R 13

17,415
Kennedy, J.E. THE PAIRED-COMPARISON METHOD AND CENTRAL TENDENCY EFFECT IN ESTHETIC JUDGMENTS. J. appl. Psychol., April 1961, 45(2), 128-129. (Bureau of Industrial Psychology, University of Wisconsin, Madison, Wisc.).

17,415
The problem of the tendency for Ss to prefer the central figures in a series (central tendency effect) was reviewed in relation to previous investigations. The belief that this effect can be eliminated by using the paired comparison method of presentation was explored by replicating a study in which preferences for isosceles triangles were determined but with one basic change. Three series of stimuli were used corresponding to the lower, middle, and upper ranges of the earlier series. Comparison of results from the two studies was made and other solutions to the problem were proposed.
G. R 3

17,416
Brainard, R.W., Campbell, R.J. & Elkin, E.H. DESIGN AND INTERPRETABILITY OF ROAD SIGNS. J. appl. Psychol., April 1961, 45(2), 130-136. (Ohio State University, Columbus, Ohio).

17,416
To determine how well European road signs could be interpreted by United States citizens and to relate these findings to sign preferences (stereotypes), a five-part study was conducted using over 100 Ss. Interpretability was investigated by having Ss write the meaning conveyed to them by each of 30 selected signs, by choosing from a list of possible meanings the best match for each sign, and, after being told the meaning of the signs, again writing the meaning conveyed to them. Stereotypes were investigated by asking the S to design signs for orally read meanings. Stereotyped signs were then constructed on the basis of the above results and their interpretability determined. The results were discussed in terms of the usefulness of graphic road signs. T. I.

17,418
Olson, P.L., Wachsler, R.A. & Bauer, H.J. DRIVER JUDGMENTS OF RELATIVE CAR VELOCITIES. J. appl. Psychol., June 1961, 45(3), 161-164. (General Motors Research Labs., Detroit, Mich.).

17,418
To investigate drivers' ability to detect the direction and rate of change of the interval separating their own car from a preceding car, 11 experienced adult drivers were tested. Two cars were used with direction and rate of change of gap controlled by holding the velocity of the following car constant at 40 mph and varying velocity of the lead car from 10 to 70 mph in increments of 10 mph. The S, a rider in the following car, kept eyes averted until a signal was given to observe the lead car; a judgment was made, after seven sec. observation, as to whether the gap was opening, closing, or holding constant and an estimate of speed discrepancy between the two cars given. Accuracy of these judgments was analyzed.
T. G. R 1

17,419
Kidd, J.S. A COMPARISON OF TWO METHODS OF TRAINING IN A COMPLEX TASK BY MEANS OF TASK SIMULATION. J. appl. Psychol., June 1961, 45(3), 165-169. (Ohio State University, Columbus, Ohio).

17,419
To study the influence of task load on training efficiency in a simulated setting, a radar air-traffic control center operation was simulated. The task, predominately discrimination-decision-making, was to guide aircraft within a specified zone of responsibility. Improvement in performance with training was compared for two conditions: constant high input load (number of aircraft under control) during training, and graduated input load during training. Test performance of two groups were compared on the basis of several criteria. An explanation for the results was proposed in terms of feedback of knowledge of performance.
T. G. R 10

17,420
Dunnette, M.D. DRIVER OPINIONS AND REPORTED PERFORMANCE UNDER VARIOUS INTERCHANGE MARKING AND NIGHTTIME VISIBILITY CONDITIONS. J. appl. Psychol., June 1961, 45(3), 170-174. (University of Minnesota, Minneapolis, Minn.).

17,420
To study driver performance and opinions under different conditions of night visibility and with the use of various highway marking systems, a cloverleaf interchange, formed by the intersections of two highways, was studied under five conditions: 1) fully illuminated, 2) dark, 3) standard use of reflectorized delineation, 4) experimental reflectorization, and 5) a combination of (1) and (4). A total of 1,137 motorists were interviewed either after leaving the major highway, after proceeding through the intersection, or after entering the major highway. The extent of difficulty in choosing the right route, markings found helpful, and personal opinions or suggestions for improvement were obtained and discussed in terms of reducing night driving problems.
T.

17,421
Drewes, D.W. DEVELOPMENT AND VALIDATION OF SYNTHETIC DEXTERITY TESTS BASED ON ELEMENTAL MOTION ANALYSIS. J. appl. Psychol., June 1961, 45(3), 179-185. (Industrial Psychology Center, North Carolina State College, Raleigh, N.C.).

17,421
To test the hypotheses that the predictive validity of a test which essentially duplicates or simulates the sequence of motion elements used on a job is greater than one which does not do so, a series of pegboard tests entitled the Purdue Elemental Motions Tests (PEMT) was designed to incorporate many of the motion elements used in the Methods-Time Measurement predetermined time system. Following tests of reliability, validation tests were conducted on an industrial sample. Three variations of the PEMT and the Minnesota Rate of Manipulation Test were administered to each S. Test results were then evaluated using an efficiency index of worker productivity as criterion.
T. R 10

17,422
Clark, R.E. THE LIMITING HAND SKIN TEMPERATURE FOR UNAFFECTED MANUAL PERFORMANCE IN THE COLD. J. appl. Psychol., June 1961, 45(3), 193-194. (USA Quartermaster Research & Engineering Command, Natick, Mass.).

17,422
To establish the lower limit of hand skin temperature for unaffected manual performance and to determine the stability of this limiting temperature when duration of exposure is varied, the hands of 12 enlisted men were cooled to 55 degrees F and 60 degrees F surface temperature on different experimental days. Performance times to complete a standard knot-tying task were obtained when S's hand first reached the appropriate skin temperature, after 20 min. of exposure at the criterion temperature, after 40 min., and after 60 min. of exposure. Changes in manual performance were analyzed as functions of hand skin temperature and duration of cold exposure.
G. R 4

17,423
Kidd, J.S. A COMPARISON OF ONE-, TWO-, AND THREE-MAN WORK UNITS UNDER VARIOUS CONDITIONS OF WORK LOAD. J. appl. Psychol., June 1961, 45(3), 195-200. (Ohio State University, Columbus, Ohio).

17,423
A comparative evaluation was made of the effect of input load and team size on the productivity of a radar approach control unit. A simulated radar approach control center was used and the task assigned was that of pattern-feeder controller. Nine laboratory trained controllers performed a total of 54 problems with varied input load (intervals between aircraft arrivals were 30, 60, or 90 sec.) and varied control unit size (one, two, or three operators per unit). Using various performance criteria (delay time, excess fuel, separation errors, missed approaches, and number of departures), the effects of these variables were assessed.
T. R 13

17,424
Morrill, C.S. & Davies, Barbara L. TARGET TRACKING AND ACQUISITION IN THREE DIMENSIONS USING A TWO-DIMENSIONAL DISPLAY SURFACE. J. appl. Psychol., Aug. 1961, 45(4), 214-221. (Mitre Corporation, Bedford, Mass.).

17,424
To investigate the effects of four different display-control systems upon operator performance in acquiring and tracking a target using three dimensions on a two-dimensional surface, four groups of ten Ss were tested. The four systems included two internally compatible (display is direct representation of control movement) and two internally incompatible ones. Target azimuth and range were represented by a symbol (a single dot) capable of moving along x and y axes simultaneously; target elevation was represented by a short vertical line, capable of vertical movement, appearing at one side of the display. A handgrip control could be rotated to control azimuth and range; a thumbwheel controlled elevation. Performance measures were compared for the four conditions. T. G. I. R 8

17,425
Blum, M.L. & Appel, Valentine. CONSUMER VERSUS MANAGEMENT REACTION IN NEW PACKAGE DEVELOPMENT. J. appl. Psychol., Aug. 1961, 45(4), 222-224.

17,425
A consumer research study on packaging design was described. From 18 design renderings submitted for a new product, those showing most promise were to be chosen. Two specifications had to be met: the package should appear both as expensive and masculine and women should prefer it as a gift for their husbands; men should prefer it as a gift for themselves. Four independent groups (female and male consumers, advertising and market executives, and designers) rated the renderings in terms of the above specifications using the Q-sort technique. Marketing implications of the findings were discussed.
T. R 1

17,426
Hughes, J.L. & McNamara, W.J. A COMPARATIVE STUDY OF PROGRAMMED AND CONVENTIONAL INSTRUCTION IN INDUSTRY. J. appl. Psychol., Aug. 1961, 45(4), 225-231. (International Business Machines Corporation, Bethesda, Md.).

17,426
A comparative study of learning achievement of employee classes taught by programmed instruction and by conventional classroom instruction was performed. Programmed textbooks containing 719 frames were prepared to cover the first 15 hours of a course for trainees in a 7070 Data Processing System servicing course. Achievement test scores for six experimental classes (70 in number) who used these booklets were compared with those of two control classes (40 in number) taught by lecture-discussion method. Actual training times were also compared. Student reaction to programmed instruction was assessed by a questionnaire.
T. R 3

17,427
Berry, P.C. EFFECT OF COLORED ILLUMINATION UPON PERCEIVED TEMPERATURE. J. appl. Psychol., Aug. 1961, 45(4), 248-250. (Psychological Research Associates, Inc., Arlington, Va.).

17,427
To investigate experimentally the effect of colored illumination upon perceived temperature, 25 Ss were instructed in a simple tracking task. During the training period, five colors of light (white, yellow, amber, blue, and green) were used for given periods of time. The Ss were told that the purpose of the test was that of determining the effect of colored light on tracking and also told the lights generated some heat and therefore, when they became uncomfortably warm, they should signal the experimenter. The room was especially equipped so that a concealed heater produced a rise of two degrees F per min. in room temperature. Mean temperature-index scores reported at onset of discomfort and final rankings by Ss as to amount of heat each light transmitted were analyzed. T. R 3

17,428
Droege, R.C. & Hill, Beatrice M. COMPARISON OF PERFORMANCE ON MANUAL AND ELECTRIC TYPEWRITERS. J. appl. Psychol., Aug. 1961, 45(4), 268-270.

17,428
The possibility of developing conversion tables that would enable prediction of performance on an electric typewriter from performance on a manual typewriter was investigated. Experienced electric typewriter operators (575 in number) were tested initially on an electric and retested on a manual typewriter. Equivalent forms of the US Employment Service Test were used. Performance scores (words per minute and errors) between the two typewriters were analyzed for differences. Uncontrolled factors in this experiment were discussed and suggestions made for further study before developing the conversion tables.
T. R 1

17,429
Maier, N.R.F. & Hoffman, L.R. ORGANIZATION AND CREATIVE PROBLEM SOLVING. J. appl. Psychol., Aug. 1961, 45(4), 277-280. (University of Michigan, Ann Arbor, Mich.).

17,429
To explore the question of the extent to which organizations that operate under the classical management philosophy are failing to use the human creative potential of their employees, groups from four populations, differing in their amount of experience and identification with industrial vocation, were compared on the frequency of creative problem solutions. The Change of Work Procedure problem was employed. Arranged from most to least identified, there were 69 groups of people presently employed in large organizations, 28 groups of business administration students, 50 groups of students from a human relations course, and 32 from an introductory psychology course. The percentage of integrative solutions from each group were compared.
T. R 12

17,437
Maritz, J.S., Morrison, J.F., Peter, J., Strydom, N.B., et al. A PRACTICAL METHOD OF ESTIMATING AN INDIVIDUAL'S MAXIMAL OXYGEN INTAKE. Ergonomics, April 1961, 4(2), 97-122. (Transvaal Chamber of Mines Research Labs., Johannesburg, Union of South Africa).

17,437
The assumptions upon which simple methods for estimating an individual's maximum oxygen intake are based were tested on African mine laborers. Four men were trained to step on and off a stool one ft. in height at a rate of 24 steps per min.; then a series of studies were made over a five-month period. Subsequent tests were made after the Ss had been trained on a bicycle ergometer; 26 other Ss were also given tests at various intervals after beginning actual work in the mines. The results of the observations were used to check assumptions in the method proposed by Astrand. Errors involved in this method were examined and compared with an alternative procedure described in this paper.
T. G. R 6

17,438
Barkla, D. THE ESTIMATION OF BODY MEASUREMENTS OF BRITISH POPULATION IN RELATION TO SEAT DESIGN. Ergonomics, April 1961, 4(2), 123-132. (Research Dept., Furniture Development Council, London, England).

17,438
The principal published information on human dimensions relevant to seat design is brought together. The populations surveyed comprise British, Swedish, and American individuals. Estimates of the measurements of young British adults are derived from the data and applications made to seat design.
T. R 20

17,439
Crawford, A. FATIGUE AND DRIVING. Ergonomics, April 1961, 4(2), 143-154. (Department of Scientific and Industrial Research, Harmondsworth, Middlesex, England).

17,439
The assumption is made that the problem of fatigue in driving is two-folds fatigue resulting from driving, and effects of fatigue, from whatever source, on driving. Difficulties in defining driving performance and measuring fatigue are discussed. Some of the research on operational fatigue in driving and in other complex skills is reviewed and the source of fatigue is discussed. It is concluded that stress is an important factor in producing driving fatigue, and various methods of assessing the effects of the emotional arousal it produces are discussed.
R 46

17,440
Wallis, D. & Samuel, J.A. SOME EXPERIMENTAL STUDIES OF RADAR OPERATING. Ergonomics, April 1961, 4(2), 155-168.

17,440
Three experiments were conducted in which several critical features of the radar operator's task were examined. Experienced operators were used and special simulators were constructed to give realistic but controllable presentations. In the first study, an auditory detection task and visual search of radar display were combined for a three-hour period with measurement of "optimal" performance before and after each period. Results were analyzed to compare effects of continuous and interrupted radar operating and to show how performance on watch is related to optimal standards. The following experiments were designed to assess 1) the influence of target density and blip-scan ratio on detection of new targets, and 2) eye-movement patterns.
T. G. I. R 13

17,441
Papaloizos, A. SOME CHARACTERISTICS OF INSTRUMENT MEASURING DIALS. Ergonomics, April 1961, 4(2), 169-182. (Department of Industrial Psychology, Ebauches, S.A., Neuchatel, Switzerland).

17,441
Two experiments were undertaken to determine the importance of different characteristics of dials with respect to their legibility. Four characteristics were studied: dial frame, dial hand, graduations, and dial color. For the first three characteristics, three variables each with two levels were investigated; for the fourth, there were two variables with two and four variables. The performance (error data) of eight Ss was analyzed for the effects of these characteristics on accuracy. The second study varied the procedure of a fixed exposure to one controlled by the S and also required a "rounding-off" of some readings. The special case of no minor graduations was also examined. Implications for rapid and accurate dial reading were discussed. T. I. R 9

17,442
Jensen, B.T., Tilton, J.R. & Anderson, D.N. DIFFERENTIAL EFFECTS OF KNOWLEDGE OF RESULTS AND DISCUSSION. Ergonomics, April 1961, 4(2), 183-188. (System Development Corporation, Santa Monica, Calif.).

17,442
A training experiment was initiated at a radar station of the USAF as to the relative contributions of knowledge of results (reports to crew members regarding their achievement) and debriefing (discussion among crew members of the work and procedures used in an attempt to improve). External events so attenuated the experimental conditions that the results could not be evaluated unambiguously. However, the change in performance of four crews, treated differentially with regard to knowledge of results and debriefing, was discussed in general terms.
T. R 6

17,443
Underwood, B.J. TEN YEARS OF MASSED PRACTICE ON DISTRIBUTED PRACTICE. Psychol. Rev., July 1961, 68(4), 229-247. (Northwestern University, Evanston, Ill.).

17,443
This paper presents a conception of how distributed practice facilitates the acquisition of verbal lists. Evidence from a series of studies dealing with the influence of distributed practice on verbal learning, which have been in process for the past ten years, is used to provide the framework for the conception. The critical variables which have emerged from this series of studies are presented and discussed in detail. Certain "soft" spots in the conception as presented are discussed.
G. R 34

17,444
Edwards, W.D. COSTS AND PAYOFFS ARE INSTRUCTIONS. Psychol. Rev., July 1961, 68(4), 275-284. (University of Michigan, Ann Arbor, Mich.).

17,444
The problem of internally contradictory or ambiguous instructions to Ss in psychological experiments is considered in this paper. Such instructions often result when several dependent variables (time, correct answers, errors) must be maximized or minimized simultaneously by the S. It is shown how the specification of cost, payoffs, and exchange rates can solve such contradictions. The necessary properties of adequate solutions are discussed.
T. R 12

17,445
Feigenbaum, E.A. & Simon, H.A. COMMENT: THE DISTINCTIVENESS OF STIMULI. Psychol. Rev., July 1961, 68(4), 285-288. (Carnegie Institute of Technology, Pittsburgh, Penn.).

17,445
This note is a comment on a previous paper of the same title in which a theory and quantitative predictions of the shape of the bowed serial position curve (in serial learning) are presented. An alternative theory is presented briefly and quantitative predictions derived from it are compared with those in the earlier paper.
T. R 6

17,446
Guilford, J.P. FACTORIAL ANGLES TO PSYCHOLOGY. Psychol. Rev., Jan. 1961, 68(1), 1-20. (University of Southern California, Los Angeles, Calif.).

17,446
This paper shows how factor theory and factor-analytic methods and results can provide the models and the information upon which a comprehensive theory of behavior could be based. Three models of personality, derivable from factor theory or from the results of factor analysis, are described. The logical foundation for factor analysis as a scientific method is then presented and an attempt is made to see logical steps from factors to the kinds of concepts that are more familiar to psychological theory. In particular, an informational theory of learning is proposed and discussed.
R 19

17,447
Adams, J.K. & Adams, Pauline A. REALISM OF CONFIDENCE JUDGMENTS. Psychol. Rev., Jan. 1961, 68(1), 33-45. (Palo Alto Medical Research Foundation, Menlo Park, Calif.).

17,447
Approaches to the problems involved in confidence or subjective probability are discussed. A method of measurement is proposed which is both descriptive and, in a sense, normative in that the method can be used to obtain a meaningful measure of realism in judgment for any of a wide range of classes of events. Several areas of application of the method are suggested.
G. R 17

17,448
Stewart, M.A., Stern, J.A., Winokur, G. & Fredman, S. AN ANALYSIS OF GSR CONDITIONING. Psychol. Rev., Jan. 1961, 68(1), 60-67. (Department of Psychiatry and Neurology, Washington University School of Medicine, St. Louis, Mo.).

17,448
An analysis of experimental work on GSR conditioning led the authors to conclude that adaptation and recovery of unconditioned responses rather than conditioning of responses has been dealt with. Criteria for defining true conditioned GSR in terms of response latency were proposed. The use of these criteria was illustrated in an experiment in which an attempt was made to condition GSR in a group of 19 normal Ss.
G. I. R 15

17,449
Broverman, D.M. EFFECTS OF SCORE TRANSFORMATIONS IN Q AND R FACTOR ANALYSIS TECHNIQUES. Psychol. Rev., Jan. 1961, 68(1), 68-80. (Worchester State Hosprital, Worcester, Mass.).

17,449
The assumption that factor solutions obtained from a Q analysis (correlating people) are essentially transpositions of factors produced by R analysis (correlating tests) is challenged. New arguments and empirical evidence of important differences between the two techniques as they are commonly employed are presented. It is argued that the effects of standardizing scores across the direction of correlation, that is, standardizing columns when correlating rows, or the reverse procedure, changes the significance of scores and therefore of inferences drawn from them. Since such procedures are customary only in Q analysis, differences between the two techniques become evident.
T. G. R 20

17,450
Gaito, J. REPEATED MEASUREMENTS DESIGNS AND COUNTERBALANCING. Psychol. Bull., Jan. 1961, 58(1), 46-54. (Wilkes College, Wilkes-Barre, Penn.).

17,450
To investigate the problems involved in the analysis of repeated measurements designs, six types of such designs are indicated. For each type, the effects of order, interactions containing order, and correlated observations on the components of variance and analysis of variance tests of significance are considered. Suggestions and cautions, based upon the findings, are offered in the use of these designs.
T. R 28

17,451
Adams, J.A. HUMAN TRACKING BEHAVIOR. Psychol. Bull., Jan. 1961, 58(1), 55-79. (University of Illinois, Urbana, Ill.).

17,451
This paper presents a critical review and analysis of research, issues, and points of view associated with human behavior in one- and two-dimensional tracking tasks. The major topic divisions are as follows: basic terminology and frame of reference, the tradition of engineering psychology and of general experimental psychology, areas of neglect (definition, description of behavior in tracking, and multidimensional tracking having two or more stimulus sources and control dimensions), pursuit tracking, compensatory tracking, and two-dimensional tracking.
R 107

17,452
Fiske, D.W. THE MATCHING PROBLEM WITH MULTIPLE JUDGES AND OBJECTS. Psychol. Bull., Jan. 1961, 58(1), 80-86. (University of Chicago, Chicago, Ill.).

17,452
Some problems of design and inference that are found in studies using the matching method with multiple judges and objects are considered. The topics discussed are as follows: the one-variable case, the two-variable case, and the multiple-category case. Techniques are indicated for testing for differences between judges or differences between objects.
R 27

17,454
Lumsden, J. THE CONSTRUCTION OF UNIDIMENSIONAL TESTS. Psychol. Bull., March 1961, 58(2), 122-131.

17,454
Methods that have been suggested, either directly or indirectly, for the construction of unidimensional tests are reviewed. Five methods (classical item analysis, Loevinger's procedure, the independence criterion method, the answer pattern method, and factor analysis) are discussed with respect to their provision for 1) a rational procedure for item selection, 2) a criterion of unidimensionality, and 3) an index of unidemensionality.
T. R 36

17,455
Wittenborn, J.R. CONTRIBUTIONS AND CURRENT STATUS OF Q METHODOLOGY. Psychol. Bull., March 1961, 58 (2), 132-142. (Rutgers University, New Brunswick, N.J.).

17,455
Stephenson's concept of Q methodology is defined and its contributions over the past few years are discussed along with the methods of usage. Several studies of the validity of this method as applied to the study of the individual are described. Primary contributions in the study of psychotherapy and the related study of persons with personality disorders are indicated along with a few studies on broader aspects of personality and related social problems. The application of the method to studies of individual differences is criticized and the use of factor analyses, analysis of variance, and correlation techniques is mentioned. Methods of deriving the statements and manner of distribution are also reviewed.
R 53

17,456
Maxfield, Kathryn E. & Perry, J.D. PERFORMANCE OF BLIND VOCATIONAL REHABILITATION CLIENTS ON THE PURDUE PEGBOARD. Percept. Mot. Skills, Oct. 1960, 11(2), 139-146. (City College, New York, N.Y.).

17,456
Analysis of the Purdue Pegboard performance of 275 blind clients under vocational evaluation was made in terms of three vision groups (legally blind with usable vision, blind from birth or an early age, and more recently blind), age, education, sex, and previous work experience. Middle 50 percent ranges in performance by subtest and raw score percentile conversion tables were presented. Correlations of the Wechsler IQs with subtest scores were also shown. Comparison of these with similar data gathered in 1953 was made with interpretations offered for observed differences.
T. R 7

17,457
Eysenck, H.J. & Eysenck, S.B.G. REMINISCENCE ON THE SPIRAL AFTER-EFFECT AS A FUNCTION OF LENGTH OF REST AND NUMBER OF PRE-REST TRIALS. Percept. Mot. Skills, April 1960, 10(2), 93-94. (Institute of Psychiatry, University of London, London, England).

17,457
To examine the concepts of massed practice and reminiscence in a perceptual task, 62 Ss were tested individually on the rotating spiral aftereffect. Lengths of the aftereffects were compared before and after a rest (30 sec. or 3 min.), following 5 or 12 massed trials. Correlations between performance and personality (extraversion and introversion) were computed. The results were discussed in relation to theories of inhibition and satiation.
T. R 3

17,459
Fraisse, P. RECOGNITION TIME MEASURED BY VERBAL REACTION TO FIGURES AND WORDS. Percept. Mot. Skills, Oct. 1960, 11(2), p. 204.

17,459
To compare recognition times for words and for corresponding figures, five Ss were required to recognize verbally four words (square, triangle, hexagon, octagon) and the four corresponding figures. The stimuli were presented five times each in random order and verbal reaction time recorded by means of a vocal key. Reaction time data were analyzed for differences between words and figures and between words of varying length. An interpretation of the findings was offered.
I. R 1

17,460
Kornhauser, M. THEORETICAL PREDICTION OF THE EFFECT OF RATE-OF-ONSET ON MAN'S G-TOLERANCE. Aerospace Medicine, May 1961, 32(5), 412-421. (Missile and Space Vehicle Dept., General Electric Company, Philadelphia, Penn.).

17,460
The effects of build-up time and of total duration of acceleration-time pulses on man's g-tolerance were predicted within the framework of a simple theoretical mass-spring model. Experimental data on human impact strength (supine position) were supplemented by data from an experimental mouse program and compared with theoretical expectations concerning the governing criterion for damage of short duration impacts. Tolerances for intermediate (0.1 to 1.0 sec.) and long duration (greater than one sec.) pulses were estimated from the theory.
G. I. R 10

17,461
Bartlett, C.J., Heermann, E. & Rettig, S. A COMPARISON OF SIX DIFFERENT SCALING TECHNIQUES. J. soc. Psychol., May 1960, 51, 343-348. (Columbus Psychiatric Institute and Hospital, Columbus, Ohio & College of Medicine of Ohio State University, Columbus, Ohio).

17,461
This study compared a new scaling technique, the magnetic board technique, with five popular scaling methods: paired comparison, rank, equal-appearing intervals, Likert, and graphic. Ss (80) were randomly assigned to the scaling techniques; their task then was to rate each of 20 occupations for status and prestige by this method. Mean scale values were computed for each occupation and these were intercorrelated. Reliabilities were also computed for each method.
T. R 4

17,462
Walters, R.H. A NON-PARAMETRIC APPROACH TO THE GRAPHICAL ANALYSIS OF TRENDS. Canad. J. Psychol., June 1959, 13(2), 84-85. (University of Toronto, Toronto, Ontario, Canada).

17,462
When the responses of a group of Ss over a series of trials on a task are examined, and when the data do not meet the requirements of a parametric analysis, a nonparametric analysis should be used. Such an approach is described and the procedure is illustrated with reference to an actual experiment.
R 2

17,463
Lambert, W.E. & Fillenbaum, S. A PILOT STUDY OF APHASIA AMONG BILINGUALS. Canad. J. Psychol., March 1959, 13(1), 28-34. (McGill University, Montreal, Quebec, Canada & University of North Carolina, Chapel Hill, N.C.).

17,463
Studies on the effects of aphasia among people who use more than one language were reviewed and three generalizations (primacy, habit strength, and affective) about such effects of speech were discussed. Both classical and new cases of polyglot aphasics were analyzed to determine if any relation exists between language learning contexts and the nature of aphasic disorder and to what extent these data fit the general principles. Some tentative conclusions were derived in support of the learning context principle.
T. R 6

17,464
Matarazzo, J.D. & Saslow, G. PSYCHOLOGICAL AND RELATED CHARACTERISTICS OF SMOKERS AND NONSMOKERS. Psychol. Bull., Nov. 1960, 57(6), 493-513. (University of Oregon Medical School, Eugene, Ore.).

17,464
A review of the literature dealing with the psychological, personal, social, and situational characteristics of smokers and nonsmokers is presented. A discussion of the findings, many of which are tabulated for study, is centered around such questions as whether there is a "smoker's personality," whether there is a genetic predisposition to a strong desire for smoking (as well as to lung cancer), and whether smoking behavior is determined by multiple factors. It is pointed out that research in this area has just begun.
T. R 44

17,465
Shewchuk, L.A. & Zubek, J.P. DISCRIMINATORY ABILITY OF VARIOUS SKIN AREAS AS MEASURED BY A TECHNIQUE OF INTERMITTENT STIMULATION. Canad. J. Psychol., Dec. 1960, 14(4), 244-248. (University of Manitoba, Winnipeg, Manitoba, Canada).

17,465
A "flicker" technique, employing an interrupted stream of air whose frequency is increased until a constant sensation of pressure occurs, was used to measure the discriminatory ability of ten different skin areas (tongue, lip, cheek, forehead, neck, tip of index finger, thumb, back of hand, and upper arm). Ten Ss, five male and five female, were tested. The critical frequency of percussion (cfp) was determined for each skin area at nine pressures of medium intensity (from 20 to 90 lbs. per square inch). The relationship between cfp and pressure was analyzed and discussed with reference to discriminatory abilities of other sensory modalities.
T. G. R 9

17,467
Simon, C.W. SOME IMMEDIATE EFFECTS OF DROWSINESS AND SLEEP ON NORMAL HUMAN PERFORMANCE. Hum. Factors, March 1961, 3(1), 1-17. (Hughes Research Labs., Malibu, Calif.).

17,467
This paper reviews the experimental literature describing normal human performance at different levels of drowsiness and sleep as these states are defined by EEG patterns. Among the types of behavioral responses to stimuli discussed are reflexes, simple movements, detection (arousal to external stimuli and awareness of internal states), discrimination, learning, and recall. The EEG as a criterion for sleep is discussed in an appendix. Suggestions are made for future research.
G. I. R 34

17,469
Haygood, R.C. & Overton, R.K. OPERATOR ACCURACY IN ANGLE MEASUREMENT AND TRANSFER. Hum. Factors, March 1961, 3(1), 29-35. (Autonetics Div., North American Aviation, Inc., Downey, Calif.).

17,469
A series of three experiments was conducted to determine operator accuracy in the measurement and transfer of angles with a first-order theodolite. Experienced operators (15 and 17) were used in the first two experiments, the first of which was designed to obtain the standard deviation of angle measurements and the second to obtain the standard deviation of angle transfers. In the last experiment, 30 inexperienced engineers were tested in the same manner. Accuracy was expressed in terms of the variability of operator's measurements and transfers. Typical measurement and transfer procedures were discussed and recommendations for their modification were given.
T. R 4

17,470
Chaffee, J.W. ANTHROPOMETRIC CONSIDERATIONS FOR ESCAPE CAPSULE DESIGN. Hum. Factors, March 1961, 3(1), 36-52. (Convair, General Dynamics Corporation, Ft. Worth, Tex.).

17,470
An experimental investigation was made of the location and spatial requirements of salient anatomical features of the human operator of high performance aircraft when simulating the use of an escape capsule. Twenty-four Ss representative of the Air Force flying population were measured. A system of anthropometric assessment was used which employs a nonstereographic, photogrammetric treatment requiring two to three ordinary eight-by-ten-in. view cameras together with adequate stroboscopic illumination. Data on the x, y, and z coordinates of 16 anatomical features of the operators when positioned in six body attitudes representative of the escape system's use were presented graphically.
T. I. R 17

17,471
Behan, R.A., Bughman, C.R., Bumpus, J.N. & Gilbert, Sally B. AN EXPERIMENTAL INVESTIGATION OF THE INTERACTION BETWEEN PROBLEM LOAD AND LEVEL OF TRAINING. Hum. Factors, March 1961, 3(1), 53-59. (System Development Corporation, Santa Monica, Calif.).

17,471
To determine the relationship between experience and performance under different conditions of load in a linear information processing system, an experiment was conducted using 12 five-man crews. The task was to detect, display, transform, redisplay, and correlate data concerning the temporal position and direction of sequences of dots displayed on a rectangular grid. Four problems using 2, 4, 8, or 12 sequences were presented. Level of training was determined by the number of problem experiences and load was defined as the number of task units to be processed. Error data were analyzed as a function of load and training.
T. G. R 7

17,472
Johnson, R.H., Gordon, D.A., Bergum, B.O. & Patterson, W.E. COED—A DEVICE FOR THE EXPERIMENTAL STUDY OF MAN-MACHINE SYSTEMS. Hum. Factors, March 1961, 3(1), 60-65. (Bendix Systems Div., Bendix Aviation Corporation, Ann Arbor, Mich.).

17,472
An experimental facility for investigating man-machine system design problems is described. The facility is called the COED (Computer Operated Electronic Display). It combines a very large capacity crt (Digitron) with a high-speed computer (IBM 704). The components, programming, and uses of the device are described.
I. R 3

17,473
Kurke, M.I. OPERATIONAL SEQUENCE DIAGRAMS IN SYSTEM DESIGN. Hum. Factors, March 1961, 3(1), 66-73. (Dunlap and Associates Inc., Washington, D.C.).

17,473
A tool for the analysis of man-machine systems is described. The tool is called OSD (Operation Sequence Diagrams) which displays pictorially information-decision-action sequences within the system. In its various versions as a time-sequence process chart, as a spatial flow chart, and as an adjunct to symbolic logic, the OSD can be used in establishing system requirements, allocating man-machine functions, determining sequence of operations, and in evaluating equipment layouts.
G. I. R 9

17,474
Hunt, D.P. THE EFFECT OF THE PRECISION OF INFORMATIONAL FEEDBACK ON HUMAN TRACKING PERFORMANCE. Hum. Factors, July 1961, 3(2), 77-85. (USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio).

17,474
To determine human operator abilities in perrorming a compensatory tracking task as a function of the precision of the displayed error information for various levels of task difficulty and practice, 64 Ss performed for two sessions (15 90-sec. trials) on two successive days. Two levels of task difficulty and four degrees of specificity of feedback information were investigated. The controller dynamics were not varied and were such that displacements of the control were integrated twice before affecting tracking error. Tracking error and extent of control motion were the criterion measures.
G. I. R 5

17,475
Hitt, W.D., Schutz, H.G., Christner, Charlotte A., Ray, H.W., et al. DEVELOPMENT OF DESIGN CRITERIA FOR INTELLIGENCE DISPLAY FORMATS. Hum. Factors, July 1961, 3(2), 86-92. (Battelle Memorial Institute, Columbus, Ohio).

17,475
A research study on the design of visual displays to be used in an intelligence center was outlined and the general findings of the study were discussed. Five specific areas were selected for investigation: 1) a comparison of vertical and horizontal arrangements of alpha-numeric material, 2) an evaluation of formats for trend displays, 3) an evaluation of methods for presentation of graphic multiple trends, 4) an evaluation of five different abstract coding methods, and 5) an evaluation of the effect of selected combinations of target and background coding on map-reading performance.
(See 17,476, 17,477, 17,478, 17,479, and 17,480).
T. I. R 1

17,476
Coffey, J.L. A COMPARISON OF VERTICAL AND HORIZONTAL ARRANGEMENTS OF ALPHA-NUMERIC MATERIAL (EXPERIMENT I). Hum. Factors, July 1961, 3(2), 93-98. (Battelle Memorial Institute, Columbus, Ohio).

17,476
To determine the relative effectiveness of vertical and horizontal arrangements of visual displays containing alpha-numeric material, 12 Ss were required to perform four tasks on each display--counting, locating, identifying, and comparing. In addition to the two types of arrangements, two density levels (one column or row and three columns or rows), and four compositions of alpha-numeric materials (letters, numbers, letters and numbers combined, and two-letter words) were used. Time and accuracy scores were combined into correct-items-per min. scores and were studied by analysis of variance techniques for differences due to experimental variables.
T. I.

17,477
Schutz, H.G. AN EVALUATION OF FORMATS FOR GRAPHIC TREND DISPLAYS (EXPERIMENT II). Hum. Factors, July 1961, 3(2), 99-107. (Battelle Memorial Institute, Columbus, Ohio). (RADC TR 60 201).

17,477
To determine which of three types of trend formats (line, vertical bar, or horizontal bar) results in superior performance for a task requiring complex decisions, experimental displays of each type were designed. Two seconday independent variables (number of time points and amount of missing data) were included to make up 27 display conditions. The task of the Ss in using the displays involved the manipulation of arbitrary rules to arrive at probabilities. The procedure was self-paced. Time to respond and oral response (decision) accuracy were analyzed.
T. G. R 3

17,478
Schutz, H.G. AN EVALUATION OF METHODS FOR PRESENTATION OF GRAPHIC MULTIPLE TRENDS (EXPERIMENT III). Hum. Factors, July 1961, 3(2), 108-119. (Battelle Memorial Institute, Columbus, Ohio). (RADC TR 60 201).

17,478
To compare the effect of multiple-line versus multiple-graph presentation of trend-type displays on operator performance, ten Ss were required to perform two tasks--point-reading and comparing--on several experimental displays. Four types of lines having low confusability were determined experimentally from a sample of 25 lines. These lines were used to construct the experimental displays: single graphs with multiple lines and multile graphs with single lines. Secondary independent variables were 1) number of trend lines displayed, 2) confusability of lines, and 3) color versus black and white. Time and accuracy scores were analyzed and discussed in terms of optimum design factors.
T. G. I. R 5

17,479
Hitt, W.D. AN EVALUATION OF FIVE DIFFERENT ABSTRACT CODING METHODS (EXPERIMENT IV). Hum. Factors, July 1961, 3(2), 120-130. (Battelle Memorial Institute, Columbus, Ohio). (RADC TR 60 201).

17,479
The relative effectiveness of selected abstract coding methods was studied in terms of their effect on various operator tasks. Five coding methods were selected: numeral, letter, geometric shape, color, and configuration. Secondary variables included in the study were target density, number of code levels, and operator tasks (identifying, locating, counting, comparing, and verifying). Accuracy and speed scores were combined in the form of number of correct responses per min. and analyzed for degree of relation among tasks, extent to which tasks could be reduced to a smaller number of dimensions, and for effect of each variable on performance.
T. G. I. R 5

17,480
Christner, Charlotte A. & Rey, H.W. AN EVALUATION OF THE EFFECT OF SELECTED COMBINATIONS OF TARGET AND BACKGROUND CODING OF MAP-READING PERFORMANCE (EXPERIMENT V). Hum. Factors, July 1961, 3(2), 131-146. (Battelle Memorial Institute, Columbus, Ohio). (RADC TR 60 201).

17,480
The relative effectiveness of the combination of certain selected coding dimensions for targets and for backgrounds of a cartographic display was studied. Three target codes (color, number, and enclosed shape) and five types of background (all white, solid gray, five shades of gray, five pastel hues, and five patterns) were combined in 15 displays and evaluated under eight different complexity conditions and five different operator tasks (locating, identifying, counting, comparing, and verifying). Time, error, and number-of-response scores were obtained for analysis. Preference ratings were also made by the five Ss.
T. I. R 9

17,481
Baker, C.A. & Steedman, W.C. PERCEIVED MOVEMENT IN DEPTH AS A FUNCTION OF LUMINANCE AND VELOCITY. Hum. Factors, Sept. 1961, 3(3), 166-173. (USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio).

17,481
To study the ability of Ss to perceive movement in depth of a luminous object in an otherwise stimulus-free surround (a visual skill that might be required in manned space operations), four Ss were required to make judgments as to whether the object was approaching or receding when the luminance of the object and duration of observation were varied. A second study dealt with the effect of target velocity on perceived movements. In both cases the stimulus object subtended a visual angle of 40 min. of arc at onset of movement. Luminance was varied from 0.001 to 1.0 ft.-L. Speed varied so that change in visual angle varied from one-fourth to two min. of arc per sec.
G. R 5

17,482
Voas, R.B. A DESCRIPTION OF THE ASTRONAUT'S TASK IN PROJECT MERCURY. Hum. Factors, Sept. 1961, 3(3), 149-165. (National Aeronautics and Space Administration, Washington, D.C.).

17,482
The astronaut's role in the Mercury system is discussed in terms of his contribution to reliability and flexibility of flight. Eight basic functions performed during the Mercury flight are described. In addition, the nonflight tasks such as those connected with design development and dissemination of information to the public are discussed.
I. R 4

17,483
Roebuck, J.A., Jr. & Levedahl, B.H. AIRCRAFT GROUND EMERGENCY EXIT DESIGN CONSIDERATIONS. Hum. Factors, Sept. 1961, 3(3), 174-209. (Human Factors Group, Douglas Aircraft Co., Inc., Santa Monica, Calif.).

17,483
A summary of the results of a systematic study of population variables and speed of exit for a large number of emergency exit configurations is presented. A description of some of the study methods is also given. While the primary purpose was to provide design data for aircraft overwing ground emergency exits, the results are of interest to designers of many types of vehicles and stationary installations.
T. G. I. R 26

17,484
Forbes, T.W. HUMAN FACTORS IN HIGHWAY DESIGN, OPERATION AND SAFETY PROBLEMS. Hum. Factors, Feb. 1960, 2(1), 1-8. (Highway Traffic Safety Center, Michigan State University, East Lansing, Mich.).

17,484
Human factor problems in the design and operation of highways both for efficient traffic flow and for safety are discussed. Factors affecting speed and accuracy of driver judgment have become critically important on modern urban freeways. Experimental studies are cited which show how highway design features affect these driver responses. Mathematical models based on such driver-vehicle-highway responses have helped explain certain puzzling problems of traffic flow. Other human engineering data already available or obtainable through specialized studies suggest ways of improving driver-vehicle-highway-environment interrelationships. Examples are given.
G. I. R 12

17,485
Herman, E.E. PROSPECTUS FOR HUMAN FACTORS IN ELECTRONICS. Hum. Factors, Feb. 1960, 2(1), 9-13. (Hughes Aircraft Company, Culver City, Calif.).

17,485
Future roles of human factors in electronics are discussed from an engineering management viewpoint. First, some influences that are presently inhibiting the acceptance of human engineering contributions are mentioned. Representative future areas of electronics in which human factors will warrant special efforts are highlighted. Finally, recommendations are advanced as to possible ways to improve and expand human factors utilization both in current type work and in new areas.

17,486
Bernberg, R.E. A COMPARISON OF THREE FLIGHT ATTITUDE DISPLAYS. Hum. Factors, Feb. 1960, 2(1), 14-17. (North American Aviation, Inc., Los Angeles, Calif.).

17,486
Modern concepts of high altitude, supersonic air vehicles demand refined and accurate information for operator control with minimal error in performance. This study attempted to define the problem in a specific area of an optimal flight attitude display with which to fly a constant pitch attitude climb. In the X-15 flight simulator, six test pilots flew a constant pitch climb of 25 degrees pitch attitude with three levels of stick damping while using each of three displays: 1) vernier side scale, 2) attitude ball, and 3) cross-hair bar. The deviations from command pitch were analyzed for effects of display, stick damping, and Ss. Further research was recommended.
T. G. I. R 1

17,487
Dreher, J.J. & Evans, W.E. SPEECH INTERFERENCE LEVEL AND AIRCRAFT ACOUSTICAL ENVIRONMENT. Hum. Factors, Feb. 1960, 2(1), 18-27. (Lockheed Aircraft Corporation, Burbank, Calif.).

17,487
The validity of the speech interference level (SIL) measure as a measure of the acoustic comfort of aircraft cabin environment was investigated. An experimental test of the masking effects of separate low and high bands of noise on both words and phrases was made. The results were then compared to those of a second test where a combination of low and high interference was used. Conclusions were drawn regarding the usefulness of SIL criteria for measuring intelligibility as well as comfort for a complex acoustic environment such as propellor-driven aircraft.
T. G. I. R 8

17,488
Bowen, H.M., Andreassi, J.L., Truax, S. & Orlansky, J. OPTIMUM SYMBOLS FOR RADAR DISPLAYS. Hum. Factors, Feb. 1960, 2(1), 28-33. (Dunlap and Associates, Inc., Stamford, Conn.).

17,488
To establish a set of optimum geometric symbols for use in radar display, two separate experiments were conducted. In the first, seven observers viewed one-half-inch high symbols of 20 different shapes as they were projected briefly under various conditions of degradation (by "noise," distortion, and blur). Their task was to indicate on an answer sheet, containing clear representations of all symbols, which one they had seen. In the second study, four symbols were varied in size and stroke width, and recognition accuracy was measured again. Recommendations were made on the basis of analysis of the accuracy data. Suggestions for combining auxiliary symbols with primary symbols were given.
T. I. R 4

17,489
Willis, H.R. OPERATOR TRENDS IN MARKING A MOVING SCALE INDICATOR. Hum. Factors, Feb. 1960, 2(1), 34-43. (McDonnell Aircraft Corporation, St. Louis, Mo.).

17,489
To determine the population stereotypes for setting a rotating scale to a quadrant on one side of zero as North and to the other as South, and also to Plus and Minus, 40 randomly selected, male, senior high school students were studied. The task consisted of making settings on a panel of six dials under speed stress. Each S decided for himself which side of the dial was North and South (or Plus and Minus) and then attempted to remian consistent in his settings. Direction of and consistency of choices were analyzed. Peripheral information was collected on scholastic performance and correlations with performance score (consistency) were obtained.
T. I. R 8

17,490
Rule, E. & Perls, T.A. HAND-HELD CALIBRATOR FOR PRESSURE-MEASURING SYSTEMS. J. acoust. Soc. Amer., May 1960, 32(5), 535-537. (Lockheed Missiles and Space Division, Palo Alto, Calif.).

17,490
The problems involved in laboratory and field calibrations of high-amplitude dynamic-pressure measuring systems are discussed. The need for a hand-held calibrator is pointed out; the design, construction, and evaluation of this equipment are described. The method used in the calibrator utilizes the vibration sensitivity of the transducer for the generation of high-amplitude dynamic pressures at a frequency suitable for calibration.
I. R 5

17,491
Creelman, C.D. DETECTION OF COMPLEX SIGNALS AS A FUNCTION OF SIGNAL BANDWIDTH AND DURATION. J. acoust. Soc. Amer., Jan. 1961, 33(1), 89-94. (Electronic Defense Group and Communication Sciences Research Lab., University of Michigan, Ann Arbor, Mich.).

17,491
To study the efficiency of human observers in the detection of complex signals (periodic trains of damped sinusoids having some similarity to speech signals), two experiments were conducted using three observers. In both, the signal duration and degree of damping (or spectral bandwidth) were varied, with the energy of the signal held constant. The task in the first study was that of detection of a signal; in the other it was amplitude discrimination. Other conditions were the same. A response efficiency measure, as developed in the theory of signal detectability, was used to study the effect of the experimental variables.

17,492
Greenwood, D.D. AUDITORY MASKING AND THE CRITICAL BAND. J. acoust. Soc. Amer., April 1961, 33(4), 484-502. (Neurophysiology Lab., Physiology Dept., University of Wisconsin, Madison, Wisc.).

17,492
This study attempted to test directly the hypothesis that there exists a critical masking band. Masked audiograms were studied as a function of the bandwidth, level, and frequency of a masking noise. In a reverse procedure, audiograms were determined when a movable, narrow, and approximately rectangular band of noise was used as a signal in the presence of one or more masking tones. From changes in both types of masked audiograms as a function of bandwidth, the critical bandwidth could be measured. Possible interpretation of the findings and their relationship to previous research on the critical band were discussed.
T. G. I. R 26

17,494
Ward, W.D. NONINTERACTION OF TEMPORARY THRESHOLD SHIFTS. J. acoust. Soc. Amer., April 1961, 33(4), 512-513. (Subcommittee on Noise, Research Center, Los Angeles, Calif.).

17,494
To investigate the question of whether or not an acoustic stimulus that produces temporary threshold shift (TTS) in one frequency region will affect the behavior of TTS in a different frequency region, 14 Ss were exposed to a one-hour exposure of high-frequency noise (2,400 to 4,800 cps at 100-db SPL) either preceded or followed by a one-hour exposure to a low-frequency noise (600 to 1,200 cps at 110-db SPL). At two intervals during exposure, testing breaks of three min. were made for measuring thresholds for interrupted pure tones. The two noises were separated by a 15-min. interval; the course of recovery was followed. The data were analyzed for interaction effects.
G. R 10

17,495
Lane, R.N. & Mikeska, E.E. PROBLEMS OF FIELD MEASUREMENT OF TRANSMISSION LOSS AS ILLUSTRATED BY DATA ON LIGHTWEIGHT PARTITIONS USED IN MUSIC BUILDINGS. J. acoust. Soc. Amer., Nov. 1961, 33(11), 1531-1535. (Texas Research Associates, Austin, Tex.).

17,495
The difficulties and limitations of field measurements of airborne sound transmission loss as compared to laboratory standard test procedures for such measurements are discussed. Since such field measurements are valuable to architects and acoustical consultants, a workable procedure is described. Measured transmission loss data obtained by the procedure on various wall structures in five different buildings are presented. The wall structures are double plaster on cork isolation, double plaster on concrete slab, double concrete block, double brick, single concrete block, and a floor slab with resiliently suspended plaster ceiling.
G. I. R 9

17,496
Jenkins, R.A. PERCEPTION OF PITCH, TIMBRE, AND LOUDNESS. J. acoust. Soc. Amer., Nov. 1961, 33(11), 1550-1557. (USAF Cambridge Research Labs., Bedford, Mass.).

17,496
This paper was concerned with the over-all structure of psychoacoustic perception, a model of which was developed. No attempt was made to produce precise quantitative data, but evidence was provided in support of the model through a series of experiments. A narrow bandpass filter, driven by a periodic train of narrow rectangular pulses, produced a wave train eliciting a strong pitch perception which varied monotonically with pulse repetition rate. This periodic wave train was used as a pitch reference to match against various stimuli. Thus, pitch, loudness, and timbre perceptions were considered.
G. I. R 6

17,497
Loeb, M. & Fletcher, J.L. CONTRALATERAL THRESHOLD SHIFT AND REDUCTION IN TEMPORARY THRESHOLD SHIFT AS INDICES OF ACOUSTIC REFLEX ACTION. J. acoust. Soc. Amer., Nov. 1961, 33(11), 1558-1560. (USA Medical Research Lab., Fort Knox, Ky.).

17,497
To compare the effectiveness of narrow band noise and a train of clicks in eliciting the middle-ear acoustic reflex and to correlate two methods of estimating the amount of activation, 16 Ss were studied in a two-phase experiment. One method involved measurement of increase in threshold in the contralateral ear; the other method measured reduction of temporary threshold shift produced by a series of gunshots. Shifts produced by clicks and noise were compared; also the results obtained from the two methods were compared by correlational methods.
T. G. R 10

17,498
Plomp, R. HEARING THRESHOLD FOR PERIODIC TONE PULSES. J. acoust. Soc. Amer., Nov. 1961, 33(11), 1561-1569. (Institute for Perception RVO-TNO, Soesterberg, The Netherlands).

17,498
In continuation of a previous study, the relation between threshold, repetition time, and duration for periodically repeated tone pulses was investigated. Masked thresholds were determined for two observers as a function of repetition time at 250, 1,000, and 4,000 cps. At each frequency the noise level was adjusted so that the threshold intensity for a continuous tone was 40 db higher than the intensity at the hearing threshold in quiet at the same intensity. Dependence of the thresholds on duration time was an indirect product of the experiments. The data were compared with predictions of theoretically derived equations.
G. I. R 7

17,499
Small, A.M., Jr. & Campbell, R.A. MASKING OF PULSED TONES BY BANDS OF NOISE. J. acoust. Soc. Amer., Nov. 1961, 33(11), 1570-1576. (University of Iowa, Iowa City, Iowa).

17,499
The masking effect of various bands of noise on a signal with its energy around 2,200 cps but with marked periodic envelope fluctuation at approximately 150 cps was investigated. For comparison, pure tones of 150 and 2,200 cps were also used as signals. For a given band of noise, Ss adjusted the noise attenuator until the noise just masked the signal (the point at which a rising and falling low pitch was defined as the masked threshold). Each masked threshold was expressed in terms of the spectrum level necessary to just mask the level and analyzed in terms of the noise bands and types of signals. Implications of the findings to pitch perception were discussed.
T. G. R 27

17,500
Swets, J.A. & Sewall, Susan T. STIMULUS VS RESPONSE UNCERTAINTY IN RECOGNITION. J. acoust. Soc. Amer., Nov. 1961, 33(11), 1586-1592. (Department of Economics and Social Sciences and Research Laboratory of Electronics, Massachusetts Institute of Technology, Cambridge, Mass.).

17,500
The relative efficacy of specifying the stimulus alternatives before and after the stimulus is presented was investigated in a simple recognition task. The signal was a tone burst of 0.1-sec. duration presented in a continuous background of white noise of approximately 50 db; a two-interval, forced-choice task was used. In the first experiment, observation following information about signal frequency was compared to that when no information was given (frequency cueing was supplied by lights); in the second the effects of cueing after the observation were examined (cueing given by tones themselves); two other experiments examined effects of cueing before observation by both methods. The experiments were discussed in connection with two current theories: signal detectability and individual choice behavior. G. R 24

17,501
Stevens, S.S. PROCEDURE FOR CALCULATING LOUDNESS: MARK VI. J. acoust. Soc. Amer., Nov. 1961, 33(11), 1577-1585. (Psycho-Acoustic Lab., Harvard University, Cambridge, Mass.).

17,501
In 1956 an empirical study was made of the manner in which loudness grows when bandwidth is increased, and the results were developed into a procedure for calculating the loudness of a sound from measurements made in octave bands. In 1957 the procedure was simplified; in this paper, further simplifications and improvements were made. 1) The equal loudness contours for bands of noise in a diffuse field have been approximated by straight lines in a log-log plot. 2) The spacing of the contours have been altered to reflect the nonlinear growth that takes place in the loudness level of bands of noise when their width exceeds the critical bandwidth. The basic formula remains the same.
T. G. R 21

17,502
Thompson, P.O. & Gales, R.S. TEMPORARY THRESHOLD SHIFTS FROM TONES AND NOISE BANDS OF EQUIVALENT RMS SOUND-PRESSURE LEVEL. J. acoust. Soc. Amer., Nov. 1961, 33(11), 1593-1597. (USN Electronics Lab., San Diego, Calif.).

17,502
To compare the temporary threshold shifts produced by bands of thermal noise with that produced by pure tones, four Ss were exposed to pure tones of 500 and 3,200 cps and to noise bands five cps, one-third and one octave wide, centered at these same frequencies. The exposures were at an SPL of 110 db. After exposure, the S tracked his 4,000-cps threshold for three min. and then his 500-, 1,000-, 2,000-, 4,000-, and 6,000-cps thresholds for the next 12 min. Threshold shifts at these frequencies were compared for each type of exposure stimulus.
T. G. I. R 6

17,503
Klumpp, R.G. & Webster, J.C. INTELLIGIBILITY OF TIME-COMPRESSED SPEECH. J. acoust. Soc. Amer., March 1961, 33(3), 265-267. (USN Electronics Lab., San Diego, Calif.).

17,503
In work on message (simple language) storage schemes, the desirability of obtaining time-compressed speech with simple modifications of existing equipment has become evident. This study was designed to ascertain the effects of speeding up the playback of a tape recorder on speech intelligibility as influenced by differences among 1) talkers, 2) speech-to-noise (S/N) ratios, 3) speech materials, and 4) listeners. Speech materials (five types) were recorded as spoken by both male and female speakers on one tape and thermal noise on another; on playback the two could be mixed to get varied S/N ratios. Playback speed was varied in the ratio of from 0.75 to 2.00 as compared to original. Both experienced and naive listeners were used.
T. G. R 12

17,504
von Bekesy, G. PITCH SENSATION AND ITS RELATION TO THE PERIODICITY OF THE STIMULUS. HEARING AND SKIN VIBRATIONS. J. acoust. Soc. Amer., March 1961, 33(3), 341-348. (Psycho-Acoustic Lab., Harvard University, Cambridge, Mass.).

17,504
This investigation was concerned with the suggestion that the nervous system of the ear is capable of identifying the periodicity of a complex sound, as such, isolated from other factors thus leading to the sensation of pitch. Since many phenomena in hearing have their counterparts in the vibratory sensations of the skin, experiments were performed using vibratory and electrical stimulation on the skin in an attempt to determine the conditions under which periodicity of the stimulus could be recognized. The results were discussed in relation to the theory of pitch sensation.
G. I. R 11

17,505
Martin, D.W. & Ward, W.D. SUBJECTIVE EVALUATION OF MUSICAL SCALE TEMPERMENT IN PIANOS. J. acoust. Soc. Amer., May 1961, 33(5), 582-585. (Baldwin Piano Company, Cincinnati, Ohio).

17,505
The "stretched" scale (upper tones higher and lower tones lower than the equally tempered scale) resulting from standard procedures used by piano tuners is described. To determine whether or not listeners would indicate a preference for stretched tuning as opposed to equal temperament tuning, tonal and chordal sequences are recorded from a small upright piano as follows: 1) tuned to a typical empirical stretched scale by means of a visual device, 2) tuned by a factory "fine tuner" by conventional auditory method, and 3) tuned to strict equal temperament by means of the visual device. Two groups of listeners, music students and musically oriented research engineers, are required to indicate preferences to a test composed of 42 comparisons. Instrumental methods for tuning pianos are discussed. T. G. R 8

17,506
Ward, W.D. & Martin, D.W. PSYCHOPHYSICAL COMPARISON OF JUST TUNING AND EQUAL TEMPERAMENT IN SEQUENCES OF INDIVIDUAL TONES. J. acoust. Soc. Amer., May 1961, 33(5), 586-588. (Baldwin Piano Company, Cincinnati, Ohio).

17,506
To investigate one aspect of the question of discriminability of melodic sequences in just intonation and equal temperament, 20 musically oriented listeners were tested. First, an ABX test, in which prerecorded ascending diatonic scales of each type were used, was administered. Two different timbres were included: one flute-like, the other spectrally complex. A second experiment employed scales deviating from equal temperament in a manner similar to the just scale but varying in amount on the third, sixth, and seventh steps. These were compared to equally tempered scales by both ABX and AB procedures. An interpretation of the findings was offered in terms of experience.
T. G. R 8

17,507
Lieberman, P. PERTURBATIONS IN VOCAL PITCH. J. acoust. Soc. Amer., May 1961, 33(5), 597-603. (USAF Cambridge Research Labs., Bedford, Mass.).

17,507
A quantitative description of the rapid fluctuations that occur in the fundamental excitation rate or pitch of normal speech was presented. The acoustical analysis was conducted with a sample of six male speakers of American English who each read a neutral test sentence in certain "emotional" modes (as a question, a statement, a fearful utterance, etc.). A statistical analysis of the durations of approximately 7,000 pitch periods was performed with a computer. Some types of changes that occur, the frequency with which they occur, the magnitude of these changes, and the extent to which the changes are modified by other concurrent speech events were described.
T. G. I. R 9

17,508
Thompson, P.O., Webster, J.C. & Galos, R.S. LIVENESS EFFECTS ON THE INTELLIGIBILITY OF NOISE-MASKED SPEECH. J. acoust. Soc. Amer., May 1961, 33(5), 604-605. (USN Electronics Lab., San Diego, Calif.).

17,508
To determine whether "liveness" would increase the intelligibility of noise-masked speech and also how changes in "liveness" would affect listener preference under these conditions, speech samples of varied "liveness" were obtained by mixing, in controlled ratios, the direct output of the talker's microphone and an output passed through a reverberation chamber. Words (phonetically balanced), short phrases, and connected discourse were transmitted at two levels of "liveness," over VHF radio and presented over earphones to 19 listeners in a series of intelligibility and preference tests. The lists were also presented in 105-db SPL helicopter cabin noise.
I.

17,509
Hellman, R.P. & Zwislocki, J.J. SOME FACTORS AFFECTING THE ESTIMATION OF LOUDNESS. J. acoust. Soc. Amer., May 1961, 33(5), 687-694. (Syracuse University, Syracuse, N.Y.).

17,509
To investigate the influence of some factors on the loudness function of a 1,000 cps tone near the threshold of audibility by the method of magnitude estimation, several studies were conducted. The studies included a comparison between SPL and sensation level as independent variables and a parametric variation of the reference sound level and of the reference number. A loudness curve that spans the range of sensation levels between 4 and 100 db was obtained and discussed in relation to data obtained by other investigators in an effort to determine whether bias had been eliminated. Several biasing factors were discussed at length.
T. G. R 24

17,510
Fletcher, J.L. & Riopelle, A.J. PROTECTIVE EFFECT OF THE ACOUSTIC REFLEX FOR IMPULSIVE NOISES. J. acoust. Soc. Amer., March 1960, 32(3), 401-404. (USA Medical Research Lab., Fort Knox, Ky.).

17,510
To assess the protection (preservation of hearing after acoustic insult) afforded to human Ss by the acoustic reflex, 24 male Ss were studied. They were first trained in the use of the Bekesy audiometer, then exposed to 100 rounds of machine-gun fire both with and without a pre-exposure to a 1,000-cps tone for activating the acoustic reflex. Pre- and postfiring audiograms, taken under both conditions, were compared and temporary threshold shifts were determined.
G. I. R 12

17,511
Raab, D.H. FORWARD AND BACKWARD MASKING BETWEEN ACOUSTIC CLICKS. J. acoust. Soc. Amer., Feb. 1961, 33(2), 137-139. (Brooklyn College, Brooklyn, N.Y.).

17,511
The masking of one click by another was studied as a function of the time interval between the pulses. Each listening (monaural) trial included two presentations of the masking pulse, spaced 0.08 sec. apart; a probe click, presented at varied times within the interval, accompanied one of the masks. The S reported which of the masks was accompanied by the probe. Two alternative forced-choice procedures were employed to measure thresholds before and after the masking click. Data from three Ss were presented.
G. R 14

17,512
Deatherage, B.H. BINAURAL INTERACTION OF CLICKS OF DIFFERENT FREQUENCY CONTENT. J. acoust. Soc. Amer., Feb. 1961, 33(2), 139-145. (Childrens Hospital, Los Angeles, Calif.).

17,512
To study binaural interaction in localizing clicks of different frequency count, the ability of Ss to center the click images (standard click presented to one ear with a variable click to the other) heard was observed. The standard click was in most cases 250 to 500 cps and the variable click was 500 to 1,000, 1,000 to 2,000, 2,000 to 4,000, 3,000 to 6,000, or 4,000 to 8,000 cps. Judgments were made at each of five SPLs from 60 to 100 db. The data were presented as time differences between two clicks required for centered images. The results were discussed in terms of current theories about localization and pitch.
G. I. R 15

17,513
Lane, H.L., Catania, A.C. & Stevens, S.S. VOICE LEVEL: AUTOPHONIC SCALE, PERCEIVED LOUDNESS, AND EFFECTS OF SIDETONE. J. acoust. Soc. Amer., Feb. 1961, 33(2), 160-167. (Psycho-Acoustic Lab., Harvard University, Cambridge, Mass.).

17,513
To determine a speaker's subjective scale for his autophonic (own vocal production) response, the methods of magnitude production and magnitude estimation were employed. The validity of the obtained subjective scale was tested with the aid of a third method, cross-modality matching. Finally, the role played by perceived loudness in determining the subjective magnitude function for autophonic level was assessed by varying the amount of auditory feedback and by masking the feedback completely. The power laws governing the autophonic response and loudness were used to predict results of the cross-modality matching and the effect of feedback.
T. G. R 19

17,514
Bilodeau, E.A. & Ryan, F.J. A TEST FOR INTERACTION OF DELAY OF KNOWLEDGE OF RESULTS AND TWO TYPES OF INTERPOLATED ACTIVITY. J. exp. Psychol., June 1960, 59(6), 414-419. (Tulane University, New Orleans, La.).

17,514
This study replicates two groups of a line-drawing study on the effect of delay of knowledge of results (KR) on learning a motor task. The two conditions were no delay and a 20-sec. delay of KR. The Ss were taught to draw three-inch straight lines while blindfolded; a hand-maintaining procedure was used in that the drawing hand and arm were kept off the table between responses and the experimenter positioned S's hand for the start of each response; KR was "long," "short," or "right." Two other groups practiced under the same conditions except that the hand was returned to the lap between responses. The number of right responses was compared with those from the earlier study.
T. G. R 3

17,515
Engen, T. & Pfaffmann, C. ABSOLUTE JUDGMENTS OF ODOR QUALITY. J. exp. Psychol., April 1960, 59(4), 214-219. (Brown University, Providence, R.I.).

17,515
A series of experiments was carried out to determine how well the human S can identify odor qualities by label (the S's own association to the odorant) with different kinds, intensities, and numbers of odorants. Judgments were obtained from five Ss for two sets of 36 odorants--one set sampled a wide variety of odorants, the other sampled only sweet-fruity odorants. The first experiment was concerned with the effect of variations in intensity and type of odorant on the amount of information transmitted in absolute judgments; the second evaluated information transmitted when both qualities and intensities varied; and the third was concerned with maximum channel capacity for odor quality.
T. G. R 12

17,516
Mead, L.C. A PROGRAM OF HUMAN ENGINEERING. Ann. N.Y. Acad. Sci., Jan. 1951, 51(Art. 7), 1125-1134. (Tufts University, Medford, Mass.).

17,516
A review is given of the manner in which the field of human engineering arose and the term itself is defined and discussed in relation to other areas of endeavor. A program of human engineering as it appeared at the time of writing (1951) is outlined in terms of objectives and types of studies undertaken. Some illustrative examples of results obtained from human engineering research are presented.
R 11

17,517
McFarland, R.A. PROBLEMS RELATING TO AIRCREWS IN AIR TRANSPORT DESIGN. Ann. N.Y. Acad. Sci., Jan. 1951, 51(Art. 7), 1146-1158. (Harvard School of Public Health, Boston, Mass.).

17,517
The main thesis of this paper is that improvements in safety and efficiency in airline operations center around the design of equipment to comply with the human characteristics of the operators. A number of illustrations relating aircrew duties to design features are given. The value of advance analysis of a system in terms of human factors is stressed.
T. G. R 16

17,518
Beals, L.S., Jr. SOME CONSIDERATIONS OF AEROMEDICAL RESEARCH. Ann. N.Y. Acad. Sci., Jan. 1951, 51(Art. 7), 1159-1165.

17,518
The effect of World War II in producing coordinated programs of research among medical personnel, representatives of the allied services, and individual laboratories to solve pressing aeromedical problems is discussed. The concept emerging from this effort is termed human engineering, a field that embraces many disciplines as they affect the relationship between men and machines The major thesis here is that this joint effort must continue if aeromedical problems of the future are to be solved. Some aspects of supersonic flight are given as illustrations of such problems.

17,519
Hausner, H.H. HUMAN EFFICIENCY AS A FUNCTION OF LIGHT AND ILLUMINATION. Ann. N.Y. Acad. Sci., Jan. 1951, 51(Art. 7), 1166-1178. (Department of Electrical Engineering, New York University, New York, N.Y. & Sylvania Electric Products Inc., Bayside, N.Y.).

17,519
Illumination engineering, the production and control of light radiation to create better seeing conditions, is discussed as one aspect of human engineering. Physiological and psychological effects of light and the relation between light and human efficiency are indicated and discussed.
T. G. I. R 14

17,520
Seitz, C.P. BETTER COCKPIT LIGHTING. Ann. N.Y. Acad. Sci., Jan. 1951, 51(Art. 7), 1204-1206. (USN Special Devices Center, Port Washington, N.Y.).

17,520
The bases for better cockpit lighting are felt to be as follows: 1) no standard (inflexible) lighting system appears possible; 2) a general principle of cockpit lighting seems attainable; 3) a comprehensive study of requirements for the various types of aircraft and operational situations is necessary; 4) indirect lighting has the least promise of providing a general principle of lighting; and 5) fluorescent, floodlighting, and a combination of the two deserve serious consideration.

17,521
Elftman, H. THE BASIC PATTERN OF HUMAN LOCOMOTION. Ann. N.Y. Acad. Sci., Jan. 1951, 51(Art. 7), 1207-1212. (Department of Anatomy, College of Physicians and Surgeons, Columbia University, New York, N.Y.).

17,521
The efficient management of normal motor activities and the substitution of prosthetic devices for the normal mechanisms depend upon an understanding of the fundamental factors which underlie human movement. The locomotor mechanism, its fundamental features, its control, and the methods by which these factors can be studied are discussed.
I. R 5

17,522
Eberhart, H.D. & Inman, V.T. AN EVALUATION OF EXPERIMENTAL PROCEDURES USED IN A FUNDAMENTAL STUDY OF HUMAN LOCOMOTION. Ann. N.Y. Acad. Sci., Jan. 1951, 51 (Art. 7), 1213-1228. (Civil Engineering Dept., University of California, Berkeley, Calif. & Orthopaedic Surgery Dept., University of California, San Francisco, Calif.).

17,522
A critical review of experimental techniques that have been used for studying human locomotion is presented. Displacement techniques reviewed are: 1) glass walkway with photography, 2) interrupted lights with photography, 3) pin studies with photography, 4) high-speed moving pictures, and 5) X-ray moving pictures. Force techniques include: 1) electromyography, 2) force plate, 3) pylon studies, and 4) calculation of internal resisting forces and moments. The integration and synthesis of data gathered by the best of these methods should contribute to a better understanding and use of corrective procedures for improvement of cases of pathological locomotion.
G. I.

17,523
Catranis, J.G. SOME RECENT DEVELOPMENTS IN LOWER EXTREMITY PROSTHESES. Ann. N.Y. Acad. Sci., Jan. 1951, 51(Art. 7), 1229-1250. (Catranis, Inc., Syracuse, N.Y.).

17,523
The basic functional requirements of lower extremity prostheses are discussed with reference to recent fundamental research findings. The nature and significance of the more important functional characteristics as related to prostheses are discussed and related to their incorporation in leg design.
G. I. R 27

17,524
Taylor, C.L. & Blaschke, A.C. A METHOD FOR KINEMATIC ANALYSIS OF MOTIONS OF THE SHOULDER, ARM, AND HAND COMPLEX. Ann. N.Y. Acad. Sci., Jan. 1951, 51(Art. 7), 1251-1265. (Department of Engineering, University of California, Los Angeles, Calif.).

17,524
A method of kinematic analysis of the motions of shoulder, arm, and hand is described. The six steps involved are discussed in detail: 1) measurement and calibration of the standard experimental S, 2) fitting of the S with visual landmarks, 3) cinematography of the S performing the activities under study, 4) obtaining the Cartesian earth coordinates of the visual landmarks from selected frames of the developed film and correcting these coordinates for parallax, 5) analysis of the coordinate data to yield the axes and angles of the idealized kinematic system, and 6) obtaining angular velocities and accelerations of the members of the kinematic system from the serial frames.
T. G. I.

17,525
Abt, L.E. HUMAN ENGINEERING PROBLEMS IN SERVICE TESTING OF PROSTHETIC DEVICES. Ann. N.Y. Acad. Sci., Jan. 1951, 51(Art. 7), 1266-1271. (College of Engineering, New York University, New York, N.Y.).

17,525
Some of the psychological considerations that enter into the selection of amputee pilot wearers of prosthetic devices which are to be service tested are reviewed. Attention is directed to issues and problems arising in connection with experimental design in a human engineering problem of this kind. Also considered are difficulties that arise with the development and utilization of a research team consisting of professionals from several diverse areas. Values and limitations of such a cross-disciplinary approach are indicated.
R 1

17,526
Churchill, A.V. TACTUAL-KINESTHETIC JUDGMENT: EFFECT OF BKD. Canad. J. Psychol., Sept. 1961, 15(3), 154-155. (Defence Research Medical Labs., Toronto, Ontario, Canada).

17,526
To establish the effective contribution of bilateral kinesthetic difference (BKD) to tactual-kinesthetic judgments, a previously reported study of interpolating on a diameter scale was repeated in modified form. The reference diameters of the scales were sensed visually and the comparison diameters were judged through the tactual-kinesthetic sense using the right and left hand alternately. Errors were classified as overestimations (positive) or underestimations (negative) and were compared, along with total errors, between the two hands.
R 4

17,527
Prentice, W.C.H. SOME COGNITIVE ASPECTS OF MOTIVATION. Amer. Psychologist, Aug. 1961, 16(8), 503-511. (Swarthmore College, Swarthmore, Penn.).

17,527
The possibility that what we call motives are really a particular kind of perceptual or cognitive event is considered. Many examples are given to point up the cognitive contribution to motivated behavior. Some suggestions are made for ways of looking at these problems--ways that might lead to needed empirical research. It is stated that the establishment of lawful relationships among cognitive variables and patterns of choice might someday lead to a genuine theory of motivation at a prephysiological level.

17,528
Richmond, D.R., Clare, V.R., Goldizen, V.C., Pratt, D.E., et al. BIOLOGICAL EFFECTS OF OVERPRESSURE. II. A SHOCK TUBE UTILIZED TO PRODUCE SHARP-RISING OVERPRESSURES OF 400 MILLISECONDS DURATION AND ITS EMPLOYMENT IN BIOMEDICAL EXPERIMENTS. Aerospace Medicine, Nov. 1961, 32(11), 997-1008. (Lovelace Foundation for Medical Education and Research, Albuquerque, N.M.).

17,528
A shock tube employed for blast biology studies is described. By appropriate modifications a wide variety of wave forms some of which closely resemble those produced by nuclear detonations under certain circumstances can be produced. Mortality data are presented on six species of animals all exposed in a similar geometry to similar pressure-time phenomena that varied among the species mostly with respect to the magnitude of the overpressure.
T. G. I. R 10

17,529
Bruner, H., Jovy, D. & Klein, K.E. HYPOXIA AS A STRESSOR. Aerospace Medicine, Nov. 1961, 32(11), 1009-1018. (Institut fur Flugmedizin, Bad Godesberg, Germany).

17,529
A new method for determining a pilot candidate's probable stress resistance and reserve capacity is developed. Efficiency of behavior under the influence of a nonspecific stressor (defined oxygen deficiency) can be objectively and reproducibly registered by means of a new apparatus. The method and evaluation processes are discussed in detail.
G. I. R 17

17,530
Marko, A.R. MULTI-CHANNEL PERSONAL TELEMETRY SYSTEM USING PULSE POSITION MODULATION. Aerospace Medicine, Nov. 1961, 32(11), 1019-1022. (USAF Aerospace Medical Div., Wright-Patterson AFB, Ohio).

17,530
A feasibility study was undertaken of a pulse position modulation, personal telemetry system. A three-channel laboratory model was assembled capable of transmitting heart rate, respiration rate, and body temperature at ranges up to approximately 100 ft. The characterstics of the system were given along with block diagrams for the recording and display units.
I. R 2

17,531
Beckman, E.L., Coburn, K.R., Chambers, R.M., DeForest, R.E., et al. PHYSIOLOGIC CHANGES OBSERVED IN HUMAN SUBJECTS DURING ZERO G SIMULATION BY IMMERSION IN WATER UP TO NECK LEVEL. Aerospace Medicine, Nov. 1961, 32(11), 1031-1041. (USN Aviation Medical Acceleration Lab., Johnsville, Penn.).

17,531
To ascertain some of the effects of prolonged weightlessness on man, a series of experiments involving seven Ss immersed in water (an effective simulation of the weightless state with respect to propriceptive responses) up to the neck level for periods of 5 to 23 hours was conducted. Weight changes and pulmonary volume measurements were recorded. Performance changes on a tracking task, during exposure to a simulated space vehicle re-entry deceleration profile, attributable to water immersion were determined. Changes in tolerance to accelerative forces were also measured.
T. G. I. R 11

17,532
Close, P. & Ireland, R. EFFECT OF CERTAIN VARIATIONS IN THE PHYSIOLOGIC STATE ON TOLERANCE TO EXPLOSIVE DECOMPRESSION. Aerospace Medicine, Nov. 1961, 32(11), 1050-1060. (USN School of Aviation Medicine, Pensacola Air Station, Fla.).

17,532
To investigate mechanisms involved in lung trauma by explosive decompression, surgical alterations in airway resistance in albino rats were made and certain drugs (epinephrine, norepinephrine, and histamine) were administered to both rats and guinea pigs. Exposures to explosive decompressions (from sea level to 40,000 or 60,000 ft. simulated altitude in 0.01 sec.) were accomplished for paired animals, one treated and one normal. Survival times and studies of lung pathology were made. On the basis of the findings and other pertinent facts, an hypothesis relating to the cause of major damage in severe uncomplicated explosive decompression was formulated.
T. I. R 20

17,533
Reynolds, S.R.M. SENSORY DEPRIVATION, WEIGHTLESSNESS AND ANTI-GRAVITY MECHANISMS. THE PROBLEM OF FETAL ADAPTATION TO A FLOATING EXISTENCE. Aerospace Medicine, Nov. 1961, 32(11), 1061-1068. (Department of Anatomy, College of Medicine, University of Illinois, Chicago, Ill.).

17,533
Sensory deprivation in relation to effects of prolonged weightlessness is approached in this discussion by reviewing embryological studies. Specifically, the problem of fetal adaptation to a floating existence is discussed. The weightless fetus is then considered in relation to weightless man in terms of established cybernetic principles.
T. R 16

17,534
Tillisch, J.H. & Carter, E.T. CLINICAL PROBLEMS IN AVIATION MEDICINE. CASE REPORT NUMBER 3. Aerospace Medicine, Nov. 1961, 32(11), 1068-1069. (Mayo Clinic and Mayo Foundation, Rochester, Minn.).

17,534
A case history of apparent pulmonary disorder in a pilot is presented to illustrate the application of modern diagnostic methods to a problem that would be difficult to handle otherwise.

17,535
Deering, R.A., Hutchinson, F. & Schambra, P.E. SYMPOSIUM ON AEROSPACE RADIOBIOLOGY. IV. BIOLOGICAL EFFECTS OF ACCELERATED HEAVY IONS. Aerospace Medicine, Oct. 1961, 32(10), 915-920. (Biophysics Dept., Yale University, New Haven, Conn.).

17,535
Results on the effects of ten Mev/nucleon heavy ions on enzymes, deoxyribonucleic acid, virus, bacteria, yeast, mammalian cells, and Artemia eggs are presented. Three different situations relating to Relative Biological Efficiency determinations are discussed: 1) exponential survivals from both gamma rays and heavy ions; 2) sigmoidal survivals, related by dose reduction factors, for all radiations studied; and 3) sigmoidal survival from X- or gamma rays but exponential survivals from heavy ions.
G. R 16

17,536
Simons, D.G. & Hewitt, J.E. SYMPOSIUM ON AEROSPACE RADIOBIOLOGY. VII. REVIEW OF BIOLOGICAL EFFECTS OF GALACTIC COSMIC RADIATION. Aerospace Medicine, Oct. 1961, 32(10), 932-941. (USAF School of Aerospace Medicine, Brooks AFB, Tex.).

17,536
The biologic effects of galactic cosmic radiation are reviewed. Track-producing heavy primary cosmic radiation is described and known physical facts reviewed in relation to probable biologic effects. Observed biological effects from high altitude cosmic radiation studies (rockets, satellites, balloons) and from laboratory studies (heavy ion linear accelerator) are discussed and compared. The type of observation most useful is indicated along with a discussion of primary research needed.
T. G. R 27

17,537
Zellmer, R.W. & Allen, R.G., Jr. SYMPOSIUM ON AEROSPACE RADIOBIOLOGY. VIII. COSMIC RADIATION—LABORATORY OBSERVATIONS. Aerospace Medicine, Oct. 1961, 32(10), 942-946. (USAF School of Aerospace Medicine, Brooks AFB, Tex.).

17,537
The effects of irradiation from protons and alpha particles of cosmic radiation were studied under laboratory conditions. Forty-eight Macaca mulatta primates were exposed to a beam of 730 Mev protons or 910 Mev alphas focused on the eyes in varying total dosages. The effects of the exposure were evaluated clinically and estimations were made of the threshold doses necessary to produce iridocyclitis, erythema, epilation, and desquamation. Dosages thus estimated were compared to those obtained in previous studies using gamma radiation. Relative biological efficiencies were obtained.
T. I.

17,538
Nixon, C.W. DIFFERENTIAL EFFECT OF BREATHING SELECTED GASES UPON TEMPORARY AUDITORY-THRESHOLD SHIFT. Aerospace Medicine, Oct. 1961, 32(10), 947-952. (USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio).

17,538
The effect of breathing selected gases, which contained high concentrations of oxygen, upon auditory threshold shift and recovery from the shift were studied. Fifteen Ss were given two-min. exposures to a 3,000-cps tone at intensity levels of 95, 100, 105, and 110 db, each in combination with the three gas environments of 100 percent oxygen, 95 percent oxygen-5 percent carbon dioxide, or air. Hearing thresholds (4,000-cps pulsed tone) were recorded five min. before exposure to the test tone and for ten min. following exposure. Differences in threshold shift and recovery time due to experimental conditions were analyzed.
G. I. R 6

17,539
Moritz, H.C., Jr. & Nicholas, N.C. ROUTINE PARTIAL PRESSURE SUIT INDOCTRINATION. RESULTS OF A TWO AND ONE-HALF YEAR PROGRAM IN STRATEGIC AIR COMMAND. Aerospace Medicine, Oct. 1961, 32(10), 953-957.

17,539
A brief analysis of 378 partial pressure suit indoctrinations performed at the Carswell Air Force Base, Texas, altitude chamber facility over a period of two and one-half years was presented. All pilots who routinely use partial pressure suits in their day-to-day mission accomplishments for the Strategic Air Command must take this indoctrination. Successful qualification is based upon ascent to and remaining at 65,000 ft. altitude for a minimum period of 60 min. Over-all success and failure rates were given; failures were further classified as to reasons for failure (physical, equipment, physiological concomitants of anxiety). The value of this indoctrination as a preselection factor was discussed.
T. I. R 8

17,540
Hanks, T.G. SYSTEMS SAFETY AND HEALTH. Aerospace Medicine, April 1961, 32(4), 283-288. (Boeing Airplane Company, Seattle, Wash.).

17,540
The degree of potential hazard implicit in modern weapon and commercial aerospace systems has made it necessary to develop a concept of complete systems health and safety capability in industry and the Armed Services. Some organizational, informational, and educational aspects of this system are outlined. The need for increased coordination among organizations is presented.

17,541
Marotta, S.F., Marbarger, J.P., Andersen, N., Hansen, J., et al. INCIDENCE OF BENDS FOLLOWING PARTIAL DENITROGENATION AT SIMULATED ALTITUDE. Aerospace Medicine, April 1961, 32(4), 289-295. (Aeromedical Lab., University of Illinois, Chicago, Ill.).

17,541
The incidence of decompression sickness was studied in 15 healthy young men who participated in a total of 96 trials in a low-pressure chamber at simulated altitude of 38,000 ft. following partial denitrogenation at 12,000 ft. for 2, 4, 6, 8, 10, and 12 hours. At high altitude each S was required to perform a standard exercise consisting of five knee bends every three minutes for 30 minutes and every two minutes for the succeeding 30 minutes, or until the S developed aviator's bends. Incidence of aviator's bends, blood pressure, heart rate, and body fat data were analyzed in relation to experimental variables.
T. G. R 10

17,542
Pogrund, R.S. HUMAN ENGINEERING OR ENGINEERING OF THE HUMAN BEING—WHICH? Aerospace Medicine, April 1961, 32(4), 300-315. (Space Technology Laboratories, Inc., Los Angeles, Calif.).

17,542
The complexity of engineering for the comfort and safety of the astronaut in a space vehicle is discussed. It is suggested that the human being might be "engineered" where high levels of performance are not required, as during extended space missions, and thus reduce the rigid requirements for design of internal environments of the space capsule. Methods of adjusting man's homeostatic balances toward varying degrees of adverse environmental stresses are discussed from the standpoint of pharmacological means, hypothermia, adaptation, and Yoga.
T. G. R 79

17,543
Sniverly, G.G. & Chichester, C.O. IMPACT SURVIVAL LEVELS OF HEAD ACCELERATION IN MAN. Aerospace Medicine, April 1961, 32(4), 316-320. (Snell Memorial Foundation, San Francisco, Calif. & University of California, Davis, Calif.).

17,543
In an effort to obtain realistic information leading to the determination of critical threshold values of cerebral acceleration, detailed data were obtained from accidents involving head trauma in cases where racing crash helmets were used. Laboratory methods were devised by which the amount of acceleration of the head could be correlated with the amount of liner deflection in the helmets. Analysis of the accident data led to some recommendations for the design of protective headgear.
T. G. I. R 5

17,544
Graybiel, A., Guedry, F.E., Jr., Johnson, W.H. & Kennedy, R.S. ADAPTATION TO BIZARRE STIMULATION OF THE SEMICIRCULAR CANALS AS INDICATED BY THE OCULOGYRAL ILLUSION. Aerospace Medicine, April 1961, 32(4), 321-327. (USN School of Aviation Medicine, Pensacola Air Station, Fla.)

17,544
Adaptation in four Ss living on a continuously rotating centrifuge over a period of 64 hours was studied utilizing a special case of the oculogyral illusion as the indicator. Each S was exposed to whole body tilt in a specially constructed chair and required to estimate the magnitude of their subjective reactions to a lighted target. Voluntary head movements were also used for obtaining judgments. Determinations of the course of adaptation to the illusion were reported and discussed in relation to anticipated problems in manned orbiting satellites.
G. R 16

17,545
Schock, G.J.D. A STUDY OF ANIMAL REFLEXES DURING EXPOSURE TO SUBGRAVITY AND WEIGHTLESSNESS. Aerospace Medicine, April 1961, 32(4), 336-340. (Department of Chemistry, USAF Academy, Colo.).

17,545
Several experiments were conducted to study the role of the vestibular apparatus during states of subgravity and weightlessness. Six cats were observed: two unoperated, two bilabyrinthectomized, and two with the vestibular cortical area of the brain removed bilaterally. Postural reflex activity of these animals was recorded on the ground and during straight and level flying (normal g conditions), and during ballistic trajectory flight (subgravity and weightless conditions). Comparisons of the responses to the various tests, with eyes open and eyes covered, were compared.
R 7

17,546
Epstein, W., Park, J. & Casey, A. THE CURRENT STATUS OF THE SIZE-DISTANCE HYPOTHESES. Psychol. Bull., Nov. 1961, 58(6), 491-514. (University of Kansas, Lawrence, Kan.).

17,546
Investigations of the relationship between perceived size and perceived distance which have been reported since 1952 are reviewed. The discussion is organized about the size-distance invariance hypothesis, the known size-apparent distance hypothesis, and Emmert's Law or the relationship between the size of the afterimage and distance.
R 85

17,547
Morrill, C.S. TEACHING MACHINES: A REVIEW. Psychol. Bull., Sept. 1961, 58(5), 363-375. (Mitre Corporation, Bedford, Mass.).

17,547
This review of teaching machines begins by discussing current trends in automated teaching machines beginning with the early efforts of Sydney L. Pressey who designed such machines in the mid-1920s. General problem areas are discussed as follows: definition, programming, response mode, knowledge of results, motivation, equipment, and relationship of teaching machines and other techniques. Some problems of application are discussed.
R 59

17,548
Rosenzweig, M.R. DEVELOPMENT OF RESEARCH ON THE PHYSIOLOGICAL MECHANISMS OF AUDITORY LOCALIZATION. Psychol. Bull., Sept. 1961, 58(5), 376-389. (University of California, Berkeley, Calif.).

17,548
The development of hypotheses concerning the mechanisms of auditory localization (perception of direction of a sound source) is traced from the early work of Venturi in 1800 to the present day. It is felt that a completely satisfactory hypothesis, including both cortical and subcortical components, is yet to be presented.
R 79

17,549
Cattell, R.B. THE MULTIPLE ABSTRACT VARIANCE ANALYSIS EQUATIONS AND SOLUTIONS: FOR NATURE-NURTURE RESEARCH ON CONTINUOUS VARIABLES. Psychol. Rev., Nov. 1960, 67(6), 353-372. (University of Illinois, Urbana, Ill.).

17,549
A design called the Multiple Abstract Variance Analysis (MAVA) method, developed for nature-nurture research on continuous variables, is examined with the objective of developing further its potentialities. Various sections deal with 1) calculations and assumptions concerning concrete, experimentally measured variances; 2) concepts and assumptions in the equations; 3) equations for the complete solution and the limited resources designs; 4) the solutions and their confidence limits; and 5) psychological theory implicit in the MAVA model.
T. R 20

17,550
Taylor, C.W. A NOTE ON DIFFERENTIAL TASTE RESPONSES TO P.T.C. (PHENYL-THIO-CARBAMIDE). Hum. Biol., Sept. 1961, 33(3), 220-222. (Department of Anthropology, University of Washington, Seattle, Wash.).

17,550
Observations on differences in taste patterns (areas of tongue responding) to pheno-thio-carbamide (PTC) of 210 Ss were reported. Four areas of the tongue were tested by placing slips of paper, which had been previously immersed in a 0.25 percent solution of PTC and distilled water and allowed to dry, on the center of the tongue. Ss who tasted the chemical also indicated in which area of the tongue the taste was perceived. These responses were then studied to see whether there were any differential taste responses according to pattern.
R 5

17,551
Clark, P.J., Vandenberg, S.G. & Proctor, C.H. ON THE RELATIONSHIP OF SCORES ON CERTAIN PSYCHOLOGICAL TESTS WITH A NUMBER OF ANTHROPOMETRIC CHARACTERS AND BIRTH ORDER IN TWINS. Hum. Biol., May 1961, 33(2), 163-180. (Department of Zoology, Michigan State University, East Lansing, Mich.).

17,551
The interrelationships among certain psychometric and anthropometric characters and birth order were investigated within pairs of like-sexed twins (40 monozygous and 37 dizygous pairs). The psychological tests were measures of cognitive skills; the anthropometric measures included head length, head breadth, bizygomatic breadth, head circumference, stature, and weight. Correlations among traits were examined.
T. R 13

17,552
Carlsoo, S. THE STATIC MUSCLE LOAD IN DIFFERENT WORK POSITIONS: AN ELECTROMYOGRAPHIC STUDY. Ergonomics, July 1961, 4(3), 193-211. (Department of Anatomy, Karolinska Institutet, Stockholm, Sweden).

17,552
To ascertain which muscles and muscle groups are engaged in various standing work positions, an EMG study was performed on 40 Ss. About 20 muscles or muscle groups were examined using both coaxial needle electrodes and surface electrodes. Action potentials were first recorded for a normal, symmetric, standing rest position followed by a variety of both symmetric and asymmetric positions. The analysis of muscle activity for the different postures was based on the records obtained for the normal, relaxed standing posture.
T. I. R 15

17,553
Pierson, W.R. MONOPHOTOGRAMMETRIC DETERMINATION OF BODY VOLUME. Ergonomics, July 1961, 4(3), 213-217. (Los Angeles County Osteopathic Hospital, Los Angeles, Calif.).

17,553
A simple and inexpensive method of determining body volume by means of monophotogrammetry is described. Comparisons of volume determined by this method with that by water displacement are made to show the accuracy of the proposed method.
T. I. R 14

17,554
Kellermann, F.T. & van Wely, P.A. THE OPTIMUM SIZE AND SHAPE OF CONTAINER FOR USE BY THE FLOWER BULB INDUSTRY. Ergonomics, July 1961, 4(3), 219-228. (Philips Ergonomics Group, N.V. Philips' Gloeilampenfabrieken, Eindhoven, Holland).

17,554
An investigation was made to determine the optimum size and shape of a container for transport and storage of bulbs in the Dutch flower bulb industry from the working efficiency and physiological points of view. An analysis of the processes of bulb handling and the requirements of the container were made with laboratory investigations of weight and optimum weight made separately using 18 Ss. The physiological costs (heart rate was index) of carrying of 35, 17.5, and 8.75 kg weights over distances of 12 meters were determined. Three different shapes of container were designed, filled with the optimum load, and given the same tests. Finally, a prototype container was designed.
T. I. R 6

17,555
Brown, I.D., Holmqvist, S.D. & Woodhouse, M.C. A LABORATORY COMPARISON OF TRACKING WITH FOUR FLIGHT-DIRECTOR DISPLAYS. Ergonomics, July 1961, 4(3), 229-251. (Applied Psychology Research Unit, MRC, Cambridge, England).

17,555
An evaluation was made in the laboratory of four flight-director displays designed to present navigational information to a pilot while he is scanning the outside world, and all but one presented the information in peripheral vision. The displays were: 1) streaming lights, 2) barber's poles, 3) flashing lights, and 4) a meter. Performance in continuous tracking and correcting sudden errors when using each display, or a combination of them, was evaluated in terms of time off target and RTs. The effect of head movements was also studied.
T. G. I. R 5

17,556
Sanders, A.F. THE INFLUENCE OF NOISE ON TWO DISCRIMINATION TASKS. Ergonomics, July 1961, 4(3), 253-258. (Institute for Perception, RVO-TNO, Soesterberg, The Netherlands).

17,556
To test the hypothesis that performance might be more affected by varying than by continuous noise, two pencil-and-paper tasks were performed twice on different days for half an hour each. The noise conditions under which both tasks were performed were: 1) random changes of noise about an average level of 75 db, and 2) steady noise level of 70 db. Forty Ss performed both tasks under both conditions. The number of reactions in every minute was scored and analyzed for degree of regularity of the reaction times. Change in regularity was taken to be a measure of noise effects.
T. R 5

17,557
Wilkinson, R.T. COMPARISON OF PACED, UNPACED, IRREGULAR AND CONTINUOUS DISPLAY IN WATCHKEEPING. Ergonomics, July 1961, 4(3), 259-267. (Applied Psychology Research Unit, MRC, Cambridge, England).

17,557
To examine the question whether decline in signal detection in many vigilance tasks might be reduced by changing the mode of presentation of signal, three alternatives were examined and compared with the automatic, regular presentation. The alternatives were to present the displays 1) automatically but at irregular time intervals, 2) not automatically but when called for by the observer, and 3) continuously with a background of "noise" upon which occasional critical features were imposed. The same basic vigilance task was used with all four modes of display. Number of signals seen were obtained for each quarter of the one-hour testing period and analyzed for decrements.
T. G. R 9

17,558
Kitchin, J.B. & Graham, A. MENTAL LOADING OF PROCESS OPERATORS: AN ATTEMPT TO DEVISE A METHOD OF ANALYSIS AND ASSESSMENT. Ergonomics, Jan. 1961, 4(1), 1-15.

17,558
Progress in the development of a practical technique for assessing the mental load on process operators in a chemical plant was described. A tentative procedure was developed on the basis of a detailed study of job requirements and a method of classifying types of mental load. A points-scoring system was devised in an attempt to quantify the classes of mental load. Upon application of these procedures, a further analysis led to a systematic method of analyzing decision-taking situations and a procedure for comparing them quantitatively. The approach used was the works-measurement. Future work was indicated.

17,559
Grandjean, E. & Perret, E. EFFECTS OF PUPIL APERTURE AND OF TIME OF EXPOSURE ON THE FATIGUE INDUCED VARIATIONS OF THE FLICKER FUSION FREQUENCY. Ergonomics, Jan. 1961, 4(1), 17-23. (Department of Hygiene and Work Physiology, Swiss Federal Institute of Technology, Zurich, Switzerland).

17,559
To investigate some factors that might be influential in causing fatigue-induced variations in cff, measurements were made of cff on seven Ss before and after performing a 30-min. arithmetic task that involved considerable mental effort. Tests were made using both an artificial pupil and normal vision in order to see if changes were due to modification of pupil aperture following mental fatigue. In a second series, the time needed to reach the point of flicker fusion was varied; in a third series, the influence of an interruption of the intermittent light between two measures of cff was examined.
T. G. R 23

17,560
Brown, I.D. & Poulton, E.C. MEASURING THE SPARE 'MENTAL CAPACITY' OF CAR DRIVERS BY A SUBSIDIARY TASK. Ergonomics, Jan. 1961, 4(1), 35-40. (Applied Psychology Research Unit, MRC, Cambridge, England).

17,560
An attempt was made to measure mental concentration in driving an automobile by giving the driver a subsidiary task to perform. The aim of the study was to determine whether the technique was suitable, by the criteria of sensitivity and safety, for use in field studies. Two groups, one of average and one of advanced drivers, were tested on a two-mile test circuit through a city residential and shopping area. The subsidiary tasks were either auditory detection (and oral response to) of a specified number in a series or addition of three digits as heard orally. Errors on the auditory task and effects of the task upon measures of driving changes were studied.
T. G. R 7

17,561
Colquhoun, W.P. THE EFFECT OF 'UNWANTED' SIGNALS ON PERFORMANCE IN A VIGILANCE TASK. Ergonomics, Jan. 1961, 4(1), 41-51. (Applied Psychology Research Unit, MRC, Cambridge, England).

17,561
To investigate the relative importance of frequency and probability of wanted signals in determining detection efficiency, the performance of 36 observers in a task of visual vigilance was observed. Both signal frequency and signal probability (ratio of wanted to unwanted signals) were varied independently. Accuracy of signal detection and frequency of false reports were analyzed for the effects of the two variables. The effect of signal location (center versus periphery) was also determined. The relevance of the findings for theory of behavior in vigilance tasks and to the design of monitoring tasks was discussed.
T. G. R 15

17,562
Corlett, E.N. THE ACCURACY OF SETTING OF MACHINE TOOLS BY MEANS OF HANDWHEELS AND DIALS. Ergonomics, Jan. 1961, 4(1), 53-62. (Department of Engineering Production, University of Birmingham, Birmingham, England).

17,562
Experiments were reported of the effects on the accuracy and speed of setting a dial to a pointer by means of a handwheel--a task simulating that of the operator of many machine tools. Five skilled and five unskilled Ss were tested under the following two conditions: 1) dial diameters of 2, 4, 6, and 8 inches, each engraved with four black-filled lines 0.008, 0.016, 0.032, and 0.064 inches wide, each with an eight-inch diameter handwheel and frictional torque of seven and one-half lbs.; 2) handwheel diameters of 4, 5½, 8, 10, and 12 inches, frictional torque 7½, 15, 30, and 60 lbs./inch, each with a six-inch diameter dial with 0.016-inch line. Accuracy and speed data were analyzed for the effects of all variables.
G. I. R 5

17,563
Crockford, G.W., Hellon, R.F., Humphreys, P.W. & Lind, A.R. AN AIR-VENTILATED SUIT FOR WEAR IN VERY HOT ENVIRONMENTS. Ergonomics, Jan. 1961, 4(1), 63-72. (Department of Human Anatomy, Oxford University, Oxford, England).

17,563
A ventilated suit assembly designed for use in the British Royal Navy was tested for use by men who have to work in high ambient temperatures. Fifteen men wearing the assembly were exposed to an ambient temperature of about 81 degrees C. The suit was ventilated with dry air (six to seven mm Hg) at volumes between 283 to 707 litres/min. (10 to 25 cubic ft./min.) at temperatures between 30 and 37.8 degrees C. Physiological observations included oral temperatures and pulse rate every five min. and body weight before and after exposure. Recommendations for use of the suit were made.
T. G. I.

17,564
Renbourn, E.T. & Stockbridge, H.C.W. WAR OFFICE CLOTHING AND EQUIPMENT PHYSIOLOGICAL RESEARCH ESTABLISHMENT. Ergonomics, Jan. 1961, 4(1), 73-79. (Clothing and Equipment Physiological Research Establishment, Royal Aircraft Establishment, Farnborough, Hants, England).

17,564
A history of the Clothing and Equipment Physiological Research Establishment and the nature of the researches undertaken are reviewed briefly. The main function is to assess the serviceability and wear-and-tear life of clothing and various types of equipment. A review of past work includes: 1) problems of the soldier's load, 2) working environment, 3) clothing and protective equipment of the soldier, and 4) design of fighting vehicles and guided weapon systems.
R 18

17,566
Ostroumov, G. AN INTERVIEW WITH YURI GAGARIN. Soviet Rev., May 1961, 2(5), 47-52.

17,566
An interview with the world's first astronaut, Yuri Gagarin, as reported in Izvestia on April 14, 1961, is reprinted here. Questions relating to the astronaut's emotional reactions toward his mission, sensations on weightlessness, what he could see from the spaceship, and various personal items are answered.

17,567
Soviet Review. AN ANALYSIS OF MAN'S FIRST SPACE FLIGHT. Soviet Rev., June 1961, 2(6), 56-72. (International Arts and Sciences Press, New York, N.Y.).

17,567
In this article, the first manned space flight of the Russians was discussed. The design of the spaceship, Vostok, medical-biological problems of manned space flight, and the method of selecting astronauts were considered. The actual flight of April 12, 1961, was described in some detail. This article first appeared in the Soviet press on April 25.

17,568
Robinson, W. OFFICE LIGHTING. THE CHANGING SCENE. Light & Lighting, Oct. 1961, 54(10), 294-296.

17,568
Trends in office lighting design are reviewed particularly as affected by the 1961 Illuminating Engineering Society glare recommendations. Past difficulties in the lighting of offices are discussed but hope is expressed for rapid improvement with new architectural and engineering design.
I.

17,569
Hopkinson, R.G. SUPPLEMENTING DAYLIGHT IN OFFICES. Light & Lighting, Oct. 1961, 54(10), 296-299.

17,569
The technique of permanent supplementary artificial lighting that has been worked out at the Building Research Station (England) is described. The system enables daylight to be supplemented by artificial light in such a way that the daylight remains dominant but in correct proportion to the other source. The advantages of such a system as compared to one of complete artificial lighting or dependence on daylight alone are discussed.

17,570
Light & Lighting. LIGHTING ABSTRACTS. Light & Lighting, Oct. 1961, 54(10), 308-309. (Illuminating Engineering Society, London, England).

17,570
Annotated abstracts in the following specialized areas are presented: optics and photometry, lamps and fittings, and lighting. Many of the articles thus abstracted are from Russian, Swedish, and American sources. The period covered is primarily April, May, and June of 1961.
R 20

17,571
Light & Lighting. LIGHTING ABSTRACTS. Light & Lighting, Aug. 1961, 54(8), p. 249. (Illuminating Engineering Society, London, England).

17,571
Annotated abstracts of articles in periodicals on lighting are presented in the following specialized areas: optics and photometry, and lamps and fittings. The period covered is the first six months of 1961.
R 10

17,572
Sisson, R.L. METHODS OF SEQUENCING IN JOB SHOPS—A REVIEW. Operat. Res., Jan.-Feb. 1959, 7(1), 10-29. (University of California, Los Angeles, Calif.).

17,572
The problem of sequencing the jobs in a job shop so as to optimize some given factor is considered. Following definitions of terms, the status of research on this problem is reviewed. Models considered fall into two categories: 1) "mechanical" models in which there is an attempt to predict the progress of each job in detail, and 2) stochastic (called here thermodynamic) models in which the distribution of the progress of each job is predicted. Solutions based on these models are also discussed. Simulation as a method for study of this problem is considered for further experimentation.
G. I. R 28

17,573
Greenberg, H. & Daou, A. THE CONTROL OF TRAFFIC FLOW TO INCREASE THE FLOW. Operat. Res., July-Aug. 1960, 8(4), 524-532. (Radio Corporation of America, New York, N.Y. & Port of New York Authority, New York, N.Y.).

17,573
An operational study of tunnel-traffic flow was conducted. Data were collected on flow within the tunnel by two methods. 1) Transit times for each vehicle through a given zone and the time headway between successive vehicles were recorded on a Simplex Productograph time machine. Average speed and flow for all vehicles in equal times were calculated. 2) Observers with stop watches, located at intervals along the roadway, marked traffic as to cars, trucks or buses, and summarized the data in half-minute intervals. The flow and density data at the bottleneck were fitted to a fluid model description of the flow. On the basis of the analysis a recommendation was made and given an experimental trial for controlling traffic input to produce in higher flow. T. G.

17,574
Boldyreff, A.W. (Ed.). A DECADE OF MILITARY OPERATIONS RESEARCH IN PERSPECTIVE—A SYMPOSIUM. FOURTEENTH NATIONAL MEETING OF THE OPERATIONS RESEARCH SOCIETY OF AMERICA, ST. LOUIS, MO., OCT. 23, 1958. Operats. Res., Nov.-Dec. 1960, 8(6), 798-860.

17,574
Five of the six papers presented at a symposium on military operations research (1958) are presented. Each paper represents one of the principal operations-research agencies of the national-defense establishments of the United States and Canada. An attempt is made to assess progress, to examine both credit and debit sides, and to point out future trends.

17,575
Engel, J.H. OPERATIONS RESEARCH FOR THE U.S. NAVY SINCE WORLD WAR II. Operats. Res., Nov.-Dec. 1960, 8(6), 798-809. (Operations Evaluation Group, Massachusetts Institute of Technology, Cambridge, Mass.). (Report from: Boldyreff, A.W. (Ed.). "A Decade of Military Operations Research in Perspective—A Symposium. Fourteenth National Meeting of Operations Research Society of America, St. Louis, Mo., Oct. 23, 1958," 62pp.).

17,575
The major trends in the USN Operations Research Program since World War II are discussed and related to the period of development—first postwar years, Korean emergency, and post-Korea. The types of problems, their scope and complexity, are indicated. The organization of the Operations Evaluations Group as it now exists is examined in terms of its effectiveness to handle problems of both long range and emergency type.

17,576
Whitson, W.L. THE GROWTH OF THE OPERATIONS RESEARCH OFFICE IN THE U.S. ARMY. Operat. Res., Nov.-Dec. 1960, 8(6), 809-824. (The Martin Company, Denver, Colo.). (Report from: Boldyreff, A.W. (Ed.). "A Decade of Military Operations Research in Perspective--A Symposium. Fourteenth National Meeting of Operations Research Society of America, St. Louis, Mo., Oct. 23, 1958," 62pp.).

17,576
Operations research in the USA is discussed in terms of the Operations Research Office (ORO) of Johns Hopkins University, the only research group supported by the USA. ORO was organized after World War II unlike other groups in the USN and USAF. The external relations of ORO to the USA and the university are described along with initial growth, productivity, and quality control methods. The current program is discussed under three topics: 1) group or major syntheses of problems of broad scope, 2) the use of computing machines, and 3) war gaming. Future trends are indicated.
T. I.

17,577
Specht, R.D. RAND--A PERSONAL VIEW OF ITS HISTORY. Operat. Res., Nov.-Dec. 1960, 8(6), 825-839. (Rand Corporation, Santa Monica, Calif.). (Report from: Boldyreff, A.W. (Ed.). "A Decade of Military Operations Research in Perspective--A Symposium. Fourteenth National Meeting of Operations Research Society of America, St. Louis, Mo., Oct. 23, 1958," 62pp.).

17,577
The initiation of Project RAND by the USAF and its desire to help sustain the active interest of the nation's scientists in the problems of defense is set forth. Developments in organization, personnel, and activities since that time are discussed. A sample list of publications is presented to show the diversity of activities of the scientists at RAND. "Lessons" learned and future trends are discussed.

17,578
de Guenin, J. OPTIMUM DISTRIBUTION OF EFFORT: AN EXTENSION OF THE KOOPMAN BASIC THEORY. Operat. Res., Jan.-Feb. 1961, 9(1), 1-7. (Groupe de Recherche Operationnelle, Esso Standard, Paris, France).

17,578
The fundamental problem of search theory is to allocate a given amount of search effort in such a way as to maximize the over-all probability of discovering an object located in a given space. In this paper a method is developed for solving the problem in the general case, where no assumption is made concerning the form of the detection probability function. A theorem is derived that gives a general relation governing the optimal solution.
G. R 6

17,579
Truelove, A.J. STRATEGIC RELIABILITY AND PREVENTIVE MAINTENANCE. Operat. Res., Jan.-Feb. 1961, 9(1), 22-29. (Defense Electronics Div., General Electric Company, Syracuse, N.Y.).

17,579
Strategic reliability of equipment is defined as the product of availability and reliability over a fixed period of time x. The equipment is subjected to preventive maintenance after Tp (fixed time) hours of continuing operation without failure. The problem is to choose Tp so as to optimize 1) availability and 2) strategic reliability. The solution to (1) has been previously given and is summarized briefly. The solution for (2) is derived and it is shown that the "optimum curve" commonly drawn for (1) may be used to solve (2) approximately.
G. R 3

17,580
Leibowitz, M.L. (Ed.). SYMPOSIUM ON MILITARY OPERATIONS RESEARCH. SEVENTEENTH NATIONAL MEETING OF THE OPERATIONS RESEARCH SOCIETY OF AMERICA, NEW YORK, N.Y., MAY 20, 1960. Operat. Res., March-April 1961, 9(2), 249-271. (Systems Research Group, Inc., Mineola, N.Y.).

17,580
The three papers presented at this symposium attempt to evaluate the accomplishments, failures, and future of Operations Research in the military planning process. The titles of each paper (see 17,581, 17,582, 17,583) are: 1) "Trends in military operations research," 2) "Military operations research--a personal retrospect," and 3) "Selecting weapons systems, 1960--the builder's-eye view."

17,581
Meale, D.W. TRENDS IN MILITARY OPERATIONS RESEARCH. Operat. Res., March-April 1961, 9(2), 252-257. (Technical Operations, Inc., Fort Monroe, Va.). (Report from: Leibowitz, M.L. (Ed.). "Symposium on Military Operations Research. Seventeenth National Meeting of the Operations Research Society of America, New York, N.Y., May 20, 1960," 22pp.).

17,581
Military operations research in its early years of World War II is contrasted with a description of its present status. Changing problems, availability of data, emphasis on planning for future systems rather than developing tactical doctrine of the chosen system, and emerging techniques of operational gaming, operational experimentation, and active synthesis are discussed. Stress is placed on the need for basic research.

17,582
Whitmore, W.F. MILITARY OPERATIONS RESEARCH--A PERSONAL RETROSPECT. Operat. Res., March-April 1961, 9(2), 258-265. (Lockheed Missiles & Space Div., Sunnyvale, Calif.). (Report from: Leibowitz, M.L. (Ed.). "Symposium on Military Operations Research. Seventeenth National Meeting of the Operations Research Society of America, New York, N.Y., May 20, 1960," 22pp.).

17,582
Some aspects of military operations research (OR) since World War II are considered and areas of both success and failure are indicated. Failures to transmit past experiences are noted with resultant need for rediscovery of results and tactics. The point of view here is that of the analyst working as liaison with operational staffs rather than that of a worker in large OR teams. The major challenge for military OR is seen to be that of influencing the really major decisions of our time in military and diplomatic affairs; to provide superiors at the highest level with "quantitative bases for executive decision."
R 7

17,583
Osborn, P. SELECTING WEAPONS SYSTEMS. 1960--THE BUILDER'S-EYE VIEW. Operat. Res., March-April 1961, 9(2), 265-271. (Convair, General Dynamics Corporation, San Diego, Calif.). (Report from: Leibowitz, M.L. (Ed.). "Symposium on Military Operations Research. Seventeenth National Meeting of the Operations Research Society of America, New York, N.Y., May 20, 1960," 22pp.).

17,583
Operations research and its relation to the problems of selecting weapons systems is presented from the viewpoint of the builder of the system. The quickening pace of weapons-systems evolution since World War II demands that planning be "recalibrated" to fundamentals in order to select viable systems. This demand, plus increasing complexity of weapons-systems, has brought the operations analyst into close working relations with the builder at all levels. It is pointed out that this trend is not apparent in other areas; that there is danger in too narrow specialization; and that the road to growth lies along broader paths.

17,584
Sandeman, P. EMPIRICAL DESIGN OF PRIORITY WAITING TIMES FOR JOBBING SHOP CONTROL. Operat. Res., July-Aug. 1961, 9(4), 446-455. (Department of Operational Research and Cybernetics, United Steel Companies, Sheffield, England).

17,584
The need to formulate sets of guiding rules to cover all instructions that govern the delay of items being processed in a jobbing shop is discussed. Because of flexibility in capacity (overtime work, borrowing from other sections, etc.) and the need of getting operations completed by a given date, it is necessary to integrate these two aspects in order to get suitable waiting-time distributions. Results are given of a study of a simplified model of such control integration on waiting times in a single server, preemptive priority queue.
T. G. R 4

17,585
Yarnold, K.W. & Nehnevajsa, J. ANALYTICAL METHODS FOR DETERMINATION OF TRAINING-DEVICE REQUIREMENTS. Operat. Res., July-Aug. 1961, 9(4), 535-544. (Dunlap and Associates, Inc., Stamford, Conn.).

17,585
The problem of developing training devices under modern conditions of military systems is discussed. The need for a logical, analytical tool that can operate upon the guesses and assumptions that are available early in system development and generate training-device needs, priorities, values, and specifications is indicated. Such a logical tool is described and the steps in using the tool are discussed. The limitations of such a method are also indicated. A hypothetical example of its use in a surface-to-air missile system is given.
T. I.

17,586
Olson, P.L. & Rothery, R.W. DRIVER RESPONSE TO THE AMBER PHASE OF TRAFFIC SIGNALS. Operat. Res., Sept - Oct. 1961, 9(5), 650-663. (Research Labs., General Motors Corporation, Warren, Mich.).

17,586
To investigate the behavior of motorists faced with the onset of an amber signal light, observations were made at five intersections representing three speed zones (30, 45, and 50 mph) where the amber phase varied in length of duration. The data from the observations gave an estimate of the probability of stopping for vehicles as a function of their distance from the intersection at the onset of the amber phase of the traffic signal. The results were compared with other investigations pertaining to amber phase lengths and implications for the proper timing of amber phases were discussed.
T. G. R 4

17,587
Egan, J.P., Greenberg, G.Z. & Schulman, A.I. OPERATING CHARACTERISTICS, SIGNAL DETECTABILITY, AND THE METHOD OF FREE RESPONSE. J. acoust. Soc. Amer., Aug. 1961, 33(8), 993-1007. (Hearing and Communication Lab., Indiana University, Bloomington, Ind.).

17,587
A model representing a listener's behavior in the situation of free response is developed. The method of free response refers to the situation in which, against a background of noise, a weak signal is presented several times in an observation interval at randomly distributed times. The listener is not given any information as to number or distribution of signals; he is instructed to press a "yes" key when he hears a signal; and, from one series to another, he is instructed to adopt an arbitrary but fixed criterion for making his decision. The technique described attempts to partition to total "yes" answers meaningfully between "hits" and "false alarms." Two experiments are described and the results analyzed according to the technique and the model that have been developed. T. G. I. R 11

17,588
Gundy, R.F. AUDITORY DETECTION OF AN UNSPECIFIED SIGNAL. J. acoust. Soc. Amer., Aug. 1961, 33(8), 1008-1012. (Hearing and Communication Lab., Indiana University, Bloomington, Ind.).

17,588
Some aspects of auditory discrimination learning were studied within the framework of signal detectability theory. Listeners were required to detect an auditory signal against a background of "white noise." The effects of giving trial-by-trial information as to whether or not a signal was delivered, and an opportunity to hear the signal before the test sequence began, were studied at two levels of signal energy. The results were analyzed for the learning effects of these two treatments.
T. G. R 13

17,589
Saito, S. & Watanabe, S. NORMALIZED REPRESENTATION OF NOISE-BAND MASKING AND ITS APPLICATION TO THE PREDICTION OF SPEECH INTELLIGIBILITY. J. acoust. Soc. Amer., Aug. 1961, 33(8), 1013-1021. (Electrical Communication Lab., Nippon Telegraph and Telephone Public Corporation, Tokyo, Japan).

17,589
Since the masking effect of noise is the principal interference factor in speech intelligibility, the masking effect of narrow-band noise was investigated as a model of nonflat-spectrum noise. Measurements were made of the masking of pure tones by various bands of noise. A normalized representation of noise-band masking in some restricted ranges was achieved and applied for the prediction of speech intelligibility. Predicted articulation scores were compared with measured ones.
G. I. R 12

17,590
Small, A.M., Jr. & Campbell, R.A. PITCH SHIFTS OF PERIODIC STIMULI WITH CHANGES IN SOUND LEVEL. J. acoust. Soc. Amer., Aug. 1961, 33(8), 1022-1027. (University of Iowa, Iowa City, Iowa).

17,590
Pitch shifts with changes in sound level were investigated for two types of stimuli, the standard pitch for each set being the same (100 cps). For one set, it was hypothesized the pitch would be analyzed on the basis of "place" and the other on the basis of "periodicity." Eight Ss, students of music, made alternate monaural pitch matches with four stimuli: pure tone, d.c. pulses (both with energy at the fundamental frequency-place pitch), and two varieties of a.c. pulses (with little energy at the fundamental frequency-periodicity pitch). The findings were discussed in relation to theories of pitch perception.
T. G. I. R 13

17,591
Small, A.M., Jr. & Minifie, F.D. EFFECT OF MATCHING TIME ON PERSTIMULATORY ADAPTATION. J. acoust. Soc. Amer., Aug. 1961, 33(8), 1028-1033. (University of Iowa, Iowa City, Iowa).

17,591
This study evaluated the effect of the on- and off-time of the test stimulus upon measured perstimulatory adaptation in the adapting ear. With a 4,000-cps adapting tone presented at 75-db sensation level, 16 combinations of on- and off-duration of the test tone were investigated using 11 listeners. The listening situation involved the steady presentation of the adapting tone to one ear throughout each 6.5 testing session and the periodic intermittent presentation of the test tone to the contralateral ear; the task was to adjust the intermittent stimulus to maintain a loudness balance. Adaptation was defined as the difference between initial level of test stimulus required for loudness balance and its level at any instant during the test period.
T. G. I. R 12

17,592
Speeth, S.D. & Mathews, M.V. SEQUENTIAL EFFECTS IN THE SIGNAL-DETECTION SITUATION. J. acoust. Soc. Amer., Aug. 1961, 33(8), 1046-1054. (Bell Telephone Labs., Inc., Murray Hill, N.J.).

17,592
Possible sequential effects in the behavior of observers in a signal-detection situation were investigated. The experiment consisted of a four-interval forced-choice situation in which the signal and noise were applied to one ear only. On some trials a continuous reference tone of same phase and amplitude as the signal, was applied to the ear not being tested. Four trained Ss were tested. Response data were examined for possible sequential effects: dependencies between successive response intervals and relations between subject-originated actions (responses) and experimenter-originated actions (indicated correct interval). A theory was developed for characterizing the dependencies by a finite-state machine and was applied to the data. T. I. R 14

17,593
Bies, D.A. & Franken, P.A. NOTES ON SCALING JET AND ROCKET NOISE. J. acoust. Soc. Amer., Sept. 1961, 33(9), 1171-1173. (Bolt Beranek and Newman Inc., Los Angeles, Calif.).

17,593
A jet or rocket engine and its small scale model are examples of dynamically similar systems if the engines are geometrically scaled and if the time-average velocities, temperatures, and densities at similar positions are identical. Appropriate scaling relationship for pressure fluctuations for such similar systems are established in this investigation and extended to systems containing acoustic liners. Corrections for small errors in scaling are suggested for the case of rocket engines. The model is felt to be a convenient tool for investigating the full scale behavior.
G. I. R 6

17,594
House, A.S. ON VOWEL DURATION IN ENGLISH. J. acoust. Soc. Amer., Sept. 1961, 33(9), 1174-1178. (Research Laboratory of Electronics, Massachusetts Institute of Technology, Cambridge, Mass.).

17,594
Average durations of 12 vowels of American English as measured in bisyllabic nonsense utterances were reported. The utterances were produced by three adult males using a conversational vocal level with uniform pattern of stress and intonation. The vowels occurred in 14 symmetrical consonantal environments consisting of the voiced and voiceless versions of three stop, one affricative, and three fricative consonant articulations. Four determinants of the characteristic durations of stressed vowels were identified and discussed.
G. I. R 11

17,595
Wallace, J.D., Lewis, D.H. & Khalil, S.A. KOROTKOFF SOUNDS IN HUMANS. J. acoust. Soc. Amer., Sept. 1961, 33(9), 1178-1182. (Division of Cardiology, Philadelphia General Hospital, Philadelphia, Penn.).

17,595
To investigate reported discrepancies in the measurement of the diastolic blood pressure level by direct and by indirect methods, direct monitoring of five sound groups (Korotkoff) from the brachial artex with vascular pressure, cuff pressure, and external sounds was carried out. Data from 13 patients were obtained for analysis. Examples of spectrograms of the Korotkoff sounds near diastolic pressure were presented.
I. R 5

17,596
Stewart, J.L., Westerfield, E.C. & Brandon, M.K. OPTIMUM FREQUENCIES FOR ACTIVE SONAR DETECTION. J. acoust. Soc. Amer., Sept. 1961, 33(9), 1216-1222. (USN Electronics Lab., San Diego, Calif.).

17,596
The topic of this paper is the method of determination of the optimum frequencies for active sonar without knowledge of the absolute values of the sonar-set parameters, but only of their frequency dependence as proposed by J.W. Horton. An attempt is made to extend the method to include noise-plus-reverbaration limiting, search rate, and processing gain in addition to the noise-limited condition.
T. G. R 12

17,597
Tanner, W.P., Jr. APPLICATION OF THE THEORY OF SIGNAL DETECTABILITY TO AMPLITUDE DISCRIMINATION. J. acoust. Soc. Amer., Sept. 1961, 33(9), 1233-1244. (University of Michigan Research Institute, Ann Arbor, Mich.).

17,597
The relation between physical parameters and response behavior were investigated in two types of amplitude-discrimination experiments. In the first, signals were segments of pure tones of the same frequency and phase, differing only in amplitude. In the second, the signals were samples of noise from the same source, differing only in power. The data were analyzed first within the framework of the theory of signal detectability. An inventory of various possible noise sources and the way these may be expected to effect detectability of signals led to derivation of an equation describing the performance. Data for three observers over four noise levels were compared to predictions and the findings discussed in relation to the applicability of Weber's law. G.

17,598
Brady, P.T., House, A.S. & Stevens, K.N. PERCEPTION OF SOUNDS CHARACTERIZED BY A RAPIDLY CHANGING RESONANT FREQUENCY. J. acoust. Soc. Amer., Oct. 1961, 33(10), 1357-1362. (Research Laboratory of Electronics, Massachusetts Institute of Technology, Cambridge, Mass.).

17,598
To investigate the perception of sounds characterized by a moving resonance (as in speech), a series of experiments was performed. Stimuli were generated by exciting a tuned circuit with a short train of pulses of a repetition rate 100/sec. The resonant frequency of the tuned circuit was changed in a piece-wise linear manner over a 500 cps range. Ss matched the test stimuli by adjusting the resonant frequency of a fixed (nonvarying in time) resonant circuit until the two stimuli were judged to be most alike. Tendencies in kind of judgments made as related to time-related characteristics were analyzed. Implications of the results for auditory theory and speech perception were discussed.
G. I. R 10

17,599
Cohen, A. FURTHER INVESTIGATION OF THE EFFECTS OF INTENSITY UPON THE PITCH OF PURE TONES. J. acoust. Soc. Amer., Oct. 1961, 33(10), 1363-1375. (Pennsylvania State University, University Park, Penn.).

17,599
A reinvestigation of the pitch-intensity relationship was conducted using trained musicians with better than average pitch discrimination as Ss. Pitch changes were observed for frequencies 50, 75, 100, 150, 200, 1,500, and 6,000 cps as each tone was raised from 40 to 100 phons in loudness level. These tones sampled the low, middle, and high frequency regions of the pitch-intensity relationship. The S's task was to make pitch matches between a pure tone of fixed loudness level and variable frequency for each of the tones under study; each S made two sets of judgments. Differences between frequencies of the matched tones were used to specify the pitch change. Reliability of repeated measurements of pitch shift for each individual and individual differences were analyzed. T. G. R 26

17,600
Montague, W.E. & Strickland, J.F. SENSITIVITY OF THE WATER-IMMERSED EAR TO HIGH- AND LOW-LEVEL TONES. J. acoust. Soc. Amer., Oct. 1961, 33(10), 1376-1380. (USN Electronics Lab., San Diego, Calif.).

17,600
To assess man's sensitivity to waterborne sound, threshold measurements were made on seven experienced divers. First, each diver, wearing aqualung regulator and tanks, face mask and suit, was seated in a frame and lowered into water until completely submerged. Threshold measurements to tones of 250, 500, 1,000, 1,500, 2,000, 3,000, 4,000, and 6,000 cps were then obtained both with and without the hood. In a second experiment, data were obtained on the "tolerance" to a high intensity tone of 1,500 cps. From these data the threshold sensitivity of the water-immersed ear, the effect of the diver's hood on this sensitivity, and the tolerance limits to intense underwater signals were found.
G. I. R 11

17,601
Sherrick, C.E., Jr. & Mangabeira-Albernaz, P.L. AUDITORY THRESHOLD SHIFTS PRODUCED BY SIMULTANEOUSLY PULSED CONTRALATERAL STIMULI. J. acoust. Soc. Amer., Oct. 1961, 33(10), 1381-1385. (Central Institute for the Deaf, St. Louis, Mo. & Washington University School of Medicine, St. Louis, Mo.).

17,601
To demonstrate the existence of contralateral auditory masking under the special conditions of simultaneous pulses of masker and signal, random noise with frequencies above 5,000 cps filtered out were presented to one ear and test signals of various frequencies to the other ear. Thresholds for the pure tone pulse were obtained under three conditions of noise in the opposite ear--quiet, pulsed, and steady. Measurements were repeated for monotic conditions. Other experiments were conducted to explore the effect of frequencies of the test signal on threshold shift under these conditions, the relation between masking of tones by tones and their frequencies, and the relation between the amount of masking and intensity of the masking stimulus.
T. G. I. R 9

17,602
Denes, P. & Mathews, M.V. SPOKEN DIGIT RECOGNITION USING TIME-FREQUENCY PATTERN MATCHING. J. acoust. Soc. Amer., Nov. 1960, 32(11), 1450-1455. (University College, London, England & Bell Telephone Laboratories, Inc., Murray Hill, N.J.).

17,602
Machine recognition of the spoken digits zero through nine was studied by means of a digital computer simulation. The spoken utterances were converted to time-frequency patterns of spectral energy. Recognition was done by cross-correlating the pattern of an unknown utterance with a test pattern for each digit and selecting the digit with the highest correlation. Time normalization could be applied to all patterns to reduce utterances to a standard duration. Results of experiments carried out using this method and an assessment of their significance were presented.
G. R 8

17,603
Guttman, N., van Bergeijk, W.A. & David, E.E., Jr. MONAURAL TEMPORAL MASKING INVESTIGATED BY BINAURAL INTERACTION. J. acoust. Soc. Amer., Oct. 1960, 32 (10), 1329-1336. (Bell Telephone Laboratories, Inc., Murray Hill, N.J.).

17,603
To study forward and backward masking, three experiments were conducted using binaural phenomena for this purpose. The method consisted of presenting two successive clicks as a doublet to one ear and a single click to the other ear. The ability of listeners to bring the single click into fusion with one or the other contralateral clicks served as the principal measure of masking. Forward masking (inability to fuse the second click) was studied as a function of repetition rate and click levels. Backward masking (inability to fuse the first click) was similarly studied. A model was presented to account for the observations.
G. R 26

17,604
Pikler, A.G. & Harris, J.D. COMPENSATORY AND PURSUIT TRACKING OF LOUDNESS. J. acoust. Soc. Amer., Sept. 1960, 32(9), 1129-1133. (USN Medical Research Lab., New London Submarine Base, Conn.).

17,604
A comparison was made of the efficiencies of the compensatory and pursuit modes in the tracking of loudness. In the compensatory mode, the S kept a loudness level constant in the face of programmed changes; in the pursuit mode, he duplicated loudness changes by manipulating an external source. Five Ss tracked three tape-recorded programs presented in eight test conditions including both modes and three channel types of reception (monotic, diotic, and dichotic). The responses were obtained by dial-writing techniques and a paper-tape voltage recorder. The findings were discussed in terms of their usefulness for suprathreshold audiometry and other practical tasks.
T. I. R 9

17,605
Tanner, W.P., Jr. THEORY OF SIGNAL DETECTABILITY AS AN INTERPRETIVE TOOL FOR PSYCHOPHYSICAL DATA. J. acoust. Soc. Amer., Sept. 1960, 32(9), 1140-1147. (University of Michigan Research Institute, Ann Arbor, Mich.).

17,605
The techniques that have been employed in establishing agreement between psychoacoustic experiments and the theory of signal detectability are examined. The general theory is presented and it is demonstrated to be a special case of the theory of testing statistical hypotheses and decision theory. Next some special cases are considered and brings into the context of the theory the relation between such parameters as the signal energy and the noise energy, and the separation between the statistical hypotheses conditional upon the existence of noise alone and those conditional upon the existence of signal plus noise. Certain logical considerations supporting adequacy of agreement between the theory and psychoaccoustics are presented.
I. R 12

17,606
Eijkman, E. & Vendrik, A.J.H. DYNAMICS OF THE VIBRATION SENSE AT LOW FREQUENCY. J. acoust. Soc. Amer., Sept. 1960, 32(9), 1134-1139. (Department of Medical Physics, Roman Catholic University, Nijmegen, The Netherlands).

17,606
The dynamic properties of the vibration sense in the human skin were investigated in a series of experiments. By means of psychophysical methods, threshold values with different time courses and durations were determined. Sinusoidal deformations and deformations linearly increasing with time were used. The results were described by a simple model yielding a value of the time constant of the receptor system. The findings were compared with electrophysiological observations. Also agreeing with electrophysiological experiments, "rectifying" properties were found. Possible mechanisms underlying these phenomena were discussed.
G. I. R 12

17,607
Curry, E.T., Fay, T.H., Jr. & Hutton, C.L. EXPERIMENTAL STUDY OF THE RELATIVE INTELLIGIBILITY OF ALPHABET LETTERS. J. acoust. Soc. Amer., Sept. 1960, 32(9), 1151-1157. (University Hearing Center, University of Illinois, Urbana, Ill.).

17,607
To ascertain the relative intelligibility of the 26 individual spoken alphabet letters, three experienced speakers recorded the stimulus materials. These materials were presented to 18 listeners over a 0- to 45-db range of levels. Percent of correct responses at each presentation level was calculated and plotted. Slope values were calculated for letters, speakers, and listeners. Threshold levels were also obtained from the curve at the 50 percent point. Various descriptive data were presented; comparisons were made with more difficult stimuli used in other studies such as the monosyllable PB lists and unselected disyllabic lists.
T. G. R 13

17,608
Anderson, F. AN EXPERIMENTAL PITCH INDICATOR FOR TRAINING DEAF SCHOLARS. J. acoust. Soc. Amer., Aug. 1960, 32(8), 1065-1074. (Electro-Acoustic Lab., School for the Deaf, Worcester, Union of South Africa).

17,608
The problems that must be met in teaching the severely deaf child to produce natural-sounding speech are discussed. An instrument for introducing informations about voice pitch and rhythm is described. The instrument extracts from the complex speech wave, as produced by pupil or teacher, information related to subjective pitch. The information is displayed on a long-persistence screen of a revolving crt in such a manner that a continuous graph of pitch versus time is obtained. The use of the machine in teaching and learning is described.

17,609
Beranek, L.L. AUDIENCE AND SEAT ABSORPTION IN LARGE HALLS. J. acoust. Soc. Amer., June 1960, 32(6), 661-670. (Bolt Beranek and Newman, Inc., Cambridge, Mass.).

17,609
From acoustical studies made in over 40 large concert halls and opera houses in 15 countries, absorption coefficients are derived for audience, chorus, and orchestra areas, unoccupied seating areas, plaster and wood walls. The postulate that the absorbing power of a seated audience, chorus, or orchestra is proportional to the floor area it occupies is validated for audience densities of between 4.5 and 8.5 square ft. per person, including aisles, and for halls with volumes between 200,000 and 1,500,000 cu. ft. Graphical relations between empty and fully occupied hall reverberation times are given; the effect of seat design on reverberation times is shown.
T. G. R 16

17,610
Rubin, H. AUDITORY FACILITATION FOLLOWING STIMULATION AT LOW INTENSITIES. J. acoust. Soc. Amer., June 1960, 32(6), 670-681. (Speech Dept., University of Pittsburgh, Pittsburgh, Penn.).

17,610
To investigate the dependence of auditory facilitation upon a number of parameters, shifts in threshold of three Ss were determined by comparing the reference threshold of a test pulse, presented alone, to the threshold for the test pulse preceded by a stimulating pulse. The variables for the stimulating pulse were duration (5 to 1,000 msec.), intensity (5 to 65 db), and frequency (1,000 cps and white noise, bandwidth 500 to 3,000 cps); for the test pulse, duration, and frequency (500 to 2,000 cps); and duration of interval between pulses (5 to 1,000 msec.). The nature of the facilitatory process, auditory or attentional, and its locus, peripheral or central, were discussed.
T. G. I. R 25

17,611
Woodhead, Muriel M. VALUE OF EAR DEFENDERS FOR MENTAL WORK DURING INTERMITTENT NOISE. J. acoust. Soc. Amer., June 1960, 32(6), 682-684. (Applied Psychology Research Unit, MRC, Cambridge, England).

17,611
To consider whether ear defenders have any real value for mental work in a moderately noisy environment, a simple form of decision-making task was performed by 48 Ss either with or without ear defenders. Two types of noise bursts were used (characterized by high and low frequencies); one burst of noise was introduced in each work period of four minutes. Performance on the task was evaluated for these conditions.
T. G. R 4

17,612
Harris, G.G. BINAURAL INTERACTIONS OF IMPULSIVE STIMULI AND PURE TONES. J. acoust. Soc. Amer., June 1960, 32(6), 685-692. (Bell Telephone Laboratories, Inc., Murray Hill, N.J.).

17,612
To investigate some physiological aspects of the timing information used in binaural lateralization, the time versus intensity trade in binaural lateralization was measured for pure tones and impulsive stimuli by the null method for high-pass and low-pass clicks at a repetition rate of 20 pulses per second and pure tones of 200, 500, and 700 cps. Mean sensation levels of 20, 30, and 40 db and interaural intensity differences of 0, 4, and 6 db were used. The data on four Ss were analyzed. On the basis of these results and from other findings in the literature, an interpretation was offered for the type of neural pathway used by such timing information.
G. I. R 14

17,613
Vanderhoof, Ellen R., Imig, C.J. & Hines, H.M. EFFECT OF MUSCLE STRENGTH AND ENDURANCE DEVELOPMENT ON BLOOD FLOW. J. appl. Physiol., Sept. 1961, 16(5), 873-877. (Department of Physiology, College of Medicine, State University of Iowa, Iowa City, Iowa).

17,613
To study peripheral vascular adjustments as a possible mechanism for improvement in work capacity with training, three groups of Ss were used. One group trained for strength development of handgrip force, another for endurance development of handgrip force, and the last were subjected only to testing procedures. At regular intervals blood flow was measured under resting conditions and following three different test exercise stresses (designed to test the functional capacity of the vascular bed). Strength and endurance scores were analyzed for changes due to training; blood flow data were treated similarly. The effect of exercise stress on blood flow response was noted.
T. G. R 7

17,614
Craig, A.B., Jr. CAUSES OF LOSS OF CONSCIOUSNESS DURING UNDERWATER SWIMMING. J. appl. Physiol., July 1961, 16(4), 583-586. (School of Medicine and Dentistry, University of Rochester, Rochester, N.Y.).

17,614
To investigate factors leading to unconsciousness during underwater swimming, Ss were asked to hold their breath for the maximal possible time under the following conditions: 1) at rest beginning from a normal respiration, 2) after a two-min. period of voluntary hyperventilation, 3) during mild exercise on a stationary bicycle, and 4) after hyperventilation and during exercise. At the breaking point the S made a maximal expiration and the end tidal air was analyzed for oxygen and carbon dioxide content. Some additional observations were made on Ss swimming underwater. An interpretation of the findings was offered.
T. G.

17,615
Issekutz, B., Jr. & Rodahl, K. RESPIRATORY QUOTIENT DURING EXERCISE. J. appl. Physiol., July 1961, 16(4), 606-610. (Research Div., Lankenau Hospital, Philadelphia, Penn.).

17,615
To gather information that would be useful in interpreting the work respiratory quotient (RQ), oxygen uptake and carbon dioxide output were determined on 19 men and eight women during exercise on the bicycle ergometer. Each S started with light work (300 or 450 kpm/min.) for a four- to five-min. period, rested 10 to 15 min., and worked at a heavier load (up to 1,500 kpm/min.) for the shorter period. Two periods of exercise each day were carried out until maximal oxygen uptake was reached. Continuous records of oxygen uptake and carbon dioxide output were made. The correct time course of RQ was calculated; excess (nonmetabolic) carbon dioxide was estimated. RQ data were analyzed in relation to these calculations.
T. G. R 26

17,616
MacCanon, D.M. & Eitzman, D.D. EFFECTS OF OXYGEN INHALATION ON RESPONSES TO COLD EXPOSURE. J. appl. Physiol., July 1961, 16(4), 627-632. (Division of Cardiology, Chicago Medical School, Chicago, Ill.).

17,616
The effects of oxygen inhalation on shivering and thermal and metabolic responses to exposure to cold (ten degrees C) were determined in ten healthy male Ss. All data were presented in tabular form and discussed with reference to the factors involved in the decrease of oxygen consumption found both here and in earlier studies.
T. R 12

17,617
Bullard, R.W. & Crise, J.R. EFFECTS OF CARBON DIOXIDE ON COLD-EXPOSED HUMAN SUBJECTS. J. appl. Physiol., July 1961, 16(4), 633-638. (Department of Physiology, Indiana University School of Medicine, Indianapolis, Ind.).

17,617
To assess the over-all effects of carbon dioxide excess on man's ability to regulate body temperature during acute cold exposure, six male Ss were exposed to an ambient temperature of five degrees C for 75-min. periods. During the exposure period various amounts of carbon dioxide (from 2.5 to 6 percent) were breathed for selected time periods. Skin and body temperatures, heart rate, shivering, thermal sensitivity, and respiratory measures were taken and analyzed in terms of carbon dioxide effects.
G. R 14

17,618
Ross, J.C., Maddock, G.E. & Ley, G.D. EFFECT OF PRESSURE SUIT INFLATION ON PULMONARY CAPILLARY BLOOD VOLUME. J. appl. Physiol., July 1961, 16(4), 674-678. (Medicine Dept., Indiana University School of Medicine, Indianapolis, Ind.).

17,618
The effect of pressure suit inflation on pulmonary diffusing capacity for carbon monoxide (DL) was studied in 12 Ss. Determinations of DL were also made at different alveolar oxygen tensions so that pulmonary capillary blood volume and the true pulmonary diffusing capacity could be calculated. Studies were made in each S with the suit on, uninflated, and then inflated. The data were studied in an effort to account for the factors involved in the increase in DL.
T. R 22

17,619
Wissler, E.H. STEADY-STATE TEMPERATURE DISTRIBUTION IN MAN. J. appl. Physiol., July 1961, 16(4), 734-740. (Department of Chemical Engineering, University of Texas, Austin, Tex.).

17,619
A steady-state mathematical model for the human heat transfer system is described. The following factors are included in the model: 1) the distribution of metabolic heat generation; 2) conduction of heat in tissue; 3) convection of heat by flowing blood; 4) loss of heat by radiation, convection, and evaporation at the surface; 5) loss of heat through the respiratory tract; and 6) countercurrent heat exchange between large arteries and veins. Derivation of the equations is presented. Computed results are compared with experimental results for the nude basal man.
T. G. I. R 5

17,620
Moncrieff, R.W. AN INSTRUMENT FOR MEASURING AND CLASSIFYING ODORS. J. appl. Physiol., July 1961, 16(4), 742-749.

17,620
The development of an instrument for simulating the natural olfactory process which also affords an objective means of detecting, estimating, and classifying odors is described. The basic process used is the adsorption of odorant materials on a sensitive surface in contact with a thermometric device. The instrument developed uses a film-coated thermistor. Some results are presented and the uses of the instrument are discussed.
T. G. I. R 19

17,621
Iampietro, P.F. PREDICTION OF SKIN TEMPERATURE OF MEN IN THE COLD. J. appl. Physiol., May 1961, 16 (3), 405-408. (USA Environmental Protection Research Div., QM Research & Engineering Center, Natick, Mass.).

17,621
In an effort to develop a method for predicting the physiological responses of man to a wide range of cold conditions, skin temperatures (11 points) of from 6 to 16 seminude men were measured during two-hour exposures to various combinations of air temperature (90 to 25 degrees F) and wind velocities (less than 1, 5, 10 mph). The data were used to derive an expression for the estimation of mean weighted skin temperature as a function of duration of exposure (up to 180 min.), air temperature (90 to -20 degrees F), and windsp[illegible]0 to 40 mph). A chart was presented for rapid estimation of skin temperature. The use of the prediction equation in practical conditions was discussed.
G. R 6

17,622
Suggs, C.W. & Splinter, W.E. SOME PHYSIOLOGICAL RESPONSES OF MAN TO WORKLOAD AND ENVIRONMENT. J. appl. Physiol., May 1961, 16(3), 413-420. (North Carolina State College, Raleigh, N.C.).

17,622
In order to describe mathematically various physiological responses to work load and environmental temperature, the following work was undertaken. The heart rate, ventilation rate, oxygen consumption rate, and mechanical efficiency responses of an S to a series of temperatures, relative humidities, and work loads were obtained. A quadratic prediction equation of each of the responses of steady-state functions of the independent variables was derived. Each of the equations represents a four-dimensional hypersurface; these surfaces were described and discussed. Heart rate responses of 19 Ss to work loads were obtained in a preliminary investigation.
T. G. R 17

17,623
Hock, R.J. EFFECT OF ALTITUDE ON ENDURANCE RUNNING OF PEROMYSCUS MANICULATUS. J. appl. Physiol., May 1961, 16(3), 435-438. (White Mountain Research Station, University of California, Big Pine, Calif.).

17,623
In order to ascertain whether the reduced partial pressure of oxygen at high altitudes restricts the physical activity of animals living in that environment, studies were made on the deer mouse. The subspecies used for the study was distributed from the floor of Death Valley at below sea level to the top of White Mountain peak (14,250 ft.). Endurance studies were made on two populations from 4,000 and 12,470 ft., respectively. Adult mice ran on a treadmill at a speed of 40 meters per min. and an inclination of 22.5 degrees. The mice were induced to run until they would no longer perform. Endurance times for the two groups were compared for significant differences.
T. G. R 18

17,624
Guedry, F.E., Jr. & Lauver, L.S. VESTIBULAR REACTIONS DURING PROLONGED CONSTANT ANGULAR ACCELERATION. J. appl. Physiol., March 1961, 16(2), 215-220. (USA Medical Research Lab., Fort Knox, Ky.).

17,624
To examine the velocity of the slow phase of nystagmus during the course of prolonged constant angular acceleration and to determine whether the time characteristics of any rise and decline correspond to the previously established time characteristics of subjective reaction, six Ss received stimuli of two degrees/sec.^{2} for 45 sec. and 1.5 degrees/sec.^{2} for 60 sec. Eye movements were recorded by the corneoretinal potential technique. The Ss were required to signal by a telegraph key the onset of rotation and, thereafter, each time he felt he had rotated through 90 degrees. Nystagmic reactions throughout its course, during and after acceleration, were compared with the subjective reactions over the same period. Theoretical implications of the findings were discussed. G. I. R 24

17,625
Slonim, A.R. EFFECTS OF RELATIVELY HIGH ACCELERATIONS ON SOME BIOLOGICAL SYSTEMS. J. appl. Physiol., March 1961, 16(2), 221-225. (USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio).

17,625
To explore possible causative mechanisms of the fatigue resulting from exposure to high accelerations, fasting male Ss were exposed to forward accelerations (12-degree headangle) at fatiguing levels varying both in amplitude and duration, nonfatiguing levels and mock runs, and to treadmill exercise. The following analyses were made: plasma bicarbonate, blood glucose, phosphorus and creatinine, urine creatinine, urine volume, urinalysis, and an estimate of creatinine clearance. Changes that occurred following each of the experimental conditions were analyzed and compared (real and mock acceleration, acceleration and exercise, and various acceleration intensities).
T. G. I. R 20

17,626
Heberling, E.J. & Adams, T. RELATION OF CHANGING LEVELS OF PHYSICAL FITNESS TO HUMAN COLD ACCLIMATIZATION. J. appl. Physiol., March 1961, 16(2), 226-230. (USAF Arctic Aeromedical Lab., Seattle, Wash. & Department of Physiology and Biophysics, University of Washington School of Medicine, Seattle, Wash.).

17,626
To determine the physiological effects of prolonged human exposure to cold in relation to changing levels of physical fitness, five nude men were exposed for one hour to a temperature of 10 degrees C in a cold chamber after 1) normal activity, 2) a physical training period, and 3) bivouac in the interior of Alaska for six weeks during January and February. During each phase of the program, physical fitness was determined by use of a treadmill. Body temperatures (hand, foot, trunk, skin, and rectal), recorded during exposure to acute cold, were the criteria by which the effects of the conditions were judged and compared. The findings were discussed in relation to cold acclimatization in man.
T. G. R 21

17,627
Davis, T.R.A. & Johnston, D.R. SEASONAL ACCLIMATIZATION TO COLD IN MAN. J. appl. Physiol., March 1961, 16(2), 231-234. (USA Medical Research Lab., Fort Knox, Ky.).

17,627
To determine whether or not cold acclimatization takes place in man as a result of seasonal climatic change, six Ss were measured once monthly from October to February for alterations in shivering, heat production, and rectal and skin temperatures produced by a standard cold exposure of 14.1 degrees C for one hour. The responses of a second group of five Ss were measured from February to September during a cold exposure of 13.7 degrees C. Patterns of change in the two groups were compared and judged with reference to the question of seasonally acquired acclimatization.
T. G. R 16

17,628
Veghte, J.H. & Webb, P. BODY COOLING AND RESPONSE TO HEAT. J. appl. Physiol., March 1961, 16(2), 235-238. (USAF Arctic Aeromedical Lab., Seattle, Wash.).

17,628
To study man's tolerance to a high level of heat stress after body cooling, five Ss were subjected to a 71-degree C environment 1) without prior cooling, 2) with prior cooling in a tank of 16-degree C water for varying lengths of time, and 3) with prior cooling by moving cool air over the skin with a special air-distributing garment. The endpoint of heat exposure was set when the S reached tolerance (impending heat stroke). Physiological measurements (continuous rectal and skin temperatures, mean body temperatures, and heat-storage rates) were analyzed for a discriminating criterion of tolerance time; tolerance times were compared for the experimental conditions of prior or no cooling.
G. R 14

17,629
Kreider, M.B. EFFECT OF DIET ON BODY TEMPERATURE DURING SLEEP IN THE COLD. J. appl. Physiol., March 1961, 16(2), 239-242. (USA Environmental Protection Research Div., QM Research & Engineering Center, Natick, Mass.).

17,629
To determine whether differences in body temperature of men sleeping in the cold would be apparent when they were fed different diets composed of similar caloric content, 13 young soldiers were divided into two groups. One group was fed a normal, high-fat, high-carbohydrate, and normal diet in the first, second, third, and fourth weeks respectively; the second group was fed a normal, high-carbohydrate, high-fat, and normal diet for the same periods. Measurements of skin (11 points) and rectal temperatures were made at 30-min. intervals throughout the night when the Ss were in sleeping bags at an ambient temperature of -30 degrees F. The results were compared with previous findings on effects of varying caloric content.
G. R 4

17,630
Reeves, J.T., Grover, R.F., Filley, G.F. & Blount, S.G., Jr. CARDIAC OUTPUT IN NORMAL RESTING MAN. J. appl. Physiol., March 1961, 16(2), 276-278. (University of Colorado Medical Center, Denver, Colo.).

17,630
To investigate the adequacy of the cardiac index (cardiac output/unit of body surface area) as a standard of normal blood flow, 63 measurements of cardiac output were made in 50 healthy, resting individuals (both male and female, ages 5 to 45 years) utilizing pulmonary arterial catheterization and the classical Fick method. Oxygen content of pulmonary and systemic arterial blood samples was determined by the Van Slyke and Neill method. The various relationships between cardiac output, oxygen uptake, and body surface area were examined.
G. R 29

17,631
Reeves, J.T., Grover, R.F., Filley, G.F. & Blount, S.G., Jr. CIRCULATORY CHANGES IN MAN DURING MILD SUPINE EXERCISE. J. appl. Physiol., March 1961, 16(2), 279-282. (University of Colorado Medical Center, Denver, Colo.).

17,631
To investigate the mechanisms of oxygen transport during rest and exercise for stepwise increments of oxygen uptake, cardiac output and femoral arteriovenous oxygen difference were measured in each of seven normal men at rest and during several stints of supine bicycle exercise. Exercise was at a constant rate for six min., followed by a period at rest; each successive stint was both more strenuous and more prolonged than the previous one. The data were analyzed for changes due to increasing metabolic demand.
T. G. R 16

17,632
Reeves, J.T., Grover, R.F., Blount, S.G., Jr. & Filley, G.F. CARDIAC OUTPUT RESPONSE TO STANDING AND TREADMILL WALKING. J. appl. Physiol., March 1961, 16(2), 283-288. (University of Colorado Medical Center, Denver, Colo.).

17,632
To evaluate the peripheral and central mechanisms of oxygen transport during standing and several grades of treadmill walking, cardiac output measurements during catheterization were obtained in normal Ss in both supine and upright postures and for treadmill walking. Femoral venous blood was sampled and the arteriovenous (A-V) oxygen difference for the exercising leg was obtained. Measurements of central and femoral A-V oxygen difference and total oxygen uptake were obtained for supine and upright positions. Changes in response due to posture were analyzed.
T. G. R 28

17,633
Froeb, H.F. VENTILATORY RESPONSE OF SCUBA DIVERS TO CO_2 INHALATIONS. J. appl. Physiol., Jan. 1961, 16(1), 8-10. (Scripps Clinic and Research Foundation, La Jolla, Calif.).

17,633
An investigation was undertaken to provide information in one animal species of the nature and degree of carbon dioxide effects on the convulsive and ultimately lethal properties of oxygen at high ambient temperatures. Mice were the experimental animals; gas was used as either 100 percent oxygen or as mixtures containing percentages of carbon dioxide ranging from 0.5 to 30 percent. Experiments were performed at 0, 2, 3, 4, 6, 8, and 10 atmospheres guage pressure or 1, 3, 5, 7, 9, and 11 atmospheres total pressure. A total of 38 conditions was studied. The moment of arrival at the desired pressure was used as the beginning point in timing periods preceding convulsion and death. The data were presented in tabular form.
T. G. R 22

17,634
Hornbein, T.F., Roos, A. & Griffo, Z.J. TRANSIENT EFFECT OF SUDDEN MILD HYPOXIA ON RESPIRATION. J. appl. Physiol., Jan. 1961, 16(1), 11-14. (Washington University School of Medicine, St. Louis, Mo.).

17,634
Recent studies of carotid body chemoreceptor activity in cats show that the activity of these organs increases over a range of oxygen tensions above the hypoxic ventilatory threshold. An attempt is made to explain the discrepancy between chemoreceptor activity by studying the transient ventilatory response to inhalation of two breaths of a low oxygen mixture. Observations of this response are correlated with the alveolar pO_2 during this brief hypoxic stimulus. Studies are also carried out on the same S to obtain his ventilatory response to anoxia during the steady state. Interpretations of the findings are offered.
T. G. I. R 9

17,635
Moreno, F. & Lyons, H.A. EFFECT OF BODY POSTURE ON LUNG VOLUMES. J. appl. Physiol., Jan. 1961, 16(1), 27-29. (Department of Medicine, Downstate Medical Center, State University of New York, Brooklyn, N.Y.).

17,635
To investigate those changes in the total lung capacity and its subdivisions resulting from the prone and supine body position, 20 normal Ss, 12 males and eight females, had determinations of total lung capacity in three body positions--sitting, prone, and supine. Tidal volume, minute ventilation, and oxygen consumption were also measured. Changes were determined by comparing prone and supine determinations with sitting determinations.
T. R 12

17,636
Dixon, M.E., Stewart, P.B., Mills, F.C., Varvis, C.J., et al. RESPIRATORY CONSEQUENCES OF PASSIVE BODY MOVEMENT. J. appl. Physiol., Jan. 1961, 16(1), 30-34. (Royal Victoria Hospital, Montreal, Quebec, Canada).

17,636
To explore the possibility that the phenomenon of hyperventilation which has been recorded in pilots flying high-velocity low-level aircraft might be caused by passive body movements due to jolting, the respiratory consequences of a number of passive body movements were investigated in a group of normal Ss. A commercially made exercise machine, consisting of seat, handlebars, and pedals, was modified so that various combinations of body movement could be produced in both sitting and supine position. Minute volume, oxygen uptake, alveolar ventilation equivalent, and alveolar oxygen tension were presented and discussed in relation to the hyperventilation problem.
T. I. R 5

17,637
Elbel, E.R., Ormond, D. & Close, D. SOME EFFECTS OF BREATHING OXYGEN BEFORE AND AFTER EXERCISE. J. appl. Physiol., Jan. 1961, 16(1), 48-52. (Physiology of Exercise Lab., University of Kansas, Lawrence, Kan.).

17,637
To determine whether or not the breathing of 100 percent oxygen would facilitate recovery from exercise and what effect it would have if used before exercise, athletes in better than average physical condition were used as Ss. They were required to breath 100 percent oxygen during six min. at rest, air during five min. of treadmill running at eight mph, and oxygen again during 19 min. of recovery. The results were compared with a control procedure in which the same Ss breathed air throughout. Measurements included pulse rate, percentage of oxygen saturation of blood hemoglobin, respiratory rate, and oxygen debt payment during recovery period.
T. G. R 13

17,638
Brouha, L., Smith, P.E., Jr., De Lanne, R. & Maxfield, M.E. PHYSIOLOGICAL REACTIONS OF MEN AND WOMEN DURING MUSCULAR ACTIVITY AND RECOVERY IN VARIOUS ENVIRONMENTS. J. appl. Physiol., Jan. 1961, 16(1), 133-140. (Haskell Laboratory for Toxicology and Industrial Medicine, E.I. du Pont de Nemours and Co., Inc., Wilmington, Del.).

17,638
To investigate the qualitative and quantitative variations in physiological functions of men and women subjected to strictly controlled stressing factors of muscular exercise and environmental heat, six men and five women performing a standard exercise were studied in three environments--normal, warm-dry, and warm-humid. The exercise consisted of pedaling a magnetic brake bicycle ergometer in time to a metronome at the rate of 60 rpm for 34 min., first at a submaximal work rate for 30 min., then without interruption at a maximal rate for four min. or exhaustion. Various respiratory and cardiovascular measurements were made and compared for the two groups.
T. G. R 15

17,639
Heitinger, T., Birkhead, N.C., Horvath, S.M., Issekutz, B., Jr., et al. ASSESSMENT OF PHYSICAL WORK CAPACITY. J. appl. Physiol., Jan. 1961, 16(1), 153-156. (Research Div., Lankenau Hospital, Philadelphia, Penn.).

17,639
In a search for a simple test of physical work capacity or physical fitness, maximal oxygen uptakes were compared with the results from five different tests of physical work capacity in 96 men (23 to 62 years of age). In addition, the "predicted" maximal uptakes, according to the Astrand-Rhyming nomogram, were compared with the actual measured values in 28 Ss between 20 and 30 years of age. The data were compared using correlational measures.
T. G. R 16

17,640
Ikai, M. & Steinhaus, A.H. SOME FACTORS MODIFYING THE EXPRESSION OF HUMAN STRENGTH. J. appl. Physiol., Jan. 1961, 16(1), 157-163. (Laboratory for Physiologic Research in Physical Education, George Williams College, Chicago, Ill.).

17,640
To throw light on the mechanism that determines the psychologic limits of muscle strength and how this limit is changed, the maximal pull of forearm flexors were measured under varied conditions. Ten Ss were studied in all conditions with 15 additional Ss in some of the conditions. The first condition was a control wherein the 10 Ss exerted maximal forearm flexion once a min. for 30 min. In other conditions various interventions were used: unexpected shot or shout, requirement of Ss to shout as they pulled, hypnosis used to increase efforts, alcohol and drugs. Changes in maximal pull data were obtained by comparison with the control condition. An interpretation of the findings was presented.
T. G. R 10

17,641
Sloan, A.W. EFFECT OF TRAINING ON PHYSICAL FITNESS OF WOMEN STUDENTS. J. appl. Physiol., Jan. 1961, 16(1), 167-169. (Department of Physiology, University of Cape Town, Cape Town, South Africa).

17,641
To ascertain the effect of regular physical training on the physical fitness of young women, four groups, undergoing different degrees of training, were tested on a modified Harvard step test at the beginning of the academic year and again four and nine months later. One group, specializing in physical education, had a very active program of gymnastics, dancing, and games; two other groups had only one 40-min. period of gymnastics each week; a fourth group had no physical training. Physical fitness index and resting pulse rate were compared for the effect of training.
T. R 20

17,642
Cavagna, G., Saibene, F. & Margaria, R. A THREE-DIRECTIONAL ACCELEROMETER FOR ANALYZING BODY MOVEMENTS. J. appl. Physiol., Jan. 1961, 16(1), p.191. (Istituto di Fisiologia, Universita di Milano, Milano, Italy).

17,642
A three-directional accelerometer, devised to investigate and analyze detailed movements in sports medicine, is described. A record of the acceleration components in the forward, lateral, and vertical directions obtained during walking is shown.
G. I.

17,643
Rytov, S.M. WHAT AN ASTRONAUT WILL SEE AND ENCOUNTER WHEN FLYING AT A SPEED APPROACHING THAT OF LIGHT. ARS J., May 1961, 31(5), 678-681.

17,643
In this article, the assumption is made that a relativistic interstellar space ship has been developed. The surrounding world is then looked at through the eyes of the passenger of such a ship drawing upon the physics of elementary particles. The following aspects of the environment are discussed: view of the celestial sphere (position and color of the stars), distortion of form of a passing star, and relativistic dust and wind. Problems that must be met, particularly in this last area, in order for a ship to survive are mentioned.
I. R 3

17,644
Goodman, B.D. PSYCHOLOGICAL AND SOCIAL PROBLEMS OF MAN IN SPACE--A LITERATURE SURVEY. ARS J., July 1961, 31(7), 863-872. (System Development Corp., Santa Monica, Calif.).

17,644
This annotated bibliography includes reports, books, and periodical articles published through the early part of 1961 which deal with the specific area of behavioral science related to space flight. This area includes problems of confinement, isolation, sensory deprivation, weightlessness, psychological assessment and training, motivation and morale, emotional stability, boredom and fatigue, performance under stress, and work load.
R 159

17,645
Ettelson, B.L., Cooper, W.N., Beaupre, Merle A., Freedman, Toby, et al. INTERNAL ANIMAL TELEMETRY: A FEASIBILITY TEST PROGRAM. ARS J., Sept. 1961, 31 (9), 1190-1195. (Spacelabs, Inc., Van Nuys, Calif.).

17,645
An improved method of animal instrumentation is described. The method uses an implanted sensor and telemeter to allow transmission of physiological data from unencumbered, intact, test animals to a receiver-signal conditioner for subsequent air to ground telemetry. To explore further the potential advantages of this system in high stress situations, a single physiological parameter is transmitted through the intact skin of an internally instrumented simian under combined environmental conditions on a centrifuge.
G. I. R 1

17,646
Wolbers, H.L. RECENT DEVELOPMENTS IN BIO-MEDICAL INSTRUMENTATION. ARS J., Oct. 1961, 31(10), 1422-1428. (Douglas Aircraft Company, Inc., El Segundo, Calif.).

17,646
New techniques of sensing and analyzing physiological changes in human Ss were considered. Bioelectronic recording techniques that were developed to record physiological and psychological changes with stress as supplementary to work output changes were described. "Mini sensors" combining the sensing device, signal amplification stages, and an FM transmitter were developed and used to transmit physiological changes over a distance of 50 ft. or more. The possible uses of the system in other situations were discussed. Improvements possible in the data analytic methods were illustrated by applying the techniques used in detecting and classifying sonar returns to EKG recordings.
G. I. R 11

17,647
Chambers, R.M. & Nelson, J.G. PILOT PERFORMANCE CAPABILITIES DURING CENTRIFUGE SIMULATIONS OF BOOST AND RE-ENTRY. ARS J., Nov. 1961, 31(11), 1534-1541. (USN Aviation Medical Acceleration Lab., Johnsville, Penn.).

17,647
One part of a human factors research effort that has been concerned with the human performance capabilities of pilots during accelerations experienced during boost, orbit, and re-entry rocket flight trajectories is summarized. Ss are 38 men who collectively receive over 2,600 closed loop centrifuge exposures. Some of the conclusions reached are formulated as general principles dealing with areas of: 1) performance tolerance, 2) practice effects, 3) restraint system, 4) individual differences, 5) control system, 6) control feedback, 7) task difficulty level, 8) display characteristics, and 9) higher mental processes. Other research needs are noted.
T. G. I. R 7

17,648
Welch, B.E., Morgan, T.E. Jr. & Ulvedal, F. SEALED CABIN EXPERIMENTATION. ARS J., [illegible] 1961 31(11), 1541-1544. (USAF School of Aerospace Medicine, Brooks AFB, Tex.).

17,648
To obtain logistic data needed in the design and development of a manned space vehicle, four separate experiments in a two-man space cabin simulator were performed. The experiments lasted for 14, 17, 30, and 30 days at altitudes of 18,000, 33,500, 18,000, and 18,000 ft. respectively. Food was supplied in a precooked dehydrated form. Water requirements were met by stored supplies in the 14-day flight and by both stored and recycled water in the other flights. Average energy intake data and a summary of water data were presented.
T. I. R 3

17,649
Smedal, H.A., Vykukal, H.C., Gallant, R.P. & Stinnett, G.W. CREW PHYSICAL SUPPORT AND RESTRAINT IN ADVANCED MANNED FLIGHT SYSTEMS. ARS J., Nov. 1961, 31(11), 1544-1548. (Ames Research Center, Moffett Field, Calif.).

17,649
A new concept in physical support and restraint for pilots and crews of motion flight simulators or advanced manned flight vehicles is described. This concept is developed on the principle of a wear-in restraint that is easily attached to or released from the support structure, which is part of the vehicle. Its capability as a functional support and restraint during sustained accelerations was established by its use in three human centrifuge systems, but its capability for tolerance to impact accelerations is unproved. Further development and testing are discussed.
I. R 9

17,650
Watanabe, S. INFORMATION THEORETICAL ANALYSIS OF MULTIVARIATE CORRELATION. IBM J. res. Develop., Jan. 1960, 4(1), 66-82. (Electrical Communication Lab., Nippon Telegraph and Telephone Public Corporation, Tokyo, Japan).

17,650
The use of information quantities in analysis of multivariate correlation is discussed. General consideration is given to correlation where symmetries among the variables do not necessarily exist. At the same time, cases where symmetries do exist are discussed as special cases. Several new theorems are introduced and proven. Two problems are discussed as illustrations: 1) redundancy in geometrical figures in pattern recognition, and 2) randomization effect of shuffling cards marked "zero" or "one."
G. I. R 14

17,651
Dantzig, G.B. INDUCTIVE PROOF OF THE SIMPLEX METHOD. IBM J. res. Develop., Nov. 1960, 4(5), 505-506. (Rand Corporation, Santa Monica, Calif.).

17,651
A new proof of the existence of an optimal basis in the simplex method based on induction is presented. Such a basis, as opposed to the customary proof based on perturbation of the constant terms, permits an earlier and more elementary proof of the fundamental duality theorem by way of the simplex method. It is shown that there exists a finite chain of feasible basis changes, which results in either an optimal feasible solution or in an infinite class of feasible solutions such that the objective form tends to minus infinity.
R 2

17,652
Clamann, H.G. HOW TO ADAPT BIO-EXPERIMENTS TO SPACE PROBES. Space Aeronautics, April 1961, 35(4), 73-77. (USAF School of Aviation Medicine, Brooks AFB, Tex.).

17,652
A discussion of the use of having biological specimens in space experimentation is presented. Criteria for specimens best suited to a given space probe are presented and illustrated by describing the use of three mice aboard the recoverable nose cone on an Atlas missile. The biopack design, life-cell atmosphere, recording equipment, and some results are reported.
G. I.

17,653
Frazier, J. ELECTROLUMINESCENT LAMPS FOR BETTER COCKPIT INDICATORS. Space Aeronautics, April 1961, 35(4), 147-158. (Instrument Dept., General Electric Co., West Lynn, Mass.).

17,653
The electroluminescent lamp, basically a capacitor with phosphor crystal embedded in its dielectric matrix, is considered for use in cockpit instrument lighting. Brightness, color, and contrast design factors are shown to be compatible with the characteristics of the lamp. Also discussed are the advantages of this type of lamp over the incandescent source now used in integral lighting systems; these include: ease of color coding (by using different phosphors), less space required, less power needed (reducing serious heat-rise problems), uniform brightness on indicators, more flexibility in design of characters for maximum legibility, and lower operating cost. The mechanics of the phenomenon of electroluminescence and its application in lighting are described. G. I.

17,654
Hawthorne, R. DO WE STILL NEED MANNED BOMBERS? Space Aeronautics, Sept. 1961, 36(3), 52-55.

17,654
An analysis of arguments for and against the manned bomber, the B-70, was presented. The basis for the analysis was interviews with men who are actually fighting the battle in the USAF and Office of Secretary of Defense and on records of congressional testimony. Questions discussed were: 1) how flexible is an ICBM force? 2) how much human judgment is needed in a nuclear war? 3) is an ICBM force another Maginot Line? 4) what does the defense against Mach 3 bombers cost? 5) how much does it take to scare the enemy? 6) can the B-70 get through the enemy's defense? and 7) what happens if atomic weapons are outlawed?

17,655
Space Aeronautics. CONTROL AND DISPLAY SYSTEM FOR PROJECT MERCURY. Space Aeronautics, Sept. 1961, 36 (3), 198-199. (Conover-Mast Publications, Inc., New York, N.Y.).

17,655
The operations control center at Cape Canaveral for the Mercury project is described. Sources of data, types of display, and duties of operations personnel are outlined.
I.

17,656
Romaine, O. SPACE AND LUNAR SUPPORT. Space Aeronautics, Nov. 1961, (Part 2), 14-18.

17,656
Problems of support for various types of space flight are discussed. Inflight support includes internal activities (maintenance, repair, test and checkout of vehicle systems, and bionic evaluation of the crew) and external activities (servicing and repair of a vehicle's structure and exterior equipment; maintenance of unmanned satellites; assembly of space stations; storage and transfer of propellants; and some aspects of rescue, retrieval, and ferry operations). Illustrative handtools, miniature spacecrafts for use in making repairs, unvented space propellant storage systems, and travel systems on moon surface are proposed and discussed.
G. I.

17,657
Kovit, B. RANGE SUPPORT. Space Aeronautics, Nov. 1961, (Part 2), 25-31.

17,657
The present range support systems for space flights (both Atlantic and Pacific missile ranges) are discussed. From the network of trackers, telemetry, and communications, data are collected for processing; problems in these areas of collection and processing of data are considered here. Real-time data processing, better instrumentation, synchronous versus nonsynchronous computer processing are discussed.
T. I. R 38

17,658
Bugelski, B.R. & Alampay, Delia A. THE ROLE OF FREQUENCY IN DEVELOPING PERCEPTUAL SETS. Canad. J. Psychol., Dec. 1961, 15(4), 205-211. (University of Buffalo, Buffalo, N.Y. & Far Eastern University, Manila, Philippines).

17,658
The possible relation between strength of a set and frequency of set-inducing experiences was examined. Twelve groups of Ss participated. They first were given one of two set-inducing experiences of varying degree by inspecting 1, 2, 3, or 4 pictures of humans or animals; next without pause they inspected the ambiguous figure, then without pause six human or animal figures, and again the ambiguous figure. In each case the second group of figures was the opposite of the first, i.e., animals followed by humans and vice versa. The results were evaluated and considered in terms of a perceptual versus cognitive approach.
T. I. R 8

17,659
Cohen, H.B. THE EFFECT OF CONTRALATERAL VISUAL STIMULATION ON VISIBILITY WITH STABILIZED RETINAL IMAGES. Canad. J. Psychol., Dec. 1961, 15(4), 212-219. (McGill University, Montreal, Quebec, Canada).

17,659
To obtain detailed information on the manner in which stimulation of the contralateral retina affects the visibility of the stabilized image, two experiments were done. In I, S viewed a stabilized image with the right eye (fitted with contact lens) and patterned light, diffused light, or no light with the left. S pressed a microswitch each time the image disappeared and released it when the image reappeared. In II, other left-eye conditions examined were an unstabilized image identical to the stabilized image (thin black line) presented at three apparent distances from the stabilized one. Five eye movement recordings of each condition were made for each of the two Ss. Results were examined by a trend analysis of variance and explained in terms of neural interaction in the visual cortex. T. G. ... R 18

17,660
Bryden, M.P. THE ROLE OF POST-EXPOSURAL EYE MOVEMENTS IN TACHISTOSCOPIC PERCEPTION. Canad. J. Psychol., Dec. 1961, 15(4), 220-225. (McGill University, Montreal, Quebec, Canada).

17,660
This study investigated "the relation between the recognition of tachistoscopically presented material and the direction of postexposural eye movements." Five Ss participated; eye movements were recorded by means of a special tight contact lens individually fitted. S viewed two types of stimuli: a row of six capital letters and a row of six familiar geometrical forms. He then reported what he had seen. The eye movements varied in type (rapid, drift), direction, and magnitude. Product-moment correlations were computed on these data for each S.
T.

17,661
Gollin, E.S. TACTUAL FORM DISCRIMINATION: DEVELOPMENTAL DIFFERENCES IN THE EFFECTS OF TRAINING UNDER CONDITIONS OF SPATIAL INTERFERENCE. J. Psychol., Jan. 1961, 51(First Half), 131-140. (Psychology Dept., Queens College, Flushing, N.Y.).

17,661
Two experiments were conducted. The first compared the performance on a tactual discrimination task under conditions of interference of three age levels of Ss (7, 10 years, adults), half having been trained on the task without interference and half having had no preliminary training. In the second experiment, performance on the same task was compared when additional Ss of the younger age levels were trained with interferents and without interferents. For both experiments the task was to make judgments of same or different after examining the standard and comparison forms. All scores were examined by analyses of variance. The results were discussed in terms of differences in perception due to developmental period.
T. I. R 3

17,662
Dietze, A.G. KINAESTHETIC DISCRIMINATION: THE DIFFERENCE LIMEN FOR FINGER SPAN. J. Psychol., Jan. 1961, 51(First Half), 165-168. (Psychology Dept., Michigan State University, East Lansing, Mich.).

17,662
Kinesthetic space perception in the form of finger span judgments was tested using the method of constant stimuli. Eleven Ss participated. Three series of eight stimuli each were tested with standards of 50, 30, and 10 mm; each S thus made 400 judgments around each standard. Probable error, constant error, and Weber fractions were determined for the three standards; a one-tailed test of significance was used to evaluate the constant errors.
T. R 4

17,663
Wendt, G.R. & Cameron, Jean S. CHEMICAL STUDIES OF BEHAVIOR: V. PROCEDURES IN DRUG EXPERIMENTATION WITH COLLEGE STUDENTS. J. Psychol., Jan. 1961, 51(First Half), 173-211. (Psychology Dept., University of Rochester, Rochester, N.Y.).

17,663
This is a detailed presentation of procedures developed over a period of years for use of college students as drug Ss. The major areas covered include the authors' research philosophy, the choice of experimental setting, steps in the conduct of an experiment, and description of the experimental sessions. "These procedures have yielded sensitive measures of drug-induced changes in mood, emotion, and motivation, and have avoided legal and public relations problems."
T. R 10

17,664
Comalli, P.E., Jr. STUDIES IN PHYSIOGNOMIC PERCEPTION: VI. DIFFERENTIAL EFFECTS OF DIRECTIONAL DYNAMICS OF PICTURED OBJECTS ON REAL AND APPARENT MOTION IN ARTISTS AND CHEMISTS. J. Psychol., Jan. 1960, 49(First Half), 99-109. (Psychology Dept., Clark University, Worcester, Mass.).

17,664
The effect of directional dynamics on 1) the apparent speed of moving pictorial objects, and 2) the autokinetic motion of pictorial objects was examined for artists versus chemists; the hypothesis was that artists should be more greatly affected by physiognomic qualities than scientists. Ss were 16 students each in art and chemistry. For the first part, S adjusted the movement of each of three stimulus pairs (one static, one dynamic) until they appeared equal. For the second part, S reported the first sign of movement when viewing each of three dynamic figures and for 30 sec. thereafter reported direction continuously. Results from both parts were tested by analyses of variance.
T. I. R 9

17,665
Nogee, P. & Lieberman, B. THE AUCTION VALUE OF CERTAIN RISKY SITUATIONS. J. Psychol., April 1960, 49 (Second Half), 167-179. (Social Relations Dept., Harvard University, Cambridge, Mass.).

17,665
Three studies were conducted to obtain measures of psychological probability under various mathematical probability conditions. Ss were 40 psychiatric aides, some of whom took part in each study. The general experimental procedure was a game in which bets, each with a given probability of winning or losing and an amount of reward or forfeit, were auctioned off to pairs of Ss. The measures of psychological probability as compared to the objective probabilities for the different situations were discussed and related to previous findings.
T. G. R 10

17,666
Bartley, S.H. & Nelson, T.M. A COMPARISON OF THREE RATES OF PULSE ONSET AND DECLINE IN PRODUCING CRITICAL FLICKER FREQUENCY. J. Psychol., April 1960, 49(Second Half), 185-194. (Psychology Dept., Michigan State University, East Lansing, Mich.).

17,666
The problem studied here was procedural: to determine how rate of pulse onset and pulse decline affects the cff. Two observers participated. Determinations of cff were made for a target 0.8 degrees by 1 degree with the following conditions varied: number of open sectors (1, 2, 3); ratio between open and closed sectors (one-fourth, one-half, three-fourths); and target intensity level (.014 cycles/ft.^{2} to 1,400 cycles/ft.^{2} in log steps). The results were considered briefly in terms of intervening body processes. This study was part of an extensive investigation on the relation between photic impingements, photochemical and neural processes, and sensory outcomes.
T. G. I. R 11

17,667
Meade, R.D. TIME PERCEPTIONS AS AFFECTED BY NEED TENSION. J. Psychol., April 1960, 49(Second Half), 249-253. (Psychology Dept., Trinity College, Hartford, Conn.).

17,667
The estimations of time under conditions of high and low need tension were compared. In one experiment, 60 Ss worked on wooden block puzzles for five min. under each tension condition (counterbalanced order). In the second experiment, 30 Ss worked on the puzzle for five min. under high tension only and 30 Ss worked under low tension only. The time estimates were evaluated by t-tests. The findings were compared to an earlier study and a new interpretation was offered.
T. R 4

17,668
Flores, I. METHODS FOR COMPARING THE LEGIBILITY OF PRINTED NUMERALS. J. Psychol., July 1960, 50(First Half), 3-14. (Dunlap and Associates, Inc., Stamford, Conn.).

17,668
Two tests for comparing legibility of printed numerals are described and applied: one is highly sensitive for relative rating of styles of characters; the second is practical and simulates the actual environment in which the characters will be read. The first test uses conditions of marginal illumination and observation time (ten msec.); the second uses adequate presentation conditions and limited judgment time. In both, five type fonts are compared: Gothic, Air Force, Stanford Research, experimental, and Park Avenue. The results are evaluated by analyses of variance and t-tests.
T. I. R 6

17,669
Lebo, Dell & Bruce, Roselyn S. PROJECTIVE METHODS RECOMMENDED FOR USE WITH THE BLIND. J. Psychol., July 1960, 50(First Half), 15-38. (Jacksonville Child Guidance and Speech Correction Clinic, Jacksonville, Fla.).

17,669
This paper presents and discusses in detail projective methods suitable for psychological examination of the blind or partially sighted and evaluates the field in general, indicating weaknesses and suggesting a long range research program. About 20 such tests are described; they are categorized as follows: auditory-stimuli read, auditory-stimuli recorded, tactile-three dimensional, and tactile-creative and expressive. Some specific problems and weaknesses which are considered include test reliability, test title designation, and test scoring systems.
R 69

17,670
Gogel, W.C. PERCEIVED FRONTAL SIZE AS A DETERMINER OF PERCEIVED BINOCULAR DEPTH. J. Psychol., July 1960, 50 (First Half), 119-132. (USA Medical Research Lab., Fort Knox, Ky.).

17,670
The process by which a binocular disparity is translated into a perceived depth interval was studied. Two groups of 18 male Ss, visual acuity at least 210 sec. of arc, observed the apparent distances of some objects (one group saw two equidistant normal playing cards and a ring located behind; the other group saw the same but the playing cards were double in size), threw darts to these distances, and made verbal estimates of these distances. Appropriate practice and calibration sessions preceded testing. Means and standard deviations of the throwing scores and distance estimates were computed. These data were analyzed by t-tests and the latter also by the Mann-Whitney U test.
T. I. R 6

17,671
Edwards, A.E. SUBLIMINAL TACHISTOSCOPIC PERCEPTION AS A FUNCTION OF THRESHOLD METHOD. J. Psychol., July 1960, 50(First Half), 139-144. (University of California, Los Angeles, Calif. & US Veterans Administration Hospital, Los Angeles, Calif.).

17,671
This study demonstrated the relationships between different methods of establishing thresholds for tachistoscopically presented words, the methods representing a "continuum" from verbal response to recognition. Seventeen Ss responded to 82 words by each of three methods: free verbalizing, discerning guess, and multiple choice. The sensitivity of the different methods was related to the subliminal perception problem.
T. R 6

17,672
Meade, R.D. TIME ESTIMATES AS AFFECTED BY NEED TENSION AND RATE OF PROGRESS. J. Psychol., July 1960, 50(First Half), 173-178. (Psychology Dept., Trinity College, Hartford, Conn.).

17,672
This study tested the effects of need tension and rate of progress on time estimates. Four groups of 12 males performed wooden block puzzles under one of two levels of need tension or one of two rates of progress, all being brought about through instructions given before or during the task. S had to estimate time spent on puzzle using as a standard a pre-experimental reading period. Mean time estimates as a function of experimental condition were evaluated by analysis of variance.
T. R 5

17,673
Gogel, W.C. THE PERCEPTION OF SHAPE FROM BINOCULAR DISPARITY CUES. J. Psychol., July 1960, 50(First Half), 179-192. (Psychology Div., USA Medical Research Lab., Fort Knox, Ky.).

17,673
Some aspects of the perceived shape of binocularly observed three dimensional objects were studied as a function of their distance from the observer. Eighteen Ss observed a rectangle located at each of three distances (5.25, 10.5, and 15.75 ft.), and a disc, and made two types of adjustments of the disc: to duplicate the distance of the rectangle and to duplicate the frontal extent of the rectangle. The results were evaluated statistically by computations of r and t, and discussed theoretically in terms of a position which emphasizes the significance of the relational characteristics of retinal stimuli.
T. G. I. R 6

17,674
Spigel, I.M. THE EFFECTS OF DIFFERENTIAL POSTEXPOSURE ILLUMINATION TO THE DECAY OF A MOVEMENT AFTER-EFFECT. J. Psychol., Oct. 1960, 50(Second Half), 209-210. (Psychology Dept., Temple University, Philadelphia, Penn.).

17,674
A pilot study was reported which had examined the effects of two postexposure illumination conditions on the decay rate of a movement aftereffect. Ten male Ss observed a rotating spiral (200 rpm) for 30 sec., then under the same illumination reported when the aftereffect had ceased. In the second series of ten trials, S's observation was followed by a period of darkness equal to his average decay time, which in turn was followed by the original room illumination. The decay times were evaluated by a t-test. Further research was indicated.

17,675
Gogel, W.C. THE PERCEPTION OF DEPTH INTERVAL WITH BINOCULAR DISPARITY CUES. J. Psychol., Oct. 1960, 50(Second Half), 257-269. (USA Medical Research Lab., Fort Knox, Ky.).

17,675
The problem was to determine how the perceived size of a depth interval varies as a function of both the distance of the interval from the observer and the magnitude of the binocular disparity. Twelve Ss made depth and frontal size judgments: S adjusted the distance between two objects at each of three distances until it appeared equal to that of the standard interval, 580 sec. of arc; S specified when the distance between two objects appeared to be the same as the width of a rectangle placed at each of three distances--12, 18, or 24 ft. The results were considered in terms of a theoretical viewpoint which gave emphasis to an observer constant and the amount of frontal size constancy.
T. G. I. R 14

17,676
Krampen, M. & Toch, H.H. THE DETERMINATION OF PERCEIVED MOVEMENT DIRECTION. J. Psychol., Oct. 1960, 50(Second Half), 271-278. (Psychology Dept., Michigan State University, East Lansing, Mich.).

17,676
The role of directional connotation in the perception of arrows and arrowlike figures was explored. Sixty-eight Ss participated; they observed one of two series of stimulus figures which varied in the amount of "arrowness" in their design, one series possessing tails, the other possessing heads. S reported the direction of movement immediately after presentation. The results were evaluated by chi-square for the following factors: direction the stimulus "pointed to," order of stimulus presentation, and type of arrow design. These findings also were considered in terms of set.
T. I. R 2

17,677
Hawkes, G.R. AN EVALUATION OF THE MAGNITUDE ESTIMATION TECHNIQUE. J. Psychol., Oct. 1960, 50(Second Half), 303-314. (Psychology Div., USA Medical Research Lab., Fort Knox, Ky.).

17,677
The method of magnitude estimation was evaluated for electrical cutaneous data obtained with the following experimental variables: set, area of stimulation, duration of stimulation, density of innervation, and momentary sensitivity of the receptor(s). Accordingly, five experiments were conducted. Ten Ss made estimates of intensity and area for each of ten stimuli. For each variable tested, median estimates were plotted and fitted by the Method of Least Squares. The differences in the resultant slope exponents were evaluated by t-tests.
G. R 12

17,678
Bartley, S.H. & DeHardt, Doris C. PHENOMENAL DISTANCE IN SCENES WITH INDEPENDENT MANIPULATION OF MAJOR AND MINOR ITEMS. J. Psychol., Oct. 1960, 50(Second Half), 315-322. (Psychology Dept., Michigan State University, East Lansing, Mich.).

17,678
The effects of the asymmetry of the background in determining the perceived distance of the target item in an outdoor scene were studied. Ten Ss participated; all met the 20/30 acuity criterion. S observed the artifical scene monocularly and adjusted the metric distance of the large print of the scene so the target appeared equidistant to the target in the small print of the same scene. The variables tested in different combinations were: target position (right, left, center); tree position, i.e., background item (right, left); and size of target (small, large). The results were examined by Friedman two-way analysis of variance technique and matched-pairs t-tests.
G. I. R 6

17,679
Bartley, S.H. & Nelson, T.M. CERTAIN CHROMATIC AND BRIGHTNESS CHANGES ASSOCIATED WITH RATE OF INTERMITTENCY OF PHOTO STIMULATION. J. Psychol., Oct. 1960, 50(Second Half), 323-332. (Psychology Dept., Michigan State University, East Lansing, Mich.).

17,679
The role of intermittency rate in changing the chromatic and brightness characteristics of a stimulus was examined. For each of five stimulus colors, two observers varied the intermittency rate upwards and noted the following changes for color and brightness: first change, maximum, terminal below cff, above cff. The results were discussed in terms of neurophysiological findings, specifically the temporal characteristics of neural discharges.
T. R 9

17,680
Edgington, E.S. NONLINEARLY RELATED MEASUREMENT SCALES. J. Psychol., Oct. 1960, 50(Second Half), 399-402. (Kansas State Teachers College, Emporia, Kan.).

17,680
The problem of selecting a measurement scale is considered when two or more nonlinearly related scales are alternatives. Examples are presented which demonstrate how consistent statistical conclusions may be reached in such situations.
T. R 1

17,681
Hawkes, G.R. & Warm, J.S. T FOR ELECTRICAL CUTANEOUS STIMULATION. J. Psychol., April 1961, 51(Second Half), 263-271. (Psychology Div., USA Medical Research Lab., Fort Knox, Ky.).

17,681
Differential discrimination of the duration of electrical cutaneous stimulation was examined as a function of intensity and duration of the standard and onset-offset rate and time. Two highly trained Ss observed; the Method of Limits was employed. The stimulus variables were: intensity—120, 160, 200 percent of the right angle current value; duration—.5, 1.0, 1.5 sec.; and onset condition—onset-offset time equated, rate of onset or offset equated. The differential thresholds were examined by analysis of variance technique for both onset conditions. The findings were discussed in terms of the "integrated intensity" theory of Holway and Hurvich.
T. G. R 15

17,682
Hawkes, G.R. INFORMATION TRANSMITTED VIA ELECTRICAL CUTANEOUS STIMULUS DURATION. J. Psychol., April 1961, 51(Second Half), 293-298. (Psychology Div., USA Medical Research Lab., Fort Knox, Ky.).

17,682
This study was undertaken to determine the number of possible absolute identifications of electrical cutaneous stimulus durations and the channel capacity for such identifications. Twelve Ss participated; half made the identifications with stimuli spaced an equal number of j.n.d.'s apart (Group 1), and half made the identifications with the stimuli spaced by apparent subjective duration based on direct estimation data (Group 2). Stimulus durations ranged from .5 to 1.5 sec.; stimulus intensity was always 6 db; and the number of stimulus durations to identify was 3, 4, 5, and 6. The amount of information transmitted as a function of number of stimulus durations for one group was evaluated by a t-test. Also, amount of information transmitted by S was evaluated. T. G. R 10

17,683
Fillenbaum, S. SOME CONSEQUENCES FOR JUDGMENT OF MANIPULATION OF THE STIMULUS DISTRIBUTION. J. Psychol., April 1961, 51(Second Half), 307-317. (Psychology Dept., University of North Carolina, Chapel Hill, N.C.).

17,683
"Two experiments were conducted to test some implications of rather different conceptions of the judgment process, viz. adaptation level (AL) theory which stresses the importance of a neutral reference level in the making of judgments and the end anchor hypothesis which stresses the importance of the terminal stimuli in anchoring the judgment scale." In the first, range was kept constant and distribution systematically varied; here one might expect systematic judgment changes from AL standpoint. In the second, range and distribution were varied simultaneously in order to keep the predicted neutral level constant; here systematic shifts would be expected in terms of anchoring. The results of each study were discussed and difficulties in interpretation noted. T. R 12

17,684
Ekman, G. A SIMPLE METHOD FOR FITTING PSYCHOPHYSICAL FUNCTIONS. J. Psychol., April 1961, 51(Second Half), 343-350. (Psychological Lab., University of Stockholm, Stockholm, Sweden).

17,684
This paper describes and illustrates a very simple method for fitting a psychophysical power function. The procedure combines graphic and algebraic techniques and can be applied to any subjective scale data established on the ratio level, and in certain instances to subjective interval scales.
T. G. R 7

17,685
Thorgersen, H.L. & Lienert, G.A. THE EFFECT OF MEPROBAMATE ON INTELLECTUAL TEST PERFORMANCE WITH AND WITHOUT STRESS. J. Psychol., April 1961, 51(Second Half), 405-409. (Psychology Dept., University of Marburg, Marburg, Germany).

17,685
The effect of meprobamate on intellectual test performance was measured with and without stress (threat of failure) to test Eysenick's drug postulate which suggests a decrease in performance under normal conditions but not when under stress. Twenty Ss divided into four groups, drug-stress, drug-no stress, placebo-stress, placebo-no stress, were given a standardized battery of tests. The differences between these scores and similar pretest scores were examined by analysis of variance procedure.
G. R 21

17,686
Gogel, W.C. CONVERGENCE AS A CUE TO ABSOLUTE DISTANCE. J. Psychol., Oct. 1961, 52(Second Half), 287-301. (USA Medical Research Lab., Fort Knox, Ky.).

17,686
The role of convergence and accommodation in the perception of absolute distance was investigated. All Ss had a visual acuity of at least 20/30 and a stereoscopic acuity of 85 sec. of arc. S made all distance judgments of this object with a visual ruler which consisted of a monocularly viewed alley containing numbered cards. In Experiments I and II, Ss judged the distance of a binocular object for six convergence values, 0 to 4 degrees in 48-min. steps, accommodation held constant. In Experiment III, the interval between successive presentations was increased to ensure independence of judgments. In Experiment IV, perceived distance was determined with convergence and accommodation varying concomitantly. The findings were considered in terms of cue systems for perceived distance. G. I. R 12

17,687
Gogel, W.C. CONVERGENCE AS A CUE TO THE PERCEIVED DISTANCE OF OBJECTS IN A BINOCULAR CONFIGURATION. J. Psychol., Oct. 1961, 52(Second Half), 303-315. (USA Medical Research Lab., Fort Knox, Ky.).

17,687
The relation between convergence and perceived distance as a function of number and position of binocular objects present was investigated. All Ss had a visual acuity of 20/30 and a stereoscopic acuity of 85 sec. of arc; Ss judged the distance of the binocular objects by the numbered cards in a monocularly viewed alley in which the objects appeared to be located. The objects were stereoscopically generated by using one of a pair of reflex sights before each eye. In experiments (E) 1, 2, and 3, two objects were used: the far one had convergence values of 0, 48, 96, 144, 192, and 240 min.; the near had two degrees greater in each case. In E 4, one and three objects were used; convergence values for the farthest were the same, and for the middle and near were 15.5 and 31 min. greater repectively. G. I. R 11

17,688
Bravo, Lucy & Mayzner, M.S. ASSIMILATION AND CONTRAST EFFECTS OF ANCHORING STIMULI ON JUDGMENTS: A PARTIAL REPLICATION OF THE SHERIF, TAUB, AND HOVLAND STUDY. J. Psychol., Oct. 1961, 52(Second Half), 333-334. (Barnard College, Columbia University, New York, N.Y. & University of Southern California, Los Angeles, Calif.).

17,688
The assimilation effects of anchoring stimuli were investigated. Several Ss made weight judgments by the method of single stimuli for two series of weights: 55 to 141 grams with anchors of 141 and 347 grams and 97 to 169 grams with anchors of 97 and 41 grams. The distributions of the data were evaluated by the Kolmogorov-Smirnov test.
T. R 3

17,689
Jones, Joan E. DEVIATIONS FROM MATCHING BEHAVIOR IN PROBABILITY LEARNING. J. Psychol., Oct. 1961, 52(Second Half), 335-345. (Defence Research Medical Labs., Toronto, Ontario, Canada). (DRML Rep. 241 5).

17,689
Three experiments were conducted in which guessing behavior in probability situations was examined as a function of: actual frequency of presentation of events (.60, .40), number of response categories (2, 5), rate of presentation of events (5, 10 per min.), and population tested (housewives, male and female students). Scores obtained under the first two experimental conditions were evaluated by analysis of variance; rate and population comparisons were made by t-tests. The findings were related to those of R. A. Gardner and L. M. Schipper.
T. G. R 12

17,690
Nelson, T.M. & Bartley, S.H. THE ROLE OF PCF IN TEMPORAL MANIPULATIONS OF COLOR. J. Psychol., Oct. 1961, 52(Second Half), 457-477. (Psychology Dept., Michigan State University, East Lansing, Mich.).

17,690
The relation of pulse-to-cycle fraction (PCF) to washout effect was examined for nine PCFs: .02, .03, .12, .25, .50, .75, .88, .97, and .98; three intensities: 3,240 cycles/ft.^{2} and one and two log units less; two spectral conditions: blue-green and red-orange. Two experienced Ss observed. S manipulated the intermittency rate; his task was to report the transition between flicker and fusion using the method of limits and the appearance of first change, maximum change, and final change for hue, saturation, and brightness. Both the quantitative and descriptive data were presented in detail. The results were considered in terms of inhibition of on- and off-discharges. Implications for color theory were noted.
T. G. R 14

17,691
Nelson, T.M., Bartley, S.H. & Bourassa, C.M. THE EFFECT OF AREAL CHARACTERISTICS OF TARGETS UPON SHAPE-SLANT INVARIANCE. J. Psychol., Oct. 1961, 52(Second Half), 479-490. (Michigan State University, East Lansing, Mich.).

17,691
The aim of this study is to consider changes in shape and slant as sensory responses, not as geometrical items, and to show the invariant relation between them. Specifically, shape-slant invariance is examined for four areal features (texture) of the target forms: 12 gauge wire, untextured, fine- and coarse-textured. Forty Ss, ten for each texture, are presented the forms visually and are required to duplicate the plane of the form by orienting a tilt-board appropriately, and by making a perspective drawing of the form. The targets are circles and ellipses presented at each of four orientations: 0, 22.5, 45, and 67.5 degrees. The findings are compared and contrasted to others in the field, particularly in terms of the basic approach.
G. R 27

17,692
Solley, C.M. INFLUENCE OF HEAD TILT, BODY TILT, AND PRACTICE ON REDUCTION OF ERROR IN PERCEPTION OF THE POSTURAL VERTICAL. J. gen. Psychol., Jan. 1960, 62 (First Half), 69-74. (Minninger Foundation, Topeka, Kan.).

17,692
The effects of head tilt, body tilt, and practice, and the interactions of these variables on the decrease in error in perception of the postural body-vertical were investigated. Twenty-four male students participated; six were assigned to each of four experimental conditions: two body tilt (30 degrees right or 30 degrees left) and two head tilt (30 degrees right or 30 degrees left). A given S was always tilted in one direction with one direction of head tilt; his task was to return himself to true vertical on each of 30 trials. Average error for blocks of five trials was computed per S; these data were examined by an analysis of variance. The results were discussed in light of other findings in the area.
T. G. R 9

17,693
Goldstein, M.E. SUBLIMINAL PERCEPTION WITH OPTICAL ILLUSIONS. J. gen. Psychol., Jan. 1960, 62(First Half), 89-101. (Psychology Dept., Yeshiva University, New York, N.Y.).

17,693
The validity of subliminally presented stimuli as an influencing factor upon the perception of supraliminal stimuli using the optical illusion approach was examined. Six figures and six patterns combined to produce illusions were the stimuli. A test session consisted of: dark adaption, establishing S's threshold for a simple pattern, and randomly presenting the figures supraliminally after presenting the corresponding patterns subliminally. Ss (33 female students) identified the figure by selecting from the rating scale a figure most closely approximated to the one presented, and gave subjective reports. Mean distortion ratings and standard deviations were obtained for experimental and control (not subliminal) sessions. Analysis of variance and Wilcoxon ranking test were used. T. I. R 30

17,694
Baggaley, A.R. SOME REMARKS ON SCALES OF MEASUREMENT AND RELATED TOPICS. J. gen. Psychol., Jan. 1960, 62 (First Half), 141-145. (Psychology Dept., University of Wisconsin, Milwaukee, Wisc.).

17,694
This paper proposes a subdivision of Stevens' nominal scale into dichotomous and categorical; questions some of the advantages claimed for nonparametric statistics, e.g., assumptions of normality and homogeneity; and advances the proposition that most psychological tests measure on an interval scale.
T. R 6

17,695
Mote, F.A., Grant, D.A. & Hoffman, G.K. THE EFFECT OF BRIEF FLASHES OF LIGHT UPON PERIPHERAL DARK ADAPTATION. J. gen. Psychol., April 1961, 64(Second Half), 233-244. (Psychology Dept., University of Wisconsin, Madison, Wisc.).

17,695
The course of peripheral dark adaptation was measured following pre-exposure to all combinations of the following intensities and durations: 3,160, 1,580, 790, 395, and 197.5 mL and 2.0, 1.0, 0.5, 0.25, and 0.1 sec. Four curves were obtained for each pre-exposure condition on each of two Ss using a modified method of limits. A monocular Hecht-Shlaer adaptometer was employed for both pre-exposure and testing; pre-exposure covered 35 degrees visual angle and the test stimulus five degrees; both were centered ten degrees nasally (on right retina). The test stimulus was 0.2 sec. in duration. Both were white light. S wore red goggles 25 min. before testing; thresholds were taken until a steady level was reached. The geometric mean of the four-log values obtained for each threshold were plotted and analyzed. T. G. R 7

17,696
Collins, W.E., Casola, A.S. & Zegers, R.T. THE PERFORMANCE OF COLOR-BLIND SUBJECTS ON THE COLOR APTITUDE TEST. J. gen. Psychol., April 1961, 64(Second Half), 245-250. (Psychology Dept., Fordham University, New York, N.Y.).

17,696
The performance of color-deficient Ss on the Color Aptitude Test (CAT) was examined. Twenty-six male Ss (11 to 15 years) classified color-deficient by the H-R-R Plates, and seven (50 to 59 years) known deuteranomalous trichromats were given the CAT, a color matching type test. The test scores of these Ss were compared with those obtained from an unselected population by J. G. Gilbert. The effect of age on color matching also was examined and discussed.
T. R 3

17,697
Melikian, L. THE EFFECT OF MEPROBAMATE ON THE PERFORMANCE OF NORMAL SUBJECTS ON SELECTED PSYCHOLOGICAL TASKS. J. gen. Psychol., July 1961, 65(First Half), 33-38. (Psychology Dept., American University of Beirut, Beirut, Lebanon).

17,697
The effect of meprobamate, placebo, and water on the performance of normal Ss on specific psychological tasks was investigated. Three females and 30 males participated; seven tasks were given: Maudsley Personality Inventory, auditory threshold, visual acuity threshold, digit span and digit symbol (Wechsler subtests), Draw-a-Person Test, and rate of speech. Five testing sessions were conducted with two experimenters administering to the drug, placebo, or water groups and giving the tests at the following times: initial testing, 30 min. later, one week later, 30 min. later, one week later. Means and standard deviations of the performances of each group were computed and an analysis of variance was carried out on the data from the first three sessions.
T. R 6

17,698
Bourne, L.E., Jr. & Beier, E.G. EFFECT OF DURATION OF INSPECTION UPON KINESTHETIC FIGURAL AFTEREFFECTS. J. gen. Psychol., July 1961, 65(First Half), 163-169. (Psychology Dept., University of Utah, Salt Lake City, Utah).

17,698
Kinesthetic figural aftereffects (FAE) were studied as a function of duration of inspection. Fifty naive Ss participated; five inspection durations were tested: 0, 30, 60, 90, and 120 sec. Order of presentations for the durations was varied within a five by five latin square replicated ten times. After a period of using the inspection block (two inches), S made width estimates for the test block (1.5 inches) by gripping it in the right hand while surveying a scale graduated in width with the left. Measurements of FAE were computed after taking into account constant error. The width estimate data were examined by analysis of variance.
T. R 10

17,699
Levita, E. EFFECTS OF CHLORPROMAZINE AND PROMAZINE ON PERSEVERATION. J. gen. Psychol., July 1961, 65 (First Half), 181-187. (Teachers College, Columbia University, New York, N.Y.).

17,699
The relationship between the administration of tranquilizing drugs (chloropromazine and promazine) and perseveration was investigated. Ss were 34 outpatients with a history of mental disease (one year or more) who had been diagnosed schizophrenic on the basis of an initial psychiatric interview. They were assigned randomly to one of three groups (two drugs and a placebo) and given a battery of tests of perseveration at the beginning and end of the three-month test period. Perseveration scores were provided by Pinard's S, Triangle, and Alphabet-Number tests; speed of tapping; and speed of writing. A Kruskal-Wallis one-way analysis of variance was performed on the postadministration scores of the three groups; Spearman r's were used to compare some of the perseveration measures. R 16

17,700
Griffin, Marie & Beier, E.G. "SUBLIMINAL" PRIOR SOLUTION CUES IN PROBLEM SOLVING. J. gen. Psychol., Oct. 1961, 65(Second Half), 219-227. (Psychology Dept., University of Utah, Salt Lake City, Utah).

17,700
This study examined the effects of prior solution cues on the task of concept identification. Four such cue conditions were tested: subliminal relevant, supraliminal relevant, subliminal nonrelevant, and supraliminal nonrelevant. Ss (56) were assigned randomly to one of the above conditions (14 Ss per group). The cues were words; the relevant ones (numbers and colors) aided S in the problem-solving task. The task was to assign geometric patterns to two categories on the basis of relevant dimensions. Measures of performance were number of errors to solution and number of trials to solution. The data were evaluated by analysis of variance technique.
T. R 13

17,701
Shelly, M.W. LEARNING WITH REDUCED FEEDBACK INFORMATION. J. exp. Psychol., Sept. 1961, 62(3), 209-222. (USN Office of Naval Research, Washington, D.C.).

17,701
Three experiments were conducted to provide data on two questions: "When information fed back to S concerning which of four (or eight) alternatives is correct, is reduced, is the initial rate of learning reduced proportionately?" and "Will the point at which maximum increase in proportion of correct responses takes place vary with the amount of information available to S?" The task was a modification of the paired-associate paradigm--S learned to associate responses with visual stimuli. In I, amount of noise in the feedback was varied; in II, sequential pattern of the noise was varied; in III, distribution of the noisy events was varied over the set of incorrect alternatives. The findings were discussed in the framework of the above questions.
T. G. R 5

17,702
Smith, Patricia C. & Smith, O.W. BALL THROWING RESPONSES TO PHOTOGRAPHICALLY PORTRAYED TARGETS. J. exp. Psychol., Sept. 1961, 62(3), 223-233. (Cornell University, Ithaca, N.Y.).

17,702
How well photographs serve as the distal stimuli for motor responses, namely, tossing a ball to absolute distances as presented in space immediately adjacent to S, was determined in four experiments: 1) effects of each of three aperture sizes providing small, medium, and large fields of view on the accuracy of tosses at directly viewed targets (3, 4.25, 5.5, 6.75, or 8 meters at various locations) were studied; monocular and binocular unrestricted viewing conditions were tested; 2) serial order of observation conditions was tested; 3) S viewed the photographs in the viewing apparatus, not the room; and 4) visual direction of a target on a surface also supporting S was examined. Data were discussed in terms of the role of motor and kinesthetic function in perception and were related to Gibson's theory. T. G. R 13

17,703
Wilkinson, R.T. INTERACTION OF LACK OF SLEEP WITH KNOWLEDGE OF RESULTS, REPEATED TESTING, AND INDIVIDUAL DIFFERENCES. J. exp. Psychol., Sept. 1961, 62(3), 263-271. (Applied Psychology Research Unit, MRC, Cambridge, England).

17,703
This study examined the effect of lack of sleep on a five-choice serial reaction test as a function of 1) increasing feedback of knowledge of results (KR) in the test, and 2) increasing familiarity with the test and with the stress. Ss, 12 enlisted men, were tested three times under each of four conditions: KR after normal sleep, KR after no sleep, no KR after normal sleep, and no KR after no sleep. Performance measures were in terms of gaps, corrects, and errors. The sleep-no sleep comparisons were assessed by a Wilcoxon Procedure. Scores in first versus second half of the test were compared. Changes in scores of the 12 tests were assessed by Wilcoxon's test; performance consistency was evaluated. The findings were considered as they relate to the concepts of arousal and motivation. T. G. R 28

17,704
Green, B.F., Jr. FIGURE COHERENCE IN THE KINETIC DEPTH EFFECT. J. exp. Psychol., Sept. 1961, 62(3), 272-282. (Lincoln Lab., Massachusetts Institute of Technology, Cambridge, Mass.).

17,704
Six experiments examined the extent to which the kinetic depth effect produces perceived coherence and rigidity of random figures--configurations of dots or straight lines. S viewed each configuration (c), rotating, for 12.5 sec. and rated it on a five-point subjective scale of rigidity or coherence. In I, the dot c's were under three conditions of constraint: random, surface, and regular placements of the dots. In II and III, the line c's were treated similarly. In IV, the effect of speed of rotation was examined: 16, 32, 64, 128, 256 degrees per sec. using both dot and line figures. In V, three rotation types were examined for effects on coherence: tumbling, spinning about vertical axis, spinning about a skew axis. In VI, nine rotation patterns were tested--fixed axes. T. G. R 7

17,705
Lordahl, D.S. CONCEPT IDENTIFICATION USING SIMULTANEOUS AUDITORY AND VISUAL SIGNALS. J. exp. Psychol., Sept. 1961, 62(3), 283-290. (Washington University, St. Louis, Mo.).

17,705
This study investigated performance in a concept identification task as a function of the amounts of simultaneously presented auditory and visual irrelevant information. Groups of two Ss were assigned to each of 48 conditions: four levels of irrelevant visual (0, 1, 2, 3 bits); four levels of irrelevant auditory (0, 1, 2, 3 bits); and three concept identification problems (one auditory and one visual bit of relevant information in each problem). Ss assigned each stimulus, containing both a visual and auditory component, to one of two categories by a lever-pressing response. An extended trend analysis of variance of the error scores was performed. The responses in one of the two categories were further evaluated after being corrected for guessing behavior. T. G. I. R 10

17,706
Shepard, R.N. & Teghtsoonian, Martha. RETENTION OF INFORMATION UNDER CONDITIONS APPROACHING A STEADY STATE. J. exp. Psychol., Sept. 1961, 62(3), 302-309. (Bell Telephone Laboratories, Inc., Murray Hill, N.J. & Eastern Pennsylvania Psychiatric Institute, Philadelphia, Penn.).

17,706
Retention of information was investigated under conditions approaching a steady-state, i.e., when the amount of information gained from each successive item just compensated for the amount forgotten from all preceding items. Ss' (63 students) task was to respond "old" or "new" to each three-digit number in a protracted sequence, depending upon Ss' memory of seeing it earlier in the sequence. Each number was presented twice; the number of numbers intervening between these two presentations was the independent variable manipulated differently under two experimental conditions: variable delay (0 to 60 intervening cards) and fixed delay (averaged two and one-half cards at different positions). Error probabilities were evaluated. Implications and estimates of the capacity of human memory were explored. T. G. R 28

17,707
Saltz, E. & Riach, Winifred J. THE EFFECT OF STRESS ON STIMULUS DIFFERENTIATION. J. exp. Psychol., Dec. 1961, 62(6), 588-593. (Center for the Study of the Cognitive Processes, Wayne State University, Detroit, Mich.).

17,707
The effects of electric shock as stress in a discrimination learning task (light patterns with overlapping or nonoverlapping elements on a display panel) were investigated. Ss (20) were placed in each of four experimental conditions: overlap-nonstress and stress, nonoverlap-nonstress and stress. Stress groups had 12 of the 36 trials subsequent to reaching criterion accompanied by shock. For overlap and nonoverlap groups, number of trials to reach criterion was compared; analysis of variance was done on difference scores (performance on the criterion and subsequent 36 trials). The depressant effects of shock on performance and the relation of this decrement to level of performance prior to shock were evaluated.
T. G. I. R 8

17,708
Goldstein, A.G. FAMILIARITY AND APPARENT COMPLEXITY OF RANDOM SHAPES. J. exp. Psychol., Dec. 1961, 62 (6), 594-597. (University of Missouri, Columbia, Mo.).

17,708
"This experiment tested the hypothesis that there is an inverse relationship between the apparent complexity of visual shapes and S's familiarity with these shapes." The Ss, 55 students, first were asked to learn the letter associated with each of 12 random shapes (two from each of six complexity categories); next they were required to judge the complexity of 48 random shapes on a seven-point scale (the 12 familiar ones and 36 new ones); finally Ss were asked to judge each of the 48 shapes on a three-point familiarity scale. Mean complexity judgments for familiar and unfamiliar shapes were compared by t-test for correlated scores.
T. R 12

17,709
Shinkman, P.G. PERCEPTION OF STIMULI OF VARYING DIMENSIONALITY. A SUPPLEMENTARY REPORT. J. exp. Psychol., Dec. 1961, 62(6), 626-627. (University of Michigan, Ann Arbor, Mich.).

17,709
This study, in part, replicated one which found that combining numbers and colors into a single stimulus complex, i.e., increasing stimulus dimensionality, improves information transmission; in addition, it assessed the contribution of differences in visual angle to these findings. Three original conditions of numbers alone, color patches alone, and their combination were replicated; color and number configurations, whose total visual angle was equated to that of the original color alone and number alone conditions, were the test conditions. The stimuli, 81 per condition, were presented to S via a Harvard tachistoscope. The data were reported in terms of information transmitted by symbol position and condition. The importance of positional bias in this kind of perceptual task was indicated. T. R 1

17,710
Kronenberger, E.J. INTERPERSONAL ASPECTS OF INDUSTRIAL ACCIDENT AND NON-ACCIDENT EMPLOYEES. Engng. industr. Psychol., Summer 1960, 2(2), 57-62. (Technology, Inc., Dayton, Ohio).

17,710
This study was aimed at contributing information on the characteristics which compose the personality of accident and nonaccident employees by measuring the surface aspects of interpersonal relationships. Fifty-three male Ss were used; 18 had had three or more industrial accidents in 1958 and 35 were accident free. Each S was given the Interpersonal Checklist first with instructions to check those words he felt described him and then those words he felt others would use to describe him. Scores were obtained for Dominance-Submission and Love-Hostility. These were compared for self- and other-perception by t-tests.
T. R 14

17,711
Furchtgott, E. & Friedman, M.P. THE EFFECTS OF HUNGER ON TASTE AND ODOR RLS. J. comp. physiol. Psychol., Dec. 1960, 53(6), 576-581. (University of Tennessee, Knoxville, Tenn.).

17,711
To test effects of hunger on odor and taste thresholds, three experiments varying in amount of practice and control of food intake were performed with college students. Thresholds were obtained by a forced-choice sniffing or sipping technique; all data were collected in an air-conditioned room. In I, iso-amyl acetate, n-butanol, and oil of cloves olfactory thresholds, and sucrose, hydrogen chloride, and salt gustatory thresholds were determined before and after lunch. In II, degree of hunger was enhanced and diurnal factor controlled by testing Ss at same time on two consecutive days, one after a 1,150-calorie lunch, the other after no lunch but standard breakfast. In III, Ss first had seven practice trials; thresholds were obtained on four days after a 1,800-calorie lunch and without lunch. T. R 14

17,712
Oshanin, D.A. & Panov, D.Y. THE HUMAN ELEMENT IN AUTOMATION SYSTEMS. Soviet Rev., Dec. 1961, 2(12), 33-46.

17,712
The role of man in modern automation is discussed in terms of those characteristics and capabilities which cannot be matched by machines: complexity, flexibility, and reliability of operations; data-processing techniques; generalizing, synthesizing, and correlating information. The problem of man's function in automatic control systems is discussed briefly and in general terms under the following categories: type of signalling stimuli; design of instruments and their panel arrangements; design, arrangement, and functioning of controls; and individual characteristics of the operator--psychological, physiological, and experiential.

17,713
Izvestia. LIFE ON THE SECOND SPACESHIP. Soviet Rev., Oct. 1960, 1(3), 61-65. (Reprinted from: Izvestia, Aug. 1960).

17,713
This article was "based on material furnished in interviews with members of the USSR Academy of Sciences who participated in preparations for the launching of the second spaceship." The medical and biological experiments on this spaceship were conducted on animals, mainly dogs. Problems studied included: weightlessness, transition from acceleration to weightlessness and vice versa, and cosmic radiation. Some details of the physiological functions of the animals in flight were noted, e.g., heart rate, breathing frequency, together with some inherent dangers to the organism in such flight.

17,714
Adams, J.A., Stenson, H.H. & Humes, J.W. MONITORING OF COMPLEX VISUAL DISPLAYS: II. EFFECTS OF VISUAL LOAD AND RESPONSE COMPLEXITY ON HUMAN VIGILANCE. Hum. Factors, Dec. 1961, 3(4), 213-221. (University of Illinois, Urbana, Ill.).

17,714
This experiment examined the monitoring behavior of the operator in semiautomatic man-machine systems and provided a first approximation of the defining operations for environmental and response-produced stimulation for the activationist hypothesis. S's task was three hours of continuous visual monitoring on a simulated vigilance display--6 or 36 symbols, having one of three speeds: 450, 900, or 1,800 knots; S had to detect the change from G to F and report it by a simple or complex response (pressing one or several buttons). The experimental design was Lindquist Type III mixed analysis of variance; visual load and response complexity were the main variables. All Ss (60) had three hours of practice. Performance was measured by percent correct detections and response latency. T. G. I. R 28

17,715
Wohl, J.G. MAN-MACHINE STEERING DYNAMICS. Hum. Factors, Dec. 1961, 3(4), 222-228. (Dunlap and Associates, Inc., Stamford, Conn.).

17,715
This paper presents a human factors analysis of the vehicle steering problem in which the perceptual inputs are identified and related to the driver's steering wheel response; the vehicle dynamics are related to the demands on the driver at varying speeds. The functions of the human in this closed-loop servo system are examined via a simplified analysis of automobile steering geometry. The proposed solution is a steering system design which minimizes the required variations in driver gain as a function of speed, a velocity-modulated steering system. The effects on steering behavior of such a system are examined.
G. I. R 5

17,716
Besco, R.O. THE EFFECTS OF COCKPIT VERTICAL ACCELERATIONS ON A SIMPLE PILOTED TRACKING TASK. Hum. Factors, Dec. 1961, 3(4), 229-236. (Human Factors, North American Aviation, Inc., Los Angeles, Calif.).

17,716
The effects of vibratory, linear, and vertical accelerations on tracking errors during a one-dimensional, pitch tracking task were studied. Four experienced test pilots performed this compensatory tracking task on the "Pilot Operated Dynamic Flight Simulator"; motion (four levels), frequency (three levels), and amplitude (three levels) of the command signal were varied. The measure of performance was the root mean square error in pitch attitude. These data were examined by analysis of variance technique. Suggestions for future research were included.
T. G. I. R 7

17,717
Gregg, L.W. & Pearson, R.G. FACTORIAL STRUCTURE OF IMPACT AND DAMAGE VARIABLES IN LIGHTPLANE ACCIDENTS. Hum. Factors, Dec. 1961, 3(4), 237-244. (Carnegie Institute of Technology, Pittsburgh, Penn. & Aviation Crash Injury Research, Flight Safety Foundation, Inc., Phoenix, Ariz.).

17,717
This paper presents "a rational analysis of the relationships among a number of variables associated with lightplane accidents together with an empirical evaluation of the adequacy of the logical structure for describing such accidents." Some of these variables are: impact condition--velocity, angle, attitude, terrain; injury to occupant--degree and location; damage to occupant's structural environment; damage to cockpit and cabin; damage to other structures. A factor analysis is performed on the data from 154 accidents. Four factors which describe the conditions at impact are found; the relationship between injury to occupant and proximity of structural damage is demonstrated; the relationship among damage variables is compared to that between damage and impact variables. T. R 3

17,718
Meister, D. THE MEASUREMENT OF MAN-MACHINE SYSTEMS UNDER FIELD OPERATIONAL CONDITIONS. Hum. Factors, Dec. 1961, 3(4), 245-252. (Astronautics, General Dynamics Corporation, San Diego, Calif.).

17,718
The special requirements and problems involved in human factors field testing are described. Some of these criteria are: programming the system's operations, operating the system in standard ways and under operational-use conditions, and complete testing of the system. Similarities between field and operational conditions and between field and laboratory conditions are discussed. The problems of control (in field testing) which include unprogrammed stimulus events and operation of many variables simultaneously are considered together with some ways of handling them. The use of "templates" in describing and analyzing the operations of a system as a function of equipment, personnel, and other relevant factors is discussed and briefly illustrated. I. R 4

17,719
Kraft, J.A. A 1961 COMPILATION AND BRIEF HISTORY OF HUMAN FACTORS RESEARCH IN BUSINESS AND INDUSTRY. Hum. Factors, Dec. 1961, 3(4), 253-283. (Operations Research, Lockheed Missiles and Space Company, Palo Alto, Calif.).

17,719
The major points covered in this brief history of human factors research were: definition of the specialty, origin, growth, geographical distribution, academic specialties represented, literature produced, program support and staff, activities in the field, salaries, trends in the field, future research needs, operating problems, and kinds of research. Appended was a list of human factors research activity in business and industry which was developed from a 1960 to 1961 survey.
T. G. R 12

17,720
Silvern, L.C. SPECIFICATIONS FOR A COMPONENT-TYPE GENERAL-PURPOSE TEACHING MACHINE OF OPTIMUM CAPABILITY FOR CURRICULUM DEVELOPMENT--1961. Hum. Factors, Dec. 1961, 3(4), 286-298. (Videosonic Systems, Hughes Aircraft Company, Culver City, Calif.).

17,720
The general teaching machine environment is defined in terms of ten modes of the "learner-teaching machine" relationship, e.g., multiple-choice--nonbranching; oral-completion--echoic-delayed; written-completion--demand. A typical aural-visual teaching machine is graphically described; magnetic tape multichannel assignments and a punched paper tape scoring device are briefly discussed.
I.R 4

17,721
Brown, R.H. VISUAL ESTIMATES OF AIRPLANE SPEED. Hum. Factors, Dec. 1961, 3(4), 284-285. (USN Research Lab., Washington, D.C.).

17,721
The accuracy with which ground observers estimate airplane speed in field tests was compared with laboratory judgments of velocity for quite different moving objects at close range. The relationship between variability of these estimates and differences in speed was expressed graphically. The applicability of this rule to other situations was indicated.
G. R 8

17,722
Carlson, V.R. OVERESTIMATION IN SIZE-CONSTANCY JUDGMENTS. Amer. J. Psychol., June 1960, LXXIII(2), 199-213. (National Institute of Mental Health, Bethesda, Md.).

17,722
To determine whether the difference between overestimation and a veridical size-judgment represents a shift in attitude on S's part, S adjusted a near, variable triangle to match a far, standard triangle under each of two instructions: to match for objective size and to match for apparent size. A total of 62 Ss participated. The standard was set at each of 11 distances; S made two adjustments for each value. Subjective reports also were obtained. Finally, two intelligence tests and a body-sway test of suggestibility were administered. The data were evaluated by significance tests of the differences and correlations between the various measures. The roles of intelligence, personality, and motivation in these judgments were discussed.
T. R 25 (approx.)

17,723
Pangborn, Rose Marie. INFLUENCE OF COLOR ON THE DISCRIMINATION OF SWEETNESS. Amer. J. Psychol., June 1960, LXXIII(2), 229-238. (University of California, Davis, Calif.).

17,723
The effect of food coloring on the sweetness and flavor of various aqueous and nectar solutions was determined. In both experiments the Ss evaluated the solutions by the method of paired comparisons: in the first, 12 highly trained Ss and a group of untrained Ss participated; in the second, ten students served. Various combinations of color (red, green, yellow), level of sweetness (8, 10, 12 of a sucrose), and flavoring (apricot, cherry, peppermint, and pear), were tested. The results were examined statistically by chi-square and significance determined by a triangular testing method.
T. R 9

17,724
Wieland, Betty A. THE INTERACTION OF SPACE AND TIME IN CUTANEOUS PERCEPTION. Amer. J. Psychol., June 1960, LXXIII(2), 248-255. (University of California, Los Angeles, Calif.).

17,724
The relationship between space and time in cutaneous perception was examined by having an observer judge whether one or two places had been stimulated when the distance between the two was held constant and the time between them varied. The data from five Ss were presented; each received prior training in the two types of discriminations. In the test sessions the two-point thresholds were obtained by the method of limits using temporal steps which varied with the range of temporal intervals. Twelve thresholds were obtained for each of seven distances between electrodes (1.0 to 14.6 cm). The data were treated by analysis of variance, the major variables being Ss and distances; they also were fitted by curves.
T. R 9

17,725
Black, R.W. & Bevan, W. THE EFFECT OF SUBLIMINAL SHOCK UPON THE JUDGED INTENSITY OF WEAK SHOCK. Amer. J. Psychol., June 1960, LXXIII(2), 262-267. (Emory University, Emory University, Ga.).

17,725
This study investigated the effect of subliminal electric shocks upon the judged intensity of supraliminal shocks. Ss were 46 students; each S received a series of 100 supraliminal 200-msec. shocks spaced at 20-sec. intervals. Five intensities were used: 1,500, 1,800, 2,100, 2,400, and 2,700 microamperes, each one 20 times. Half the Ss (experimental) also received a 200-msec. subliminal stimulus (50 percent of S's threshold) at the midpoint of the 20-sec. interval between shocks. S rated each shock on a seven-point scale which varied from very strong to very weak. GSRs also were recorded. The results were analysed by Alexander's method. The implications for pooling theory and the concept of arousal were noted.
G. R 15

17,726
Jenkin, N. & Feallock, Sally M. DEVELOPMENTAL AND INTELLECTUAL PROCESSES IN THE SIZE-DISTANCE JUDGMENT. Amer. J. Psychol., June 1960, LXXIII(2), 268-273. (University of Sydney, Sydney, Australia & University of Virginia Hospital, Charlottesville, Va.).

17,726
This study seeks to answer the questions "Is the correlation between age and judgment of size-distance mediated by the growth of intelligence, or is it a developmental relationship independent of intelligence?" Four groups of Ss (normal children, normal adolescents, normal adults, and mentally retarded persons) made objective, binocular size-matches of white squares under conditions of full illumination. Two angular separations of the standard and comparison (19 degrees and 87 degrees) and two distances of the comparison object (20 and 160 inches) were tested. The data were treated by analysis of variance technique, separate analyses being performed for each set of experimental conditions.
T. R 10

17,727
Siegel, H. & Duncan, C.P. RETINAL DISPARITY AND DIPLOPIA VS. LUMINANCE AND SIZE OF TARGET. Amer. J. Psychol., June 1960, LXXIII(2), 280-284. (Northwestern University, Evanston, Ill.).

17,727
This study examined the amount of retinal disparity which can be tolerated up to the point where diplopia occurs and the effect of photopic luminance and target size on this measure. Ss were 120 students; each reported when the single circle was first seen, and when two circles instead of one were seen. This was done for each of four sizes (52 min. to 7 degrees 3 min.) at each of four luminances (0.04 to 1.13 ml.). The data were converted to log scores and treated by analysis of variance.
T. G. R 8

17,728
Krauskopf, J. FIGURAL AFTER-EFFECTS WITH A STABILIZED RETINAL IMAGE. Amer. J. Psychol., June 1960, LXXIII (2), 294-297. (Brown University, Providence, R.I.).

17,728
These studies were designed "to test the effects of motion of the retinal images on the production of figural aftereffects in such a way that both effects of eye movements were controlled." In Experiment I the objects were seen under stabilized-image conditions, in II under normal conditions. In both, the test session consisted of: preinspection determination of point of subjective equality (PSE) for height of rectangles, satiation by presentation of one rectangle for three min., postsatiation PSE determination. The pre- and postsatiation PSEs were evaluated by a sign test; the differences between I and II were tested by t.
I, R 7

17,729
Krauskopf, J. & Engen, T. THE DISTANCE-PARADOX IN KINESTHETIC FIGURAL AFTER-EFFECTS. Amer. J. Psychol. June 1960, LXXIII(2), 298-301. (Brown University, Providence, R.I.).

17,729
The distance-paradox in kinesthetic figural aftereffects was studied. The Ss were 60 students. The task was to find the width of a variable bar, which appeared equal to a two-inch standard bar, before and after the presentation of an inspection bar. Five widths of inspection bar (2.5 to 4.5 inches) were used; the Ss accordingly were divided into five groups (half of each used the right and half the left hand on the standard). The differences in subjective equality pre- and postinspections were evaluated by t-tests; two other measures of equality were computed and examined by analyses of variance.
G. R 11

17,730
O'Connell, D.N. & Tursky, B. SILVER-SILVER CHLORIDE SPONGE ELECTRODES FOR SKIN POTENTIAL RECORDING. Amer. J. Psychol., June 1960, LXXIII(2), 302-304. (Massachusetts Mental Health Center, Boston, Mass.).

17,730
This apparatus note describes an electrode which has the characteristics desired for accurate recording of skin potentials: low bias potential, freedom from drift, and long-term stability. It has three parts: an outer casing of durable plastic, an inner core of silver-silver chloride, and a metal terminal assembly for attaching recording leads.
I. R 2

17,731
Behar, I. A NEW TACHISTOSCOPE FOR ANIMALS AND MAN. Amer. J. Psychol., June 1960, LXXIII(2), 305-306. (US Veterans Administration Hospital, Durham, N.C.).

17,731
A tachistoscope is described which is simple, accurate, flexible, and nominal in cost. It has three essential parts: daylight and monochromatic lamps to illuminate the exposure-field, specially prepared stimulus-cards, and a timing device.
I.

17,732
Thomlinson, J.T. WEBER'S LAW AND THICKNESS DETERMINED TACTUALLY. Amer. J. Psychol., June 1960, LXXIII(2), 316-317. (San Francisco State College, San Francisco, Calif.).

17,732
This note describes the laboratory procedure which can be used to demonstrate that the tactile perception of thickness follows Weber's law. It is a simple technique available to every lab, and consists of S matching thicknesses via groups of consecutive leaves from a book. The data of nine Ss making 20 determinations for each of 17 standard groups of leaves are also included.
G. R 3

17,733
Hochberg, J. & Brooks, Virginia. THE PSYCHOPHYSICS OF FORM: REVERSIBLE-PERSPECTIVE DRAWINGS OF SPATIAL OBJECTS. Amer. J. Psychol., Sept. 1960, LXXIII(3), 337-354. (Cornell University, Ithaca, N.Y.).

17,733
The development and validation of a higher order psychophysical equation which predicts the depth-responses of untrained observers to nonperspective projection (drawings of three-dimensional objects) was reported. Four experiments were conducted. In I the equations were developed: Ss judged apparent tridimensionality of nine families of "wire forms" using a 0 to 10 graphic rating scale; forms were scored for bidimensionality using 17 tests; S scores were correlated with each of the 17 scores. In II the generality of the equations was examined by carrying out the same procedure for four new families of forms. In III the reliability was tested by readministering some of the forms at a later time. In IV the generality of the scaling procedure was evaluated by using a paired-comparison technique. T. I. R 23

17,734
Warren, R.M. & Poulton, E.C. BASIS FOR LIGHTNESS-JUDGMENTS OF GRAYS. Amer. J. Psychol., Sept. 1960, LXXIII(3), 380-387. (National Institute of Mental Health, Bethesda, Md. & Applied Psychology Research Unit, MRC, Cambridge, England).

17,734
This study attempted to minimize the influence of background contrast on lightness judgments of various grays. Ss, 475 male students, made judgments of gray relative to white in four experiments: 1) for large adjacent sheets of gray and white, S made numerical estimates of lightness; 2) for the same situation, S made linear estimates of lightness on a line labelled white and black at opposite ends; 3) for the same gray and white sheets but against a black surround, S made numerical estimates; 4) for strips of white, gray, and black (gray in middle), S made numerical estimates. The results were considered in terms of the physical-correlate theory of sensory intensity.
T. R 16

17,735
Natsoulas, T. JUDGMENTS OF VELOCITY AND WEIGHT IN A CAUSAL SITUATION. Amer. J. Psychol., Sept. 1960, LXXIII(3), 404-410. (Wesleyan University, Middletown, Conn.).

17,735
This study examined further the perceptual phenomena described by A. Michotte as launching and releasing. Both velocity and size ratios of the two stimuli were varied; for each these were: 3:1, 2:1, 1:1, 1:2, and 1:3. The stimulus objects were squares or rectangles, one red and one black. The S's task was to judge the ratio of the two velocities or weights, indicate which was faster or heavier, and how many times faster or heavier. The results were evaluated by three-way analyses of variance.
T. G. R 2

17,736
Saucer, R.T. & Coppinger, N.W. STANDARD STIMULUS-CONDITIONS FOR THRESHOLDS OF APPARENT MOVEMENT. Amer. J. Psychol., Sept. 1960, LXXIII(3), 435-439. (US Veterans Administration Center, Kecoughtan, Va.).

17,736
This study attempted 1) to develop stimulus conditions (for testing apparent visual movement) which are free from biases of familiarity, expectancy, and meaning; and 2) to provide a set of normally distributed test scores for use in parametric analysis of data. Three groups of male Ss—normal self-supporting, partially employable institutionalized, infirm elderly—were presented the stimulus situation of four neon indicator lights lighted serially at different rates to obtain thresholds of apparent movement. A retest was conducted under the same conditions. These thresholds were evaluated statistically by analysis of variance; also a test-retest correlation was obtained.
G. R 6

17,737
McAllister, W.R. & McAllister, Dorothy E. THE 'READY' SIGNAL IN EYELID-CONDITIONING. Amer. J. Psychol., Sept. 1960, LXXIII(3), 444-447. (Syracuse University, Syracuse, N.Y.).

17,737
This study investigated the possibility that the ready signal in eyelid conditioning is a variable which affects the level of conditioning. Ss were 18 male and 14 female students; half of each sex were conditioned with and half without the ready signal. The conditioning stimulus was a 1,000-cycle tone presented at 55 db for 900 msec.; unconditioned stimulus was a puff of air for 100 msec.; ready signal was spoken a few seconds before presentation. Percentage of conditioned responses per block of ten trials was the measure of performance. The data were evaluated by analysis of variance (Lindquist's Type III).
T. G. R 6

17,738
Wallach, H. & McKenna, V.V. ON SIZE-PERCEPTION IN THE ABSENCE OF CUES FOR DISTANCE. Amer. J. Psychol., Sept. 1960, LXXIII(3), 458-460. (Swarthmore College, Swarthmore, Penn. & Carleton College, Northfield, Minn.).

17,738
The perception of size in the absence of distance cues was examined. Ss, 26 students, matched the standard (devoid of distance cues) and comparison objects (best distance cues compatible with darkroom requirements) using the method of limits. Altogether 25 sizes of comparison object were judged smaller, equal, or larger than the standard. A control experiment followed for 16 of the Ss, i.e., the judgments were made viewing the standard binocularly in a lighted room. The results were considered in light of assumptions about image size, distance cues, and their role in size perception.
R 4

17,739
Kinney, Jo Ann S., Sweeney, E.J. & Ryan, Alma P. A NEW TEST OF SCOTOPIC SENSITIVITY. Amer. J. Psychol., Sept. 1960, LXXIII(3), 461-467. (USN Medical Research Lab., New London Submarine Base, Conn.).

17,739
This paper outlines the considerations and principles upon which a new test of scotopic sensitivity is based, summarizes data obtained with an experimental model, and presents the results found with the later portable version. The problem of external validity of the test also is considered.
T. G. I. R 7

17,740
Vanderplas, J.M. ON THE FLATTENING-EFFECT OF OPTICAL MAGNIFICATION. Amer. J. Psychol., Sept. 1960, LXXIII (3), 473-478. (Washington University, Seattle, Wash.).

17,740
The author first presents a summary and interpretation of S. H. Bartley's account of the flattening effect of binoculars which he shows to be not strictly in accord with optical theory. He then offers an explanation for the effect in terms of the altered representations of distance and size of objects in optical space relative to "real" space as a function of the magnifying instrument.
I. R 8

17,741
Goldstein, A.G. & Borresen, C.R. RED-GREEN COLOR DEFICIENCY AND COMPENSATORY LEARNING: AN EXPERIMENTAL CRITIQUE. Amer. J. Psychol., Sept. 1960, LXXIII(3), 482-485. (University of Missouri, Columbia, Mo.).

17,741
This paper 1) criticizes what appear to be several errors in a study by R. K. Overton and W. L. Brown in which they tested implications of the hypothesis that "a permanent physiological weakness may elicit compensatory learning even though S has never been aware of the weakness," and 2) summarizes results from a study designed to eliminate errors which were in the areas of testing conditions, statistical analysis, and experimenter bias. Briefly, the color vision of 20 normal and 20 red-green blind Ss was tested with plates under standard conditions and related to S's response time to spatial position of traffic lights. The response times also were compared for the normal and color-blind Ss.
R 3

17,742
Hawkes, G.R. & Warm, J.S. THE SENSORY RANGE OF ELECTRICAL STIMULATION OF THE SKIN. Amer. J. Psychol., Sept. 1960, LXXIII(3), 485-487. (USA Medical Research Lab., Fort Knox, Ky.).

17,742
This study was done to determine the values of a.c. required for the absolute thresholds of tingle and of pain and for the tolerance-limit of current intensity. These responses were obtained from two highly trained Ss at each of five frequencies of the sine wave currents: 100, 500, 1,000, 5,000, 10,000 cycles. The relative reliability of the responses was determined by Bartlett's homogeneity of variance. Some other findings were related briefly to the present data.
G. R 3

17,743
Kolers, P.A. & Rosner, B.S. ON VISUAL MASKING (METACONTRAST): DICHOPTIC OBSERVATION. Amer. J. Psychol., March 1960, LXXIII(1), 2-21. (US Veterans Administration Hospital, West Haven, Conn.).

17,743
Visual masking, inhibition of appearance of black disk when followed by concentric black ring, was studied as a function of: time between cycles of observation (1,500 to 5,500 msec.) duration of disk (10 to 80 msec.) duration of pause between disk and ring (3.5 to 180 msec.) and angular separation of the two (1.67 to 3.35 degrees). Paracontrast, inhibition of second figure by the first, also was studied as a function of angular separation and pause between figures. One well-trained observer participated. Stimuli were presented by a stereoscopic tachistoscope. Data were obtained by a modified quantal method. Findings were discussed in terms of intraocular stray-light, disinhibitory processes, and other photochemical and neural action.
G. I. R 25

17,744
Zajac, J.L. CONVERGENCE, ACCOMMODATION, AND VISUAL ANGLE AS FACTORS IN PERCEPTION OF SIZE AND DISTANCE. Amer. J. Psychol., March 1960, LXXIII(1), 142-146. (University of Edinburgh, Edinburgh, Scotland).

17,744
Early and recent findings and observations on the relative importance of convergence, accommodation, and visual angle in perceived size and distance were examined. Specific considerations included perceived size and changing visual angle, perceived size and changing distance of fixation point, size and distinctness of the two monocular images, and retinal disparity and depth perception.
R 22

17,745
Greenberg, G. EYE-DOMINANCE AND HEAD-TILT. Amer. J. Psychol., March 1960, LXXIII(1), 149-151. (Duke University, Durham, N.C.).

17,745
The relationship between eye-dominance and head-tilt was examined on 163 college students using group tests. The eye test involved alignment of a hand-held pencil and distant fixation point followed by monocular observation of same. The head-tilt test used the above situation with S fixating on the distant point and judging whether either of the two pencil images appeared higher than the other. The results were tested by chi-square.
T.

17,746
Howard, I.P. ATTNEAVE'S INTEROCULAR COLOR-EFFECT. Amer. J. Psychol., March 1960, LXXIII(1), 151-153. (University of Durham, Durham, England).

17,746
In this note the author explains Attneave's interocular color effect without benefit of binocular interaction and indicates how the explanation may be tested by three simple demonstrations.
R 2

17,747
Behar, I. & Bevan, W. THE PERCEIVED DURATION OF AUDITORY AND VISUAL INTERVALS: CROSS-MODAL COMPARISON AND INTERACTION. Amer. J. Psychol., March 1961, LXXIV(1), 17-26. (USA Medical Research Lab., Fort Knox, Ky. & Kansas State University, Manhattan, Kan.).

17,747
To investigate intermodal relationships in judgment by comparing the shift of subjective scales for duration with intermodal and heteromodal anchors, five related experiments were conducted. In each the method of single stimuli was used with a standard series of five arithmetically spaced intervals of one to five sec. Groups of Ss (20 to 120 in size) judged the stimuli in terms of an 11-category scale. The two modalities compared were vision and audition. Anchor stimuli were durations of usually 10 and 20 sec. The data from each experiment were evaluated by analysis of variance technique.
G. R 12

17,748
Doehring, D.G. ACCURACY AND CONSISTENCY OF TIME-ESTIMATION BY FOUR METHODS OF REPRODUCTION. Amer. J. Psychol., March 1961, LXXIV(1), 27-35. (Central Institute for the Deaf, St. Louis, Mo.).

17,748
Four methods of reproduction were employed in this study in order to determine the influence of response factors on the accuracy and consistency of time estimation. These methods were the usual one of two taps on a telegraph key and three variations in which only one tap was required. The time intervals of 0.5, 1, 2, 4, and 8 sec. were judged by eight male Ss using each of the methods. The data were evaluated by analysis of variance for repeated measurements, and by Newman-Keuls sequential range for those differences found significant in the primary analysis. The findings were compared with previous results and discussed in terms of identifying all relevant variables.
T. G. I. R 5

17,749
Hoffeld, D.R., Seidenstein, S. & Brogden, W.J. PROFICIENCY IN FINGER-TRACKING AS A FUNCTION OF NUMBER OF FINGERS. Amer. J. Psychol., March 1961, LXXIV(1), 36-44. (University of Wisconsin, Madison, Wisc.).

17,749
Four experiments were conducted to investigate the relation between tracking proficiency and complexity and to determine the relative proficiency of the individual fingers in tasks of different complexity. In Experiments I and II, the task required four-finger tracking, in III a single finger, and in IV two fingers. For each condition in each experiment different groups of 15 Ss were used. The task was a unidimensional compensatory tracking type. The data were examined by analyses of variance.
G. R 3

17,750
Hawkes, G.R. CUTANEOUS DISCRIMINATION OF ELECTRICAL INTENSITY. Amer. J. Psychol., March 1961, LXXIV(1), 45-53. (USA Medical Research Lab., Fort Knox, Ky.).

17,750
To provide data which would bear on the use of electrical cutaneous stimulation for purposes of communication, $\Delta I/I$ for stimulation of fingertip by a.c. was measured at various combinations of stimulus-frequencies and standard intensities (100, 500, and 1,500 cycles at 120 percent and 200 percent of the current at threshold). Three Ss participated; two methods of stimulus presentation were used: "best" method and method of successive stimuli. The values of $\Delta I/I$ obtained here were compared to those from other modalities.
G. I. R 17

17,751
Maier, Barbara, Bevan, W. & Behar, I. THE EFFECT OF AUDITORY STIMULATION UPON THE CRITICAL FLICKER FREQUENCY FOR DIFFERENT REGIONS OF THE VISIBLE SPECTRUM. Amer. J. Psychol., March 1961, LXXIV(1), 67-73. (Kansas State University, Manhattan, Kan.).

17,751
This study was a comprehensive evaluation of the effect of auditory input upon monocular, foveal cff for lights of different color. Three groups of 12 Ss each were tested with one of three dominant wave lengths: 490.5, 538.0, and 605.7 mu; each group experienced all combinations of three loudness-levels: 0, 40, and 80 phons and three frequencies: 290, 1,050, and 3,900 cycles. Thresholds were obtained by the method of limits. The data were evaluated by analysis of variance technique.
T. G. R 24

17,752
Payne, M.C., Jr. APPARENT WEIGHT AS A FUNCTION OF HUE. Amer. J. Psychol., March 1961, LXXIV(1), 104-105. (Georgia Institute of Technology, Atlanta, Ga.).

17,752
Three hypotheses were tested: 1) that objects of the same size but different hues differ in apparent weight, 2) that apparent weight of an achromatic object differs from that of a chromatic object of the same brightness, 3) that there is no significant relation between apparent weight and preference for hue. The stimulus objects were cubes: red, yellow, green, blue, purple, and gray, of equal saturation and brightness. Ss judged apparent weight on a five-point scale; they also ranked all colors in order of their preference. The weight data were evaluated by analysis of variance, and the weights and preferences by rank order correlation.
T. R 5

17,753
Malmo, R.B. & Davis, J.F. A MONOPOLAR METHOD OF MEASURING PALMAR CONDUCTANCE. Amer. J. Psychol., March 1961, LXXIV(1), 106-113. (McGill University, Montreal, Quebec, Canada).

17,753
This paper describes an apparatus and method used to study variations of skin conductance at a single site. The method makes use of an indifferent or reference electrode and an active electrode. Apparatus details include a circuit diagram, description of electrode construction and chloriding, measurement of voltage and resistance, and placement of electrode leads.
I. R 7

17,754
Lynn, R. REVERSIBLE PERSPECTIVE AS A FUNCTION OF STIMULUS-INTENSITY. Amer. J. Psychol., March 1961, LXXIV (1), 131-133. (University of Exeter, Exeter, England).

17,754
Two hypotheses were examined: 1) that rate of reversal on the Necker Cube should be a function of amount of stimulation, and 2) that stimulus-intensity should affect rate of reversal. Twelve Ss reported spontaneous reversals and reversals when they were trying to prevent them under one of two illuminations. The differences in mean reversal rates were evaluated by t-tests. The results were considered in terms of Fisichelli's theory.
R 5

17,755
Zajac, J.L. DEPTH-PERCEPTION AND ASTIGMATISM. Amer. J. Psychol., March 1961, LXXIV(1), 133-134. (University of Edinburgh, Edinburgh, Scotland).

17,755
This note describes some depth phenomena observed and investigated by the author. These phenomena result from differences in the kind and degree of astigmatism of each eye, and are the same as those obtained with a stereoscope or free stereoscopy.
R 2

17,757
Maheux, M., Townsend, J.C. & Gresock, C.J. GEOMETRICAL FACTORS IN ILLUSIONS OF DIRECTION. Amer. J. Psychol., Dec. 1960, LXXIII(4), 535-543. (Catholic University of America, Washington, D.C.).

17,757
Two hypotheses regarding illusions of direction were tested, namely, that the deviation of the segments determined on parallel lines by transverse lines are: "1) an inverse function of the length of these segments; and 2) an inverse function of the size of the acute angles they form with the intersecting lines of the field." In Experiment I, S made judgments of the length of segments for oblique lines alone and incorporated in a section of Zöllner's figure for each of ten lengths: 1 1/2 to 40 mm. In Experiment II, the same Ss made judgments of the size of angle formed by the oblique and parallel line in each of 11 sections of Zöllner's figure (angles from 10 to 70 degrees). The data were discussed in terms of Gestalt principles of direction and pregnance. T. G. I. R 4

17,758
Long, E.R., Reid, L.S. & Henneman, R.H. AN EXPERIMENTAL ANALYSIS OF SET: VARIABLES INFLUENCING THE IDENTIFICATION OF AMBIGUOUS, VISUAL STIMULUS-OBJECTS. Amer. J. Psychol., Dec. 1960, LXXIII(4), 553-562. (University of North Carolina, Chapel Hill, N.C.).

17,758
Three experiments were performed to determine: 1) whether set can vary in degree, 2) whether level of ambiguity influences the effectiveness of set, and 3) under what conditions set operates to increase discrimination by increasing interpretability or by increasing correct responses by reducing number of alternatives. Ss identified degraded letter-patterns presented at varying levels of ambiguity under several conditions of set: 1) different numbers of alternatives, 2) alternatives drawn from different populations, and 3) alternatives in different temporal relation to the stimulus. The data from each study were evaluated by analysis of variance.
T. R 24 (approx.).

17,759
Long, E.R., Henneman, R.H. & Garvey, W.D. AN EXPERIMENTAL ANALYSIS OF SET: THE ROLE OF SENSE-MODALITY. Amer. J. Psychol., Dec. 1960, LXXIII(4), 563-567. (University of North Carolina, Chapel Hill, N.C.).

17,759
Two experiments were performed to determine whether establishing set by ear would yield results different from those obtained by vision (17,758). In Experiment I, 60 Ss were required to identify each of 33 distorted spondaic nouns presented aurally. For each word, set was established by presenting four undistorted spondaic words aurally and/or visually before and/or after the stimulus word. An analysis of variance was performed on the frequency of identification data. In the second experiment, the stimulus objects were the same, but they were presented visually at each of two durations: one-third sec. and four sec. The alternatives also were the same but presented only visually. These data were evaluated by analysis of variance technique.
T. R 3

17,760
Reid, L.S., Henneman, R.H. & Long, E.R. AN EXPERIMENTAL ANALYSIS OF SET: THE EFFECT OF CATEGORICAL RESTRICTION. Amer. J. Psychol., Dec. 1960, LXXIII (4), 568-572. (University of Virginia, Charlottesville, Va.).

17,760
The effect of increasing the category information of a stimulus word upon set was studied. Ss (60 college men) were required to identify each of 48 distorted stimulus words after one of two types of familiarization: study of both words and categories, study of categories only. Set was manipulated by varying the number of category terms from one to five. The procedure was the same as in 17,758 and 17,759. The frequencies of correct identifications were again evaluated by analysis of variance.
T. R 9

17,761
Slivinske, A.J. & Hall, J.F., Jr. THE DISCRIMINABILITY OF TONES USED TO TEST STIMULUS-GENERALIZATION. Amer. J. Psychol., Dec. 1960, LXXIII(4), 581-586. (Pennsylvania State University, State College, Penn.).

17,761
The discriminability of the auditory stimuli (loudness dimension only) utilized in Hovland's study of generalization was investigated using two other psychophysical techniques: 1) absolute judgment, and 2) a method designed to approximate conditions of generalized tests. The Ss were 150 students; half were presented the Hovland series (40, 60, 74, 86 db), half the series taken from an equal discriminability scale (30, 66, 94, 110 db). For the first method, S assigned a number from one to four to the tones; for the second, one of the tones was designated as standard and S responded same or different to the others. Separate analyses of variance were performed on the data. The implications of the results for stimulus-generalization studies were indicated.
G. R 7

17,762
Newman, S.E. & Saltz, E. EFFECTS OF CONTEXTUAL CUES ON LEARNING FROM CONNECTED DISCOURSE. Amer. J. Psychol., Dec. 1960, LXXIII(4), 587-592. (North Carolina State College, Durham, N.C. & Wayne State University, Detroit, Mich.).

17,762
Four predictions concerning the effects upon learning of similarity of contextual cues in connected discourse were made on the basis of Gibson's theory of generalization and tested. The Ss were 40 students, 20 each in the high- and low-similarity groups. Each S read aloud either the high- or low-similarity version of the test material in five two-min. periods. After each period a test of nine items was administered. Speed of reading was recorded. Performance on the tests was evaluated statistically for the two groups. The results were considered in terms of Gibson's theory and some limitations indicated.
T. R 11

17,763
Logie, L.C., Pizzuto, J.S., Overall, J.E. & Brown, W.L. THE PERCEPTION OF RADIATION BY ALBINO RATS. Amer. J. Psychol., Dec. 1960, LXXIII(4), 593-598. (USAF School of Aviation Medicine, Brooks AFB, Tex. & University of Texas, Austin, Tex.).

17,763
The hypothesis that albino rats perceive X-radiations as "noxious stimuli" was tested by determining whether they could distinguish otherwise identical dark compartments. The effects of sex and gonadectomy also were examined. Each of 40 albino rats (ten male, ten female, ten gonadectomized male, ten gonadectomized female) were placed in the compartments and the time spent there was recorded. The data were subjected to a three-way factorial analysis of variance. A second group of 20 normal male albinos was tested in order to establish the reliability of these results.
G. R 5

17,764
Over, R. THE EFFECT OF INSTRUCTIONS ON SIZE-JUDGMENTS UNDER REDUCTION-CONDITIONS. Amer. J. Psychol., Dec. 1960, LXXIII(4), 599-602. (University of Sydney, Sydney, Australia).

17,764
The effect of two sets of instructions on the estimation of size under reduction conditions was determined. Ss were 20 students unfamiliar with the setup; half were given the "objective" instructions, half the "retinal" ones. Each made size equality judgments for two sizes and three distances of the standard and three distances of the comparison in all combinations using a variation of the method of limits. The results were considered in terms of the role played by experimental features.
T. R 8

17,765
Morse, Elizabeth B. & Runquist, W.N. PROBABILITY-MATCHING WITH AN UNSCHEDULED RANDOM SEQUENCE. Amer. J. Psychol., Dec. 1960, LXXIII(4), 603-607. (Hobart College, Geneva, N.Y. & Pomona College, Claremont, Calif.).

17,765
This experiment was designed to determine whether the probability-matching which has been reported by various investigators would occur with a sequence of events clearly unscheduled by the experimenter; also transfer to a scheduled situation was studied. Ss were 32 students; 16 served in both situations and 16 acted as controls. The unscheduled situation was predicting whether a rod dropped on a surface of parallel lines would come to rest in contact with a line; the scheduled was a two-choice light guessing one which used the sequence S established in the first. Subjective results also were obtained and related to earlier findings.
G. R 9

17,766
Epstein, W. THE KNOWN-SIZE-APPARENT-DISTANCE HYPOTHESIS. Amer. J. Psychol., Sept. 1961, LXXIV(3), 333-346. (University of Kansas, Lawrence, Kan.).

17,766
Three experiments were performed to determine whether: 1) modification of normal assumptions concerning size of familiar objects would effect appropriate changes in perception, 2) relative size of similar objects is sufficient cue for apparent localization in an analogous situation, 3) systematic localization responses could be observed in the absence of size cues. Ss made distance and size judgments of playing cards, blank cards, and/or colored discs of various sizes. Prior experience with all sizes of playing cards was given half the Ss in (1), and only one size of disc was given to each S in (3). The results from each were examined by analysis of variance and some explanations set forth.
T. R 25 (approx.).

17,767
Pruitt, D.G. INFORMATIONAL REQUIREMENTS FOR MAKING DECISIONS. Amer. J. Psychol., Sept. 1961, LXXIV(3), 433-439. (Yale University, New Haven, Conn.).

17,767
The role of verbal awareness in secondary or mediated generalization was evaluated by determining whether Ss who had learned without awareness would show significant mediated generalization and whether aware and unaware Ss would differ in the amount of generalization exhibited, speed of learning, IQ, and retention. Ss learned a discrimination task involving Arabic numbers; then generalization was tested by replacing the numbers with corresponding numbers of circles, e.g., "2" replaced by two circles. Next, retention with original objects was tested and an IQ measure also obtained. The data for Ss with and without insight were compared on the above variables by t-tests.
T. R 7

17,768
Gardner, R.A. IMMEDIATE AND RESIDUAL FIGURAL AFTER-EFFECTS IN KINESTHESIS. Amer. J. Psychol., Sept. 1961, LXXIV(3), 457-461. (USA Quartermaster Research & Engineering Command, Natick, Mass.).

17,768
This study replicated and expanded upon Wertheimer and Leventhal's work on residual aftereffects in kinesthetic judgments by utilizing a somewhat more refined method. S held a pair of discs simultaneously between thumb and forefinger (representing imaginary cylinder) of both the right and left hands (variable and standard, respectively), and made 12 presatiational and a single postsatiational judgment using the method of adjustment. Five such tests were given at intervals of 24 hours. The 60 Ss were divided into three major groups: one was satiated for four min. to induce overestimation of standard, one to induce underestimation, and the third rested for this period. The immediate and residual aftereffects were analyzed statistically for the three groups.
G. R 10

17,769
Simoneau, G.R. AN IMPROVED CIRCUIT FOR TIME-ON-TARGET AND INTEGRATED ERROR-SCORES IN CONTINUOUS TRACKING. Amer. J. Psychol., Sept. 1961, LXXIV(3), 471-472. (General Dynamics Corporation, Groton, Conn.).

17,769
This note describes a simple, highly stable and reliable circuit which makes possible the economical recording of both time-on-target and integrated absolute error. The main components are d.c. amplifiers and sensitive relays.
R 1

17,770
Costello, C.G. CONSTANT ERRORS IN THE MEASUREMENT OF KINESTHETIC FIGURAL AFTER-EFFECTS. Amer. J. Psychol., Sept. 1961, LXXIV(3), 473-474. (Institute of Psychiatry, University of London, London, England).

17,770
The effect of handedness on the size of kinesthetic figural aftereffects was tested. The Ss were 18 right-handed men. S was required to estimate the width of a test block by indicating the place on the comparison block which corresponded to it. This was done with the test block in the right hand and comparison in left and vice versa. The results for ascending and descending trials were analyzed separately. Differences between the estimates and physical equality for right versus left (test block) were examined by t-tests. The findings were considered in terms of Wertheimer's hypothesis.
R 4

17,771
Kinney, Jo Ann S. DISCRIMINATION IN AUDITORY AND VISUAL PATTERNS. Amer. J. Psychol., Dec. 1961, LXXIV(4), 529-541. (USN Medical Research Lab., New London Submarine Base, Conn.).

17,771
The experiment sought to provide quantitative data on the perception of temporal differences in auditory patterns and compare these with similar vision data. Intervals of 10, 20, 30, and 40 msec. between tones were tested for two frequency-separations of the tones (1,200 and 1,440 cycles and 1,200 and 3,480 cycles) used in each of six patterns--basic, pyramid, ascending, triad, two and four repetitions. Most Ss discriminated the temporal separations by the ABX method. The results were evaluated by t-tests. The comparable visual elements were rectangles with two vertical separations (small and large) and five patterns (basic, triad, pyramid, two and four repetitions); each combination was observed at five horizontal separations by four Ss. The results emphasized the similarities in the two modalities. T. G. I. R 11

17,772
Engel, Gloria & Parducci, A. VALUE OF BACKGROUND IN THE SPECIFICATION OF THE STIMULUS FOR JUDGMENT. Amer. J. Psychol., Dec. 1961, LXXIV(4), 569-575. (University of California, Los Angeles, Calif.).

17,772
Two experiments investigated shifts in adaptation level for judgments of visual size: when the background of only one stimulus in the series was varied, and when the backgrounds of the standard and comparison stimuli were varied independently. In the first, 30 Ss judged the size of a black square projected on a white background in terms of a five-category scale. Five sizes of square were used and three size conditions of background. The data were examined by analysis of variance technique. In the second, seven Ss judged the second square presented as larger or smaller than the first (standard). One square size for both standard and comparison and the three background sizes were used in all combinations. Modifications of Helson's equations for absolute and comparative judgments were suggested and discussed. T. R 6

17,773
Parducci, A. & Marshall, Louise M. CONTEXT-EFFECTS IN JUDGMENTS OF LENGTH. Amer. J. Psychol., Dec. 1961, LXXIV(4), 576-583. (University of California, Los Angeles, Calif.).

17,773
The effects of context on judgment of the length of lines were studied for sets of lines which differed with respect to the physical values of their midpoints, medians, and means. Also, the relative effects of manner of presentation on these judgments were studied. Eleven sets of 45 lines each were presented in each of two ways: frequency-spaced and length-spaced. S rated each line of a set on a six-point scale of length. The responses of 27 Ss, randomly selected, were examined by analyses of variance. The results were discussed in terms of judgment as a range-frequency compromise, and adaptation-level theory.
T. R 4

17,774
Wilcott, R.C. & Beenken, H.G. THE CONTINUOUS MEASUREMENT OF PALMAR SWEATING. Amer. J. Psychol., Dec. 1961, LXXIV(4), 619-624. (Western Reserve University, Cleveland, Ohio & University of Nebraska College of Medicine, Lincoln, Neb.).

17,774
A device used for the measurement of the moisture content of a continuous flow of gas is described in terms of its application to the measurement of palmar sweating. It operates on the basis of the simultaneous absorption and electrolysis of the water content of a gas flowing through it. Construction details, operating procedure, apparatus latency, and some response data are also included.
G. I. R 1

17,775
Corah, N.L. & Cohen, W. ATTENTION AND THE KINESTHETIC FIGURAL AFTER-EFFECT. Amer. J. Psychol., Dec. 1961, LXXIV(4), 629-630. (Washington University, Seattle, Wash. & University of Buffalo, Buffalo, N.Y.).

17,775
Some evidence on the relation between attention and perception was presented. Twenty-four Ss made four practice judgments on the test object, four presatiation judgments, rubbed for 60 sec. on the inspection object, and finally made four postsatiation judgments on the test object. The difference between mean presatiation and mean postsatiation judgments were evaluated by t for related measures.
R 3

17,776
Edgington, E.S. A STATISTICAL TEST OF CYCLICAL TRENDS, WITH APPLICATION TO WEBER'S LAW. Amer. J. Psychol., Dec. 1961, LXXIV(4), 630-632. (Kansas State Teachers College, Emporia, Kan.).

17,776
This brief article described the application of a statistical test that is appropriate for testing Weber's law. König's data for visual brightness discrimination of white light were used. The quantitative feature was the number of runs (a group of one or more identical signs) of signs (the indication of increase or decrease in the size of the Weber ratio as stimulus-intensity increase) of successive differences.
T. R 5

17,777
Hirsh, I.J. & Sherrick, C.E., Jr. PERCEIVED ORDER IN DIFFERENT SENSE MODALITIES. J. exp. Psychol., Nov. 1961, 62(5), 423-432. (Central Institute for the Deaf, St. Louis, Mo.).

17,777
To determine the amount of time that must intervene between two stimulus events for S to report correctly which preceded the other, four experiments on sense modalities were done: 1) visual--identical visual stimuli were presented at two points along either a horizontal or vertical line at each of seven temporal intervals (from 60 msec., left or lower light leading to 60 msec., right or upper light leading); 2) auditory--two pulses differing in pitch, ear stimulated, and both pitch and ear were presented at six temporal intervals; 3) tactual--similar to (2), using vibratory stimuli to index fingertip; 4) two stimuli were delivered to different modalities. Results were compared across senses and considered in light of the more simple type judgment of temporal resolution. G. R 13

17,778
Marx, M.H., Murphy, W.W. & Brownstein, A.J. RECOGNITION OF COMPLEX VISUAL STIMULI AS A FUNCTION OF TRAINING WITH ABSTRACTED PATTERNS. J. exp. Psychol., Nov. 1961, 62(5), 456-460. (University of Missouri, Columbia, Mo.).

17,778
Two training techniques for the recognition of complex visual stimuli in which only the pattern or basic arrangement of the elements remains relatively stable were investigated. The Ss, 198 students, were divided into three groups: one viewed the pattern itself (control) and two viewed abstracted forms (lines representing the major direction or "flow" of the pattern and pattern represented by simple geometric designs). Five basic patterns, 50 and 25 percent deletions of these patterns, and 50 and 25 percent additions of noise to these patterns were tested. The task was to associate the name and pattern presented on the training trials (12) and then identify the patterns on the test trials (12). Analysis of variance was performed on the number of correct recognitions for groups and pattern types. T. G. I.

17,779
Lipman, R.S. & Spritz, H.H. THE RELATIONSHIP BETWEEN KINESTHETIC SATIATION AND INHIBITION IN ROTARY PURSUIT PERFORMANCE. J. exp. Psychol., Nov. 1961, 62(5), 468-475. (Edward R. Johnstone Training and Research Center, Bordentown, N.J. & Special Studies Unit, National Institute of Mental Health, Bethesda, Md.).

17,779
To test the hypothesis of similarity between satiation and inhibition and to identify the Hullian analogue of satiation in motor learning, the rotary pursuit performance of high and low kinesthetic satiaters were compared under different work and rest schedules. In I, retarded adolescents served--23 in the high satiation, 24 in the low, and 18 in the control group. A massed to spaced performance schedule was used in over 48 trials for the high and low groups, a spaced schedule for the control. Mean time on target scores were compared by Mann-Whitney U tests. In II, college sophomores served--16 and 13 in the high and low groups performing under the massed schedule, 17 and 17 in the high and low groups under the spaced schedule. Scores were compared by the same tests. G. R 14

17,780
Zipf, Sheila G. THE EFFECTS OF AMOUNT OF REWARD, REQUIREMENT, AND SEVERAL RELATED PROBABILITIES ON HUMAN PERFORMANCE. J. exp. Psychol., Nov. 1961, 62(5), 503-509. (University of California, Berkeley, Calif.).

17,780
The effect on human performance of changes in motivating conditions was investigated; the variables constituting motivation were: amount of reward, probability of reward for successful performance, probability of success, and amount of increase in speed required. Ss were 240 students; the task was card sorting (IBM cards with different numbers of holes). Ss had 12 min. of practice and three six-min. work periods; each work period was preceded by variations in the motivating instructions. The performance scores were subjected to analysis of variance; relationship between performance and verbal reports of desire for reward also was examined. The findings were considered in light of prevailing theories on reward expectancy and amount and resulting performance. T. R 18

17,781
Reid, L.S., Lloyd, K.E., Brackett, H.R. & Hawkins, W.F. SHORT-TERM RETENTION AS A FUNCTION OF AVERAGE STORAGE LOAD AND AVERAGE LOAD REDUCTION. J. exp. Psychol., Nov. 1961, 62(5), 518-522. (University of Virginia, Charlottesville, Va.).

17,781
Two experiments on short-term retention were conducted: I examined the effect of various average storage loads upon recall of sequentially presented items, average load reduction held constant; and II examined variation in average load reduction, average storage load held constant. The Ss were required to remember (store) each word in a series of familiar English words and to recall same when the appropriate class name was heard. Other words were presented or previously presented items were asked for recall during the storage period. In I, there were four storage loads: 2.5, 3.5, 4.5, 5.5; in II, there were six load reductions: 1.0, 1.5, 2.0, 2.5, 3.0, 3.5. All Ss responded to two sequences a day for four days. The error scores were examined by analysis of variance and trend analysis. T. R 3

17,782
Pinneo, L.R. THE EFFECTS OF INDUCED MUSCLE TENSION DURING TRACKING ON LEVEL OF ACTIVATION AND ON PERFORMANCE. J. exp. Psychol., Nov. 1961, 62(5), 523-531. (Institute of Physiology, University of Pisa, Italy).

17,782
The relation between induced muscle tension, activation, and the level of performance on an auditory tracking task was investigated. Tension was induced by the use of a hand dynamometer with a given pressure; tracking was done by a foot depressing and releasing a pedal at a predetermined rate (failure to keep pace was indicated by a tone in earphones); EMG, EEG, EKG, GSR, and respiration rate measures were recorded. Ss (38) practiced until performance reached a stable level; each performed one trial under: 1) each of five tension conditions (very heavy to very light based on S's dynamometer grip), 2) no muscle tension, and 3) exertion of leg on pedal. Performance measures were errors, distance off target, and pull on strain gauge dynamometer. Analyses of variance were used. T. G. R 15

17,783
Karn, H.W. & Gregg, L.W. EFFECTS OF INSTRUCTION ON THE PERCEPTION OF MULTIPLE TARGETS: SUPPLEMENTARY REPORT. J. exp. Psychol., Nov. 1961, 62(5), 533-534. (Carnegie Institute of Technology, Pittsburgh, Penn.).

17,783
An initial attempt to provide better understanding of perceptual performance in a multiple stimulus situation through a modification of instructions was reported. Ss had 30, 10, or 0 prior presentations of the configuration—three circles each of which contained a dot; two always contained the dot; the third was present or absent randomly. They were presented one of three sets of instructions: nonspecific, problem-solving set, and specific solution inferred. An analysis of variance was performed on the error data.
G. R 3

17,784
Behnke, A.R. ANTHROPOMETRIC FRACTIONATION OF BODY WEIGHT. J. appl. Physiol., Nov. 1961, 16(6), 949-954. (Division of Research, Lankenau Hospital, Philadelphia, Penn. & San Francisco Institute of Medical Sciences, Presbyterian Medical Center, San Francisco, Calif.).

17,784
This paper reported the results of anthropomorphic measurements made on two small groups of men (34) and women (24) and a large group of workmen (488). Eleven circumferences were measured by tape: shoulders, chest, abdomen, buttocks, thighs, biceps, forearms, wrists, knees, calves, and ankles; stature was determined via a wall chart. The data analysis included computation of standard errors of estimate, coefficients of variation, weight-stature quotients, and proportional weights for each anthropometric dimension. This technique of assessing body build quantitatively by fractionation was considered in some detail. Some earlier data also were presented for comparison.
T. R 14

17,785
Taylor, W.L. & Behnke, A.R. ANTHROPOMETRIC COMPARISON OF MUSCULAR AND OBESE MEN. J. appl. Physiol., Nov. 1961, 16(6), 955-959. (USN Radiological Defense Lab., San Francisco, Calif. & San Francisco Institute of Medical Sciences, Presbyterian Medical Center, San Francisco, Calif.).

17,785
Anthropometric measurements of muscular and obese men were compared in an effort to obtain an index of fatness. Fractional body weights were calculated for the 11 circumferences and these were divided into two groups—one concerned mainly with the trunk and the other with the extremities. Body weight was thus partitioned into two components; these computations plus the estimates of body fat from them were included. Also, planimeter measurements of the lateral trunk and posterior shoulder areas were compared in relation to percentage and absolute amounts of fat (as determined from body density measures).
T. G. I. R 9

17,786
Behnke, A.R. QUANTITATIVE ASSESSMENT OF BODY BUILD. J. appl. Physiol., Nov. 1961, 16(6), 960-968. (San Francisco Institute of Medical Sciences, Presbyterian Medical Center, San Francisco, Calif.).

17,786
A quantitative classification of body build is outlined for adolescents and adults which is based on 11 anthropometric circumferences: shoulders, chest, abdomen, buttocks, biceps, forearm, wrist, thigh, knee, calf, and ankle; and eight diameters: biacromial, bi-iliac, chest, bitrochanteric, wrist, ankle, knee, and elbow. The measures are converted to "d" values and selected ones placed in three categories which give numerical values for: degree of fatness, muscularity, and skeletal size. Equivalent weights are derived for each category and Ss are rated according to the three components. The skeletal component is evaluated in relation to chemical and biophysical analysis of body structure. Resultant values of the above computations and derivations provide the basis for the somatogram. T. I. R 8

17,787
Astrand, P.-O. & Saltin, B. OXYGEN UPTAKE DURING THE FIRST MINUTES OF HEAVY MUSCULAR EXERCISE. J. appl. Physiol., Nov. 1961, 16(6), 971-976. (Department of Physiology, Kungliga Gymnastiska Centralinstitutet, Stockholm, Sweden).

17,787
Oxygen uptake, heart rate, pulmonary ventilation, and lactic acid concentration were studied in human Ss performing very heavy exercise on a bicycle ergometer. Five well-trained Ss participated, one female and four male. Each session began with a ten-min. warm-up period followed by an increased work load which was varied so that exhaustion terminated exercise after about two to eight min. Heart rate was recorded on an electrocardiograph; expired air was measured in a balanced spirometer and analyzed by the Haldane technique; lactic acid was determined from a blood sample drawn from the finger tip. The data were subjected to statistical analysis and the main findings were compared to those of other researchers.
T. G. R 15

17,788
Astrand, P.-O. & Saltin, B. MAXIMAL OXYGEN UPTAKE AND HEART RATE IN VARIOUS TYPES OF MUSCULAR ACTIVITY. J. appl. Physiol., Nov. 1961, 16(6), 977-981. (Department of Physiology, Kungliga Gymnastiska Centralinstitutet, Stockholm, Sweden).

17,788
Oxygen uptake, heart rate, pulmonary ventilation, and blood lactates were studied in human Ss performing maximal work in various types of muscular activity. Seven well-trained Ss participated; seven exercises were studied: cycling in sitting position on ergometer, cycling in supine position on ergometer, simultaneous arm and leg work on bicycle ergometers, running on treadmill, skiing, swimming, and cranking with arm. The physiological measures were obtained by techniques simular to those employed in 17,787. Heart rate and oxygen uptake data were compared for the different activities; these differences were evaluated statistically and related to other relevant findings.
T. G. R 13

17,789
Hodgkins, Jean. INFLUENCE OF UNILATERAL ENDURANCE TRAINING ON CONTRALATERAL LIMB. J. appl. Physiol., Nov. 1961, 16(6), 991-993. (Department of Physical Education--Women, University of California, Santa Barbara, Calif.).

17,789
The effect of unilateral endurance training on the contralateral limb was tested. Forty-one college women participated. The endurance task was to lift an 18-lb. boot which was strapped to the bottom of one foot from one prescribed point to another at a given rate of speed for as long as possible. After three practice trials, initial scores on the task were established for each leg. Ten training sessions then were carried out on one leg only; then the other leg was tested. Initial and final scores were compared and evaluated by t-tests.
T. R 3

17,790
Vetter, K. & Horvath, S.M. ANALYSIS OF PHYSIOLOGICAL TREMOR DURING REST AND EXHAUSTION. J. appl. Physiol., Nov. 1961, 16(6), 994-996. (Division of Research, Lankenau Hospital, Philadelphia, Penn. & University of California, Santa Barbara, Calif.).

17,790
Physiological tremor was examined statistically during rest and exhaustion. Eighteen healthy Ss participated; some were right-handed, some left-handed. The amplitude and frequency components of tremor were registered from both hands on all Ss and EKGs were obtained from those doing the bicycle ergometer exercise. Right- and left-hand values of the tremor components were compared graphically as were those of the rest and exhaustion periods.
T. G. R 9

17,791
Rawson, R.O. & Randall, W.C. VASCULAR AND SWEATING RESPONSES TO REGIONAL HEATING OF THE BODY SURFACE. J. appl. Physiol., Nov. 1961, 16(6), 1006-1010. (Yale University School of Medicine, New Haven, Conn. & Loyola University, Chicago, Ill.).

17,791
The significance of cutaneous and internal thermoreceptors in the regulation of human temperature was studied. Eight male Ss were exposed simultaneously to environmental temperatures of 60 degrees C and 25 degrees C; either the upper or lower half of the body was placed in the heated climate chamber. Four sessions were conducted on each S: two involved sudden exposure to the high temperature on each half of the body; two involved gradual warming (30 to 60 min.). Cutaneous (from seven surface areas), rectal, and tympanic membrane temperatures, and vasomotor and sudomotor responses were recorded. The patterns of response were compared for the different environmental conditions, and the relative roles of the central and peripheral mechanisms in temperature regulation were discussed. G. R 11

17,792
Davis, T.R.A. CHAMBER COLD ACCLIMATIZATION IN MAN. J. appl. Physiol., Nov. 1961, 16(6), 1011-1015. (USA Medical Research Lab., Fort Knox, Ky.).

17,792
The shivering response was investigated as an index of artificially induced cold acclimatization in man. Ten Ss, in March (maximum cold acclimatization), were exposed eight hours daily for 31 days to an air temperature of 11.8 degrees C; six Ss, in September (minimum cold acclimatization), similarly were exposed to 13.5 degrees C. Shivering activity, oxygen consumption, rectal temperature, and skin temperature from eight surface areas were measured. The results from the two groups were evaluated statistically on a paired data basis and their implications for artificial acclimatization were discussed.
T. G. R 20

17,793
Steiner, S.H. & Mueller, G.C.E. HEART RATE AND FORWARD ACCELERATION. J. appl. Physiol., Nov. 1961, 16(6), 1078-1080. (Department of Medicine, Indiana University Medical Center, Indianapolis, Ind. & Department of Surgery, Massachusetts General Hospital, Boston, Mass.).

17,793
The effect on cardiac output of altering the position of the cardioregulatory centers in the head and neck with respect to those in the thorax during forward acceleration was studied. Heart rate was measured on six human Ss with the head in each of three positions: neutral (fully supine), elevated, and depressed while accelerating at eight g; and before (control) and after (postcontrol) the acceleration period. The differences in the measures were evaluated statistically by t-tests. Physiological explanations for the results were offered.
T. I. R 9

17,794
Hurley, H.W. THE CONTROL OF FUMES IN THE ELECTROPLATING INDUSTRY. Ann. occup. Hyg., Dec. 1959, 2(1), 30-38. (W. Canning & Co. Ltd., Birmingham, England).

17,794
This paper first considers the different types of fumes associated with the electroplating industry and then discusses the techniques of exhausting and scrubbing them. The solutions from which fumes arise are chrome, copper, cadmium, zinc, and caustic cleaners; these are cleaned by specially designed scrubbers. The steam from the hot water swills is handled by exhaust ducts. Also, the removal of polishing dust is briefly described.
I. R 2

17,795
Vokes, G.H. AIR CONSERVATION IN INDUSTRY. Ann. occup. Hyg., Dec. 1959, 2(1), 39-53. (Vokes Ltd., Guildford, Surrey, England).

17,795
This paper is aimed at emphasizing "the attractive feasibility of internal recirculation from dusty processes, providing adequate dust removal means are incorporated." Three types of apparatus for air cleaning are considered: electrostatic precipitator, disintegrator scrubber, and dry filter. Because of economic considerations only the dry filtration technique is considered in detail. Some types described include the "Box Canister" and paper absolute. Average fuel costs for recirculating air are calculated and presented. Finally, the feasibility of recirculating is considered.
T. I. R 1

17,796
Bamblin, W.P. DUST CONTROL IN THE ASBESTOS TEXTILE INDUSTRY. Ann. occup. Hyg., Dec. 1959, 2(1), 54-74. (Turner Brothers Asbestos Co. Ltd., Rochdale, Lancs, England).

17,796
The highlights of the Merewether and Price study, which examined 363 people from various age groups of the asbestos industry (for incidence of fibrosis) and made engineering recommendations regarding equipment, plant, and methods to be used, are presented as background information for evaluating the present conditions in the industry. The remainder of the report describes and discusses the methods of dust suppression now utilized. These include exhaust hoods, damping troughs, and oil emulsion treatments for the weaving operation; mechanical mixing of various grades of fiber; automatic dispensing of the fiber; better enclosure of all machines; and mechanical means for removal of dust from machines.
T. I. R 2

17,797
Green, D.M. DETECTION OF AUDITORY SINUSOIDS OF UNCERTAIN FREQUENCY. J. acoust. Soc. Amer., July 1961, 33(7), 897-903. (Economics Dept. & Research Lab. of Electronics, Massachusetts Institute of Technology, Cambridge, Mass.). (AFCCDD TR 61 8).

17,797
The influence of a signal-frequency uncertainty on the ability to detect a sinusoidal signal in noise was investigated using extreme conditions of signal uncertainty with the aim of establishing both the magnitude of the phenomenon and the importance of certain obvious physical variables. S listened to 100 two-alternative forced-choice trials per experimental session and judged in which of two temporal intervals the signal was presented (with continuous background noise). One of two signal conditions prevailed within a session: fixed frequency (2,250 cps) or a randomly selected frequency from a range of frequencies: 0, 100, 300, 500, 1,000, 3,500 cps. Results demonstrated the relation between signal energy and range of uncertainty for a given percentage of correct detections. T. G. R 11

17,798
Nixon, J.C. & Glorig, A. NOISE-INDUCED PERMANENT THRESHOLD SHIFT AT 2000 CPS AND 4000 CPS. J. acoust. Soc. Amer., July 1961, 33(7), 904-908. (Research Center, Subcommittee on Noise, Los Angeles, Calif.).

17,798
Three samples of male industrial workers with environments of continuous, steady-state noise which had average SPLs in the octave bands from 150 to 4,800 cps of 77 to 96 db were studied. Each sample was subgrouped according to length of time on job (greater than 1 to less than 25 years). Median hearing levels were calculated for 2,000 and 4,000 cps for each subgroup (corrected to median age effect). The resulting values were defined as the noise-induced permanent threshold shift. These data were considered in terms of exposure time in years.
T. G. R 4

17,799
Loeb, M. & Dickson, C. FACTORS INFLUENCING THE PRACTICE EFFECT FOR AUDITORY THRESHOLDS. J. acoust. Soc. Amer., July 1961, 33(7), 917-921. (USA Medical Research Lab., Fort Knox, Ky. & University of Kentucky, Lexington, Ky.).

17,799
Three experiments were performed in order to investigate the practice effects on auditory thresholds. In I, auditory thresholds for 125, 500, 1,000, and 3,000 cps in quiet were obtained from 40 Ss by the Békésy tracking method on five successive days. These data were examined by separate analyses of variance at each frequency. In II, thresholds for the same frequencies were obtained against a background of 50 db white noise. Forty different Ss participated, ten at each frequency. The data were evaluated in the same manner. In III, Ss were asked to track their 3,000-cps thresholds against a background of high-frequency noise. The data again were subjected to analysis of variance. The theoretical implications of the findings were indicated. T. G. R 6

17,800
Whitworth, R.H. & Jeffress, L.A. TIME VS INTENSITY IN THE LOCALIZATION OF TONES. J. acoust. Soc. Amer., July 1961, 33(7), 925-929. (Texas Western University, El Paso, Tex. & Defense Research Lab. & Psychology Dept., University of Texas, Austin, Tex.).

17,800
This study was concerned with the roles of time and intensity differences in lateralization. Five Ss were asked to match the lateral position of one tone, the "signal," by means of another, the "pointer." The two tones of the same frequency (500 cps) were presented alternately for durations of 0.8 sec. with 0.8-sec. pause between. The experimenter randomly selected the stimulus condition--a combination of interaural time and intensity differences (0, ± 90, ± 180, ± 270 musec. and 0, ± 3, ± 6, ± 9 db). S adjusted the interaural time difference for the pointer until it seemed in the same lateral position as the signal. Three Ss had normal hearing; two had high-frequency hearing losses. Results were related to other findings and discussed in terms of the possible peripheral mechanisms involved. G. R 15

17,801
Webster, J.C. INFORMATION IN SIMPLE MULTIDIMENSIONAL SPEECH MESSAGES. J. acoust. Soc. Amer., July 1961, 33(7), 940-945. (USN Electronics Lab., San Diego, Calif.).

17,801
How much collateral information could be added onto a simple two-choice message, and at what rate could it be transcribed? Toward this end, Ss were presented with simultaneous pairs of four-bit messages at rates of 2, 3, 4, and 6 pairs every four sec. Each message was either (a) or (i) said by male or female, as a question or statement, and heard in either right or left ear. S sometimes listened to both messages but usually listened only for the messages: in one ear, of one voice, of one vowel sound, or of one inflection. The relative ease of assimilating the four dimensions was discussed. G.

17,802
Buel, W.D. & Bachner, Virginia M. THE ASSESSMENT OF CREATIVITY IN A RESEARCH SETTING. J. appl. Psychol., Dec. 1961, 45(6), 353-358. (Science Research Associates, Chicago, Ill. & Pure Oil Company, Palatine, Ill.).

17,802
The descriptive and predictive validities of several psychometric instruments were investigated by using them to evaluate creativity in the research personnel of a major cereal and feed company. Ss were 54 persons engaged in work calling for creative behavior. Tests were: Adaptability, Forms A and B; Thurstone Temperament, Form AH; Guilford-Martin; Allport-Vernon-Lindzey; Kuder Preference; Forced-Choice (locally constructed). Three criteria of creativeness were collected against which the psychometric instrument validities were calculated. All correlations between the test scores and criteria among the significant predictors and among the criteria were Pearson product-moment coefficients.
T. R 19

17,803
Robinson, J.E., Jr., Cook, K.G. & Zeleny, C.E. PILOT JUDGMENTS OF SIMULATED COLLISIONS AND NEAR MISSES: A COMPARISON OF PERFORMANCE WITH UNCODED AND TWO-TONE CODED MODELS. J. appl. Psychol., Dec. 1961, 45(6), 359-363. (Applied Psychology Corporation, Arlington, Va.).

17,803
This study compared the ability of pilots to perceive relative motion of a visually coded versus uncoded aircraft model. Six pilots participated; all received practice in the task. There were four test sessions; each consisted of six practice and 12 test problems with one aircraft model. The four models were: one entirely white and three black and white in different patterns. Each problem required the S to judge only miss, collide, or undecided as to the path of the simulated B-47 image and his craft. Relative heading and altitude of the courses were varied. Speed and accuracy scores were obtained. The data were statistically evaluated by analysis of variance.
T. R 4

17,804
Hughes, C.L. VARIABILITY OF STROKE WIDTH WITHIN DIGITS. J. appl. Psychol., Dec. 1961, 45(6), 364-368. (International Business Machines, New York, N.Y.).

17,804
This study attempted to investigate "systematically the effect of variations in within-variable stroke width, conventional versus symbolic digits, emphasizing the unique aspects of digits through stroke boldness, angularity versus curvature, and the interaction of these variables." Ss were male students; all received training on the symbols prior to testing. Each symbol, illuminated at 100 ft.-c, was presented at a distance of 21 ft.; this was decreased at one-ft. intervals until S correctly identified it. Eight types of symbols were used. A factorial analysis of variance was employed to examine the effects of form, stroke width, and their interaction. Separate analyses treatment by Ss were done for each form type for the digits 0 through 9.
T. I. R 20

17,805
Obermayer, R.W., Swartz, W.F. & Muckler, F.A. THE INTERACTION OF INFORMATION DISPLAYS WITH CONTROL SYSTEM DYNAMICS IN CONTINUOUS TRACKING. J. appl. Psychol., Dec. 1961, 45(6), 369-375. (Martin Company, Baltimore, Md.).

17,805
The interaction between both compensatory and pursuit modes of information display and three levels of control system dynamics in a continuous tracking task was investigated. Nine adult males served as Ss; all were given instruction and practice in the task. The course was a simple sine wave with a frequency of two and two-ninths cpm, amplitude of two inches, and period of 27 sec. Six scores were obtained: average absolute error, root mean square error, time on target, hits, average absolute control movement, and control-stick count. A treatment by treatment by Ss analysis of variance was used to evaluate the data (ten trials/treatment combination).
T. G. R 12

17,806
Minor, F.J. & Revesman, S.L. EXPERIMENTAL EVALUATION OF BINARY CODES FOR CONSOLE DISPLAY. J. appl. Psychol., Dec. 1961, 45(6), 381-387. (International Business Machines Corporation, Endicott, N.Y.).

17,806
Three binary code schema were evaluated in terms of operator coding performance with the aim of selecting one to be used on a data processing system console display. The codes were: biquinary, binary coded decimal, and combined code. Fifty-five naive Ss were used; they were divided into three groups (one for each code) and given a one-hour training session. The Ss performed encoding and decoding problems in the manner used in actual field conditions; these problems, however, were presented as paper-and-pencil tests. Each S performed 108 problems, 36 per trial. A three-by-three analysis of variance for repeated measurements on independent groups was performed for both time and error scores.
T. G. I. R 2

17,807
Chisman, J.A. & Simon, J.R. PROTECTION AGAINST IMPULSE-TYPE INDUSTRIAL NOISE BY UTILIZING THE ACOUSTIC REFLEX. J. appl. Psychol., Dec. 1961, 45(6), 402-407. (State University of Iowa, Iowa City, Iowa).

17,807
This study investigated "the practicability of protecting the ear against industrial impulse noise by externally eliciting the acoustic reflex (AR) action of the intra-aural muscles prior to the presentation of the noise." Ten college males with no significant hearing loss served as Ss; three conditions--no AR, 250 cps AR, 1,000 cps AR--were tested. An experimental session consisted of: a pre-exposure audiogram in which thresholds for nine frequencies between 250 and 12,000 cps were determined, one of three experimental treatments--100 impacts of a mechanical drop hammer during a ten-min. period, and a postexposure audiogram. The TTS--the measure of lack of hearing protection--was determined by comparing the pre- and postaudiograms. These data were treated by analysis of variance technique. T. G. R 12

17,808
Promisel, D.M. VISUAL TARGET LOCATION AS A FUNCTION OF NUMBER AND KIND OF COMPETING SIGNALS. J. appl. Psychol., Dec. 1961, 45(6), 420-427. (Johns Hopkins University, Baltimore, Md.).

17,808
Operator performance in obtaining information from a double-coded visual display was investigated as a function of: number of target signals (0, 2, 4, 6, or 8 out of 40 signals), hue-shape combination of target (5 out of 49 were used as targets), number of competing signals (0, 8, 16, 24, or 32), and distribution of the competition between hue and shape. Twenty male Ss with normal color vision selected all signals on a display which matched a sample signal; time and error scores were obtained. The time scores were subjected to an analysis of variance for a modified random block design with fixed effects. Error scores were examined by a Friedman two-way analysis of variance. The findings were discussed in some detail.
T. G. I. R 15

17,810
Lochner, J.P.A. & Burger, J.F. FORM OF THE LOUDNESS FUNCTION IN THE PRESENCE OF MASKING NOISE. J. acoust. Soc. Amer., Dec. 1961, 33(12), 1705-1707, (National Physical Research Lab., Council for Scientific and Industrial Research, Pretoria, South Africa).

17,810
This paper establishes the form of the loudness function for a 1,000-cps pure tone in the presence of random noise and demonstrates that the relation holds when the only masking noise is the physiological noise generated in the ears.
T. G. R 6

17,811
Bell, C.G., Fujisaki, H., Heinz, J.M., Stevens, K.N., et al. REDUCTION OF SPEECH SPECTRA BY ANALYSIS-BY-SYNTHESIS TECHNIQUES. J. acoust. Soc. Amer., Dec. 1961, 33(12), 1725-1736. (Research Laboratory of Electronics, Massachusetts Institute of Technology, Cambridge, Mass.).

17,811
Procedures for the analysis and reduction of speech signals in terms of the time-varying vocal-tract resonances and source characteristics are described. The basic method involves comparison of speech spectra with a series of spectra synthesized within the analyzer. Each spectrum is generated according to a set of rules based on an acoustical theory of speech production. The analysis yields a set of parameters that describes the best matched synthesized spectrum. All operations have been programmed on a general purpose digital computer. The advantages of these techniques are discussed.
G. I. R 26

17,812
Carbonell, Jaime R. & Zuccoli, J.L. VOLUME PER SEAT AND VARIATION OF THE REVERBERATION TIME WITH THE SIZE OF THE AUDIENCE. J. acoust. Soc. Amer., June 1961, 33(6), 757-759. (University of Uruguay, Montevideo, Uruguay).

17,812
This paper presents equations and charts by which one can compute quantitatively how a change in the type of seats, volume of hall, or number of seats affects the relative variation in the reverberation time according to the number of occupied seats.
G. R 7

17,815
Bennett, H.E. & Porteus, J.O. RELATION BETWEEN SURFACE ROUGHNESS AND SPECULAR REFLECTANCE AT NORMAL INCIDENCE. J. opt. Soc. Amer., Feb. 1961, 51(2), 123-129. (Michelson Lab., China Lake, Calif.).

17,815
The reflectance of a surface is a sensitive function of its roughness. A theory relating these properties is described and an experimental verification for the case of normal incidence is presented. Since very small surface roughness may be of importance in optical measurements, the theory is considered in relation to experimental data for various optically polished surfaces.
T. G. R 17

17,816
Barakat, R. TOTAL ILLUMINATION IN A DIFFRACTION IMAGE CONTAINING SPHERICAL ABERRATION. J. opt. Soc. Amer., Feb. 1961, 51(2), 152-157. (Information Technology Labs., Itek Corporation, Lexington, Mass.).

17,816
The total illumination (or encircled energy) in a diffraction image containing spherical aberration is studied for various amounts of third- and fifth-order aberration. The Zernike polynomials are used to represent spherical aberration. The evaluation of the total illumination is done numerically, using double Gauss quadrature and 49 quadrature points. Contour maps of the total illumination are constructed and compared with the aberration-free case.
T. G. R 9

17,817
Boynton, R.M., Sturr, J.F. & Ikeda, M. STUDY OF FLICKER BY INCREMENT THRESHOLD TECHNIQUE. J. opt. Soc. Amer., Feb. 1961, 51(2), 196-201. (Department of Psychology and Institute of Optics, University of Rochester, Rochester, N.Y.).

17,817
As part of a program of research concerned with transient sensitivity changes of the human visual system, a new approach to the study of flicker is described. Increment thresholds of a small test flash are measured with the flashes superposed upon a flickering background stimulus. Instrumentation is described that permits accurate temporal positioning of the test flash within the light-dark cycle of the background field, and allows rapid threshold measurements to be obtained for the test flash in any temporal position. The results are interpretated in relation to the "on-responses" of the visual system.
G. I. R 14

17,818
Collins, W.E. LUMINOSITY FUNCTIONS OF NORMAL, DEUTERANOMALOUS, AND DEUTERANOPIC SUBJECTS AS DETERMINED BY ABSOLUTE THRESHOLD AND CFF MEASUREMENTS. J. opt. Soc. Amer., Feb. 1961, 51(2), 202-206. (USA Medical Research Lab., Fort Knox, Ky.).

17,818
To determine the spectral sensitivity of one deuteranopic, two deuteranomalous, and two normal Ss, Zeger's colorimeter appropriately modified, was used. Absolute threshold data were collected using a 25-min. field; cff curves were determined for both 50- and 100-min. fields. Luminosity relationships among the Ss as obtained by both techniques were examined.
T. G. R 13

17,819
Luria, S.M. ACCOMMODATION AND SCOTOPIC VISUAL ACUITY. J. opt. Soc. Amer., Feb. 1961, 51(2), 214-219. (USN Medical Research Lab., New London Submarine Base, Conn.).

17,819
Changes in scotopic acuity as a function of varying states of natural accomodation were measured with targets at various distances and luminances. Data from two observers were analyzed to determine the amounts of negative accomodation needed to produce maximum acuity at the various luminances and at the various target distances with constant luminance. The effect of color of fixation light (white or red) was also fixated.
G. R 6

17,820
Kelly, D.H. SYSTEMS ANALYSIS OF THE PHOTOGRAPHIC PROCESS. II. TRANSFER FUNCTION MEASUREMENTS. J. opt. Soc. Amer., March 1961, 51(3), 319-330. (Research Labs., Technicolor Corporation, Burbank, Calif.).

17,820
The special techniques required to measure photographic transfer functions (a previous paper described a nonlinear model of the macro- and microimaging properties of the photographic process, characterizing the performance of any given film by means of transfer functions) were described; detailed methods of computation were given. A photographic procedure for separating isotropic optical losses into lens and film components was discussed; results of this method were compared with data obtained by different methods from other laboratories. Illustrative measurements of both optical and chemical transfer functions were presented for several different emulsions and processing techniques.
G. I. R 17

17,821
Rosin, S. OPTICAL SYSTEM FOR LARGE TELESCOPES. J. opt. Soc. Amer., March 1961, 51(3), 331-335. (J.W. Fecker Div., American Optical Company, Pittsburgh, Penn.).

17,821
This paper describes an optical system composed of a large primary hyperboloidal mirror (eccentricity greater than 1.5) and a closely spaced two-element lens system (for coma and astigmatism correction) in the convergent beam. It delivers a high-quality image over a flat field of appreciable size. Details of the design in terms of optical surfaces--their radii, separation, glass, and diameters; and the Seidel contribution of these surfaces--spherical, coma, astigmatism, Petzval, axial color, and lateral color are outlined.
T. G. I. R 6

17,822
Blank, A.A. CURVATURE OF BINOCULAR VISUAL SPACE. AN EXPERIMENT. J. opt. Soc. Amer., March 1961, 51(3), 335-339. (Institute of Mathematical Sciences, New York University, New York, N.Y.).

17,822
The sign of the curvature of any geometry is an intrinsic property independent of its coordinatization. Accordingly, it is possible in principle to determine the sign of the curvature of binocular visual space without employing knowledge of the particular relationship between the physical stimulus and the associated visual geometry. A simple experiment for making this determination is conducted in which the observer is presented with three star-like lights in a triangular arrangement in the eye-level plane. The task is to bisect the sides (left and right) with a fourth light. A second task is to reproduce, on the base of the triangle, a given distance as seen along the sides. The outcome for a number of observers is given.
T. G. I. R 8

17,823
Baumgardt, E. & Hillmann, Beverly. DURATION AND SIZE AS DETERMINANTS OF PERIPHERAL RETINAL RESPONSE. J. opt. Soc. Amer., March 1961, 51(3), 340-344. (Groupe de Recherches de Physiologie des Sensations, Sorbonne, Paris, France & Radio Corporation of America, Burlington, Mass.).

17,823
An experiment was conducted using four observers to determine the effect of increasing size on the time interval over which the product of intensity and time is a constant. Circular fields of red and blue-green monochromatic light centered in the peripheral retina 20 degrees from the point of fixation were used. Thresholds for durations from 3.13 to 1,000 msec. and areas of 3.43 min., 1, 3, and 8 degrees were obtained by the method of constants. The intensity-time relations were analyzed and discussed in relation to previous results reported in the literature.
G. I. R 14

17,824
Howarth, C.I. ON-OFF INTERACTION IN THE HUMAN ELECTRORETINOGRAM. J. opt. Soc. Amer., March 1961, 51(3), 345-352. (Department of Psychology, The University, Hull, England).

17,824
It is predicted that: 1) the off response in the human ERG should resemble an inverted on response, 2) the relationship between duration and amplitude for single flashes should pass through a maximum and between interval and amplitude for double flashes through a minimum at about the same time, and 3) maximum and minimum should be accounted for by algebraic summation of on and off responses. Conditions tested are: stimulus intensities (250, 5,000, 16,000, 50,000 mL) and adapting intensities (0.1, 8, 160, 1,600 mL); flash durations of 5 to 250 msec. and flash intervals covering a smaller range; red, blue, and white light flashes; and light-dark ratios of 1:1 and 3:1. Effects of various combinations of these conditions on the responses of two Ss are discussed in terms of the above predictions. G. I. R 25

17,825
de Lange Dzn, H. EYE'S RESPONSE AT FLICKER FUSION TO SQUARE-WAVE MODULATION OF A TEST FIELD SURROUNDED BY A LARGE STEADY FIELD OF EQUAL MEAN LUMINANCE. J. opt. Soc. Amer., April 1961, 51(4), 415-421. (Statensingel 56a, Rotterdam, The Netherlands).

17,825
The response of the brightness system (flicker fusion) to a sinusoidal modulated test field was compared with two forms of square-wave modulation at low and at high luminance in the cone vision range. Using two electrical analogs, an explanation for the experimental results was sought.
G. I.

17,827
Boynton, R.M. & Wagner, M. TWO-COLOR THRESHOLD AS TEST OF COLOR VISION. J. opt. Soc. Amer., April 1961, 51(4), 429-440. (Department of Psychology and Institute of Optics, University of Rochester, Rochester, N.Y.).

17,827
The two-color threshold is obtained by finding the just visible luminance of a test flash of one color seen against a background of another color. For normal observers such threshold luminance is lower than when both test flash and background color are the same. The factor by which color differences alone reduce the increment threshold is defined as the heterochromatic threshold reduction factor (HTRF). A color test capable of measuring HTRF is devised and applied to 67 Ss, 21 of whom are red-green defective according to five independent criteria. The test's ability to discriminate the color defectives and the normals is analyzed.
T. G. I. R 8

17,828
Shortess, G.K. & Krauskopf, J. ROLE OF INVOLUNTARY EYE MOVEMENTS IN STEREOSCOPIC ACUITY. J. opt. Soc. Amer., May 1961, 51(5), 555-559. (Rutgers University, New Brunswick, N.J. & Brown University, Providence, R.I.).

17,828
Involuntary eye movements have been suggested as the basis for the resolution of the small differences in visual angles which have been found in stereoscopic acuity determinations. To test this suggestion, an optical apparatus was constructed in which the images presented to both eyes were stabilized (optical compensation for effects of eye movements). Stereoscopic thresholds were obtained for three Ss under both normal and stabilized viewing conditions for exposure times from 0.02 to 1.00 sec. Threshold data were analyzed as a function of time of exposure and the two conditions compared.
G. I. R 13

17,829
Fry, G.A. RELATION OF BLUR FUNCTIONS TO RESOLVING POWER. J. opt. Soc. Amer., May 1961, 51(5), 560-563. (School of Optometry, Ohio State University, Columbus, Ohio).

17,829
The type of blur involved in an optical image can be specified by describing the distribution of illuminance across the image of a narrow line; this is called the blur function. If the blur function conforms to the normal curve (Gaussian blur function), the image of a grating will gradually fuse as the spacing decreases; otherwise "spurious resolution" (apt to occur when optical image of grating is out of focus) may take place. This paper presents mathematical proof that an optical system with a Gaussian blur function is free from spurious resolution with any kind of grating. This approach to the problem is discussed in relation to the Cobb-Fry index of blur.
G. I. R 9

17,830
Cox, Jennifer. UNILATERAL COLOR DEFICIENCY, CONGENITAL AND ACQUIRED. J. opt. Soc. Amer., Sept. 1961, 51 (9), 992-999. (Technical Optics, Imperial College, London, England).

17,830
The literature on unilateral color vision defects is reviewed with particular reference to a unilateral deuteranope described by Graham and his associates and Walls. A similar atypical unilateral deuteranomalous S is described, where the color vision defect has been acquired due to the disease, retrobulbar neuritis. The hue discrimination and luminosity curves for this patient are compared with those found by Graham, and the possibility that retrobulbar neuritis could be responsible for a unilateral deutan defect with good visual acuity is discussed.
T. G. I. R 22

17,831
Kelly, D.H. IMAGE-PROCESSING EXPERIMENTS. J. opt. Soc. Amer., Oct. 1961, 51(10), 1095-1101. (Itek Labs., Lexington, Mass.).

17,831
A technique is proposed for generalized spatial filtering with large, incoherent light sources making use of the photographic Herschel effect. Outputs are obtained by a single exposure in a conventional optical printer; no scanning equipment, photographic masks, or special developing processes are used. Exploratory experiments with the technique are reported and desirable improvements are pointed out. Several different kinds of image processing for various applications are demonstrated.
G. I. R 29

17,832
Walraven, P.L. ON THE BEZOLD-BRUCKE PHENOMENON. J. opt. Soc. Amer., Oct. 1961, 51(10), 1113-1116. (Institute for Perception RVC-TNO, Soesterberg, The Netherlands).

17,832
An explanation of the Bezold-Brücke phenomenon (that hues of most visual stimuli change with luminance) is given in the framework of the Young-Helmholtz theory. Experimental data reported by Purdy are supplemented by measurements of hue shift in the purple region.
G. R 18

17,833
Jones, R.C. INFORMATION CAPACITY OF PHOTOGRAPHIC FILMS. J. opt. Soc. Amer., Nov. 1961, 51(11), 1159-1171. (Research Lab., Polaroid Corporation, Cambridge, Mass.).

17,833
A method of calculating the information capacity of photographic films is described, and numerical results are given for four different Kodak films (Royal-X Pan, Tri-X Panchromatic negative, Plus-X Panchromatic negative, and Panatomic-X). The results are transformed and interpreted with some comparisons made with the information capacity of some other channels (sound and television). The accuracy of the results is discussed.
T. G. I. R 25

17,834
Ogle, K.N. PERIPHERAL CONTRAST THRESHOLDS AND BLURRING OF THE RETINAL IMAGE FOR A POINT LIGHT SOURCE. J. opt. Soc. Amer., Nov. 1961, 51(11), 1265-1268. (Biophysics, Mayo Clinic and Mayo Foundation, Rochester, Minn.).

17,834
The effect of blurring of the retinal image upon visibility of a point-like source of light seen peripherally against a white background was investigated. Contrast thresholds were measured for different degrees of out-of-focus retinal images from the fovea to 12 arc degrees in the temporal field in the horizontal meridian. From a theoretically derived equation, curves were fitted to the sets of data from which the angular diameters of a minimal effective retinal area were calculated for each peripheral measurement.
G. I. R 3

17,835
Dodt, E. & Jessen, K.H. CHANGE OF THRESHOLD DURING LIGHT AND DARK ADAPTATION FOLLOWING EXPOSURES TO SPECTRAL LIGHTS OF EQUAL SCOTOPIC AND EQUAL PHOTOPIC EFFICIENCIES. J. opt. Soc. Amer., Nov. 1961, 51(11), 1269-1274. (William G. Kerckhoff-Herzforschungsinstitut der Max-Planck-Gesellschaft, Bad Nauheim, Germany).

17,835
This study, using a constant small b wave in the frog's ERG as criterion, measured the change of threshold during dark adaptation after exposure to orange and blue lights of equal scotopic and photopic efficiency. A white test flash of 0.1 sec. was used; light adaptation was 15 min. The frogs were dark-adapted overnight and ERG was recorded with silver-silver chloride electrodes with cotton wicks. In addition, incremental thresholds for test lights of various wavelengths were determined during exposure to stepwise increased levels of illumination with orange and blue lights of equal scotopic efficiency. The two-color threshold technique of W. S. Stiles was employed. The results were used to offer interpretation for findings obtained with the human eye under similar testing conditions. G. R 18

17,836
Harte, R.A. RECEPTOR ELEMENTS OF THE HUMAN RETINA AS SEMICONDUCTORS. J. opt. Soc. Amer., Nov. 1961, 51(11), 1275-1278. (Bissett-Berman Corporation, Santa Monica, Calif.).

17,836
The inability of classical chemical analysis of rhodopsin to account for several important experimental findings in the visual processes has led to the use of other methods; in particular, semiconductive analysis has been suggested. A brief review of studies using the method for analysis of the photosynthesis process is given. Using a similar method, an attempt is made to derive the scotopic threshold value for the human eye. The results are compared with values obtained in the classical studies of Hecht, Schlaer, and Pirenne.
R 12

17,837
Bliss, J.C. & Macurdy, W.B. LINEAR MODELS FOR CONTRAST PHENOMENA. J. opt. Soc. Amer., Dec. 1961, 51(12), 1373-1379. (Electrical Engineering Dept. & Electronics Research Lab., Massachusetts Institute of Technology, Cambridge, Mass.).

17,837
Discrete and continuous models are defined to describe contrast phenomena such as Mach bands. Two-sided z transforms are used to describe the discrete systems and Fourier transforms for continuous systems. These models are used to relate a psychological model based on the work of von Bekesy on skin and vision and a physiological model based on the work of Hartline, et al., describing lateral neural interaction in the eye of Limulus. Illustrative examples are given.
G. I. R 8

17,838
Alpern, M. & Sugiyama, S. PHOTIC DRIVING OF THE CRITICAL FLICKER FREQUENCY. J. opt. Soc. Amer., Dec. 1961, 51(12), 1379-1385. (University of Michigan, Ann Arbor, Mich. & School of Social Researches, Kwansei Gakuin University, Nishinomiya, Japan).

17,838
A light pulsing above cff significantly elevates and one pulsing below cff significantly depresses subsequent cff measurements. The characteristics of these phenomena, their dependence upon duration of fixation, the luminance of the measuring and adapting lights, and the duration of the aftereffect are described in the present series of experiments. Two different psychophysical methods of measurement are used to establish the validity of the results exclusive of procedural effects: continuous adjustment and constant stimulus. A theoretical explanation of the results is offered which is amenable to experimental proof.
T. G. R 26

17,839
Farnsworth, D. LET'S LOOK AT THOSE ISOCHROMATIC LINES AGAIN. Vision Res., June 1961, 1(1/2), 1-5. (USN Medical Research Lab., New London Submarine Base, Conn.).

17,839
A criticism of certain assumptions about color blindness and the fundamental mechanisms of color sensation that have arisen from a 1935 study (Pitt) on the characteristics of dichromatic vision is presented. The question of the effect of pigmentation, of using average data, and of the extension of isochromatic lines beyond the color-mixture area to copunctal loci are discussed.
G. R 3

17,840
Pitt, F.H.G. COMMENTS ON DEAN FARNSWORTH'S PAPER "LET'S LOOK AT THOSE ISOCHROMATIC LINES AGAIN." Vision Res., June 1961, 1(1/2), 6-7.

17,840
A reply is made to a criticism of the assumptions derived from a study of the characteristics of dichromatic vision (17,839).
R 1

17,841
MacAdam, D.L. A NONLINEAR HYPOTHESIS FOR CHROMATIC ADAPTATION. Vision Res., June 1961, 1(1/2), 9-41. (Research Labs., Eastman Kodak Company, Rochester, N.Y.).

17,841
Under different ordinary qualities of illumination, a given surface retains its chromatic appearance nearly undisturbed after the observer becomes adapted to the change in quality, although the visual stimuli may be quite different for the diverse qualities (chromatic adaptation). Analyses of data obtained from three independent experimenters indicate that the currently held hypothesis of a linear relation between the response and the stimulus does not hold. A nonlinear hypothesis is proposed and tested for its validity in accounting for the experimental data--that for any pair of adaptations the respective color responses 1) are nonlinearly related to the tristimulus values for properly chosen primaries, and 2) bear constant ratios for all pairs of perceptually equal colors. T. G. R 37

17,842
Sperling, H.G. PREDICTION OF RELATIVE LUMINOUS EFFICIENCY FROM FUNDAMENTAL SENSATION CURVES. Vision Res., June 1961, 1(1/2), 42-61. (Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.).

17,842
A summarization of previously published data on the spectral sensitivity of the fovea obtained by different psychophysical methods, stimulus sizes, and in various adaptive states is made. Additional luminosity data obtained on dichromatic colorblind observers under the same conditions are included. The derivation of fundamental sensation curves from the color confusions of dichromatic observers is presented and results of the attempted synthesis of the luminous efficiency functions from these theoretical functions are reported. These latter results are relevant to the source of the major humps and dips, the additivity law of luminances, and the general question of an additive trichromatic theory of color reception.
G. R 28

17,843
Thomas, F.H., Dimmick, F.L. & Luria, S.M. A STUDY OF BINOCULAR COLOR MIXTURE. Vision Res., June 1961, 1 (1/2), 108-120. (USAF Human Resources Research Office, Fort Rucker, Ala.).

17,843
An investigation was made of the effects of stimulus size, exposure time, and surround on the frequency with which observers reported matching binocular mixtures. An apparatus was used that presented simultaneously the components for binocular color mixing to each eye, and an additive, comparison mixture of the components, to both eyes. A comparison of binocular with additive mixtures as a function of 1) their relative total luminances using equal binocular components, and 2) variable binocular composition with constant total luminance was also made. A brief history of work on binocular color mixture was included.
G. I. R 13

17,844
Sloan, Louise L. AREA AND LUMINANCE OF TEST OBJECT AS VARIABLES IN EXAMINATION OF THE VISUAL FIELD BY PROJECTION PERIMETRY. Vision Res., June 1961, 1(1/2), 121-138. (Wilmer Ophthalmological Institute, Johns Hopkins University and Hospital, Baltimore, Md.).

17,844
The visual field is examined using a modified Goldmann perimeter to measure in any desired location of the field the luminance of the projected test object just perceptibly brighter than a background of fixed luminance. Six test object sizes from 1/16 to 64 mm^2, luminances over four log units in steps of 0.1 log unit, and locations between 50 degrees nasal and 60 degrees temporal on the horizontal meridian are tested. Data for normal eyes show the relationship between area and threshold luminance and the variation in this relation from center to periphery. In eyes with defects in the visual field the threshold gradient(s) in the appropriate meridian(s) provides a precise measure of the extent and density of the defect and a direct test for abnormality in the capacity for areal summation. T. G. I. R 10

17,845
Francois, J. & Verriest, G. ON ACQUIRED DEFICIENCY OF COLOUR VISION, WITH SPECIAL REFERENCE TO ITS DETECTION AND CLASSIFICATION BY MEANS OF THE TESTS OF FARNSWORTH. Vision Res., Oct. 1961, 1(3/4), 201-219. (Eye Clinic, University of Ghent, Ghent, England).

17,845
Differences between congenital forms of color vision deficiency and the acquired ones are itemized. The methods and tests used for diagnosis are discussed and the usefulness of the Panel D-15 and 100-Hue of Farnsworth is noted. A classification of the various types of acquired dyschromatopsia is presented and their occurence in the various ocular diseases is discussed. Some physiopathological considerations of the study of acquired color deficiencies are indicated.
G. I. R 78

17,846
Fry, G.A. FARNSWORTH HUE CIRCLES. Vision Res., Oct. 1961, 1(3/4), 263-268. (School of Optometry, Ohio State University, Columbus, Ohio).

17,846
A tristimulus color mixing device is described which provides a continuously variable circle of colors, as on a color mixture diagram, in the manner of the Farnsworth Hue Circles. The device uses filters instead of pigment colors, but the principle should be extended to spectrally pure stimuli. The apparatus can be used to test for color blindness and can also be used to map out lines of constant hue and constant saturation. Other uses are suggested.
I. R 2

17,847
Granger, G.W. & Ikeda, H. EFFECT OF HYPERVENTILATION ON FOVEAL CRITICAL FLICKER FREQUENCY. Vision Res., Oct. 1961, 1(3/4), 287-300. (Psychology Dept., Institute of Psychiatry, Maudsley Hospital, London, England).

17,847
The effect of voluntary hyperventilation on the relation between foveal critical flicker frequency and retinal illumination was investigated with circular test fields ranging in angular diameter from 2.5 min. to 2.0 degrees and 11 min. The results were interpreted in terms of increased foveal interaction and discussed in relation to recent work on spatial integration in the retina.
G. R 34

17,848
Shipley, T. THE VEILING FUNCTION AND NON-ADDITIVITY IN FLICKER-FUSION. Vision Res., Oct. 1961, 1(3/4), 301-309. (Ophthalmology Dept., University of Miami School of Medicine, Miami, Fla.).

17,848
The concept that the disappearance of visual flicker between any two alternating lights, upon the adjustment of the brightness of one, reflects the fact that the two lights are then of equal brightness is re-examined. The flicker-fusion of a reference white light and a second monochromatic light is first determined; then the brightness of the second light is gradually increased until flicker just becomes visible again. The amount of brightness that can be added before flicker reoccurs is analyzed for two observers under several conditions. The resultant curve is called the veiling function.
G. R 8

17,849
Corso, J.F. THE QUANTAL HYPOTHESIS AND THE THRESHOLD OF AUDIBILITY. Amer. J. Psychol., June 1961, LXXIV (2), 191-204. (Pennsylvania State University, State College, Penn.).

17,849
The neural quantum theory of sensory discrimination was studied in two experiments. In the first, thresholds of hearing were determined on 15 normal-hearing Ss in a continuous manner (both ascending and descending series) for frequencies from 5 to 200 cps. The frequency-location of "steps" in the audibility function was analyzed. The second study used a range from 5 to 25 cps, an ascending direction of frequency change, and 25 presentations at each experimental value of the stimulus. The data were analyzed for goodness of fit of a linear function to values independently predicted from the quantal and the phi-gamma hypotheses.
T. G. R 20

17,850
Gardner, R.A. MULTIPLE-CHOICE DECISION-BEHAVIOR WITH DUMMY CHOICES. Amer. J. Psychol., June 1961, LXXIV(2), 205-214. (Wellesley College, Wellesley, Mass.).

17,850
To study multiple-choice behavior in an uncertain situation, a Humphreys-type verbal conditioning procedure was used. The number of choices was varied by adding dummy choices to the categories of choice that were available. These dummy choices represented categories of critical events that never appeared in the programs. The data were analyzed for effects of number of presentations of a category as affected by the number of categories of choice available. Responses to the dummy choices were analyzed in terms of rate of extinction. An interpretation of the findings was offered.
T. G. I. R 13

17,851
Beck, J. & Shaw, W.A. THE SCALING OF PITCH BY THE METHOD OF MAGNITUDE-ESTIMATION. Amer. J. Psychol., June 1961, LXXIV(2), 242-251. (University of Pennsylvania, Philadelphia, Penn.).

17,851
To determine the effect upon the pitch-function, derived by the method of magnitude-estimation, of the frequency of the standard, two groups of Ss were required to make direct numerical estimates of the magnitudes of pitch. For one group the standard was a tone in the middle of the series, while for the other the standard was the lowest tone of the series. Following the estimations, the Ss were presented with the same series of tones and required to assign numbers reflecting the octave-relationships between each tone and the standard. The pitch functions from each experiment were compared.
T. G. R 13

17,852
Chandler, K.A. THE EFFECT OF MONAURAL AND BINAURAL TONES OF DIFFERENT INTENSITIES ON THE VISUAL PERCEPTION OF VERTICALITY. Amer. J. Psychol., June 1961, LXXIV(2), 260-265. (Yale University, New Haven, Conn.).

17,852
To investigate the effect of monaural and binaural auditory stimulation upon the visual perception of verticality, 48 Ss were tested. Apparent verticality of a luminescent rod was determined in the dark while Ss were stimulated under nine different conditions of auditory stimulation and five different starting positions of the visual object. The findings were discussed in relation to a sensory-tonic theory of perception.
T. I. R 6

17,853
Schaie, K.W. SCALING THE ASSOCIATION BETWEEN COLORS AND MOOD-TONES. Amer. J. Psychol., June 1961, LXXIV (2), 266-273. (University of Nebraska, Lincoln, Neb.).

17,853
Some semantic correlates of response to color were investigated by assessing the strength of association between colors and mood-tones. The association between 11 adjectival mood-descriptions, as well as the term "pleasant" with ten colors, was scaled by means of a variation of the constant-sum method using the constant-stimulus model. Scale-values were obtained for each color on each mood-tone from two groups of judges, one of which repeated judgments after a three-month interval. The results were studied for stability and an attempt was made to identify factors underlying such associations.
T. R 13

17,854
Lipsitt, L.P. & Engen, T. EFFECTS OF PRESENTATION OF PAIRED AND SINGLE-STIMULUS ON DISCRIMINATION OF LENGTH. Amer. J. Psychol., June 1961, LXXIV(2), 274-277. (Brown University, Providence, R.I.).

17,854
Simultaneous and successive stimulus presentations were studied as they affect the areas of psychophysics and of discriminative learning. Two experiments were performed in which the Ss were to determine which of two lines, presented either simultaneously or successively (at one- or five-sec. intervals), was the longer; in the first, the task was simply to select the longer; in the second, the task was to discover the correct stimulus of each pair--Ss were informed after each judgment as to which stimulus was correct, but were not told that the relevant feature was length. Accuracy of performance in both situations was analyzed and compared.
T. G. R 3

17,855
Bedford, T. RESEARCHES ON THERMAL COMFORT. Ergonomics, Oct. 1961, 4(4), 289-310.

17,855
The progress of research on thermal comfort during the past 40 years is described. A brief outline of developments up to the end of World War I is first presented. The developments from 1919 to 1928 are discussed under the following topics: 1) investigations in factories, 2) effective temperature, 3) radiant heat, and 4) measurements of skin temperature. Topics included for 1930 to 1944 are: 1) thermal measurements, 2) thermal comfort, and 3) pleasant and stimulating environments. The developments since 1945 include: 1) corrected effective temperature, 2) comfort zones, 3) freshness, 4) distribution of warmth, and 5) statistical methods.
T. G. R 50

17,856
Baker, C.H. MAINTAINING THE LEVEL OF VIGILANCE BY MEANS OF KNOWLEDGE OF RESULTS ABOUT A SECONDARY VIGILANCE TASK. Ergonomics, Oct. 1961, 4(4), 311-316. (Defence Research Medical Labs., Toronto, Ontario, Canada).

17,856
An experiment was conducted in which a central vigilance task (visual signal detection) was performed concurrently with a peripheral task (detection of changes in room illumination or of a continuous 1,000-cycle tone). Knowledge of results concerning performance on the secondary task was given by means of a small digital readout display located above the central display which indicated response times. There were five groups of 18 Ss, each of whom performed under five different conditions. The performance data were analyzed to study the effect of knowledge of performance of a secondary task on level of vigilance.
T. G. R 3

17,857
Spencer, J. ESTIMATING AVERAGES. Ergonomics, Oct. 1961, 4(4), 317-328. (Department of Psychology, University of Bristol, Bristol, England).

17,857
To determine what factors influence the averaging process (as shown in the work of process operators), the ability to estimate averages of several values of a variable presented either symbolically or graphically was investigated. Ss were presented symbolic information on small white cards on which were typed between 10 and 20 two-digit numbers; the task was to assess the single value which would best represent the series after a ten-sec. exposure. Graphical information was presented as 10 to 20 points on inch, ruled tenths, graph paper. Here the task was to set a cursor line at a position across the graph corresponding to the judged average value within ten-sec. time. Information varied in both amount and scatter of values about the mean; judgment errors were analyzed for the variables. T. G. R 6

17,858
Jeeves, M.A. CHANGES IN PERFORMANCE AT A SERIAL-REACTION TASK UNDER CONDITIONS OF ADVANCE AND DELAY OF INFORMATION. Ergonomics, Oct. 1961, 4(4), 329-338.

17,858
To study changes in performance on a serial-reaction task under conditions of giving the display signals at different points either before or after the responding limb is in a position to take appropriate action, an experiment was undertaken. The display consisted of four lights which appeared in random order at the ends of the arms of a cross. The S responded by moving a lever in a horizontal plane in a direction corresponding to the position of the light, then returning to center, which caused the next light to appear. Delay of 0.0 to 0.5 sec. and advance signal timing from 0.0 to 0.25 sec. after or before the control reached center were introduced. Center times, return times, and total RTs were analyzed.
T. G. R 7

17,859
North, J.D. & Lomnicki, Z.A. FURTHER EXPERIMENTS ON HUMAN OPERATORS IN COMPENSATORY TRACKING TASKS. Ergonomics, Oct. 1961, 4(4), 339-353. (Boulton Paul Aircraft Ltd., Wolverhampton, England).

17,859
Three experiments on control sensitivity in compensatory tracking tasks were reported. The first examined changes in sensitivity of controls when two targets were used. The second studied the joint effects of changes in control sensitivity and in display magnification on performance. The third examined the effects of changes in control sensitivity in the case when the isotonic controls (i.e., controls allowing for free movements of the handle) used in the previous experiments were replaced by isometric controls constructed in such a way that the errors were compensated by the operator's exerting a varying force on the controls with practically no handle movements. Effects of learning were also observed.
T. G. R 4

17,860
Riehl, J.L. ANALOG ANALYSIS OF EEG ACTIVITY. Aerospace Medicine, Dec. 1961, 32(12), 1101-1108. (USAF Bioastronautics Branch, Brooks AFB, Tex.).

17,860
An automatic processing of EEG activity on both human Ss and animals was presented. It was a direct extension and generalization of a method of analysis previously described in which a formal mathematical analysis of frequency and voltage of the EEG wave forms were integrated with respect to time; the relationship F·1/v, where F is the frequency and V is the voltage, can be used as a unit of activity which varies continuously as a function of time. An extreme data compression and instantaneous or real-time read-out were demonstrated. The EEG data were automatically processed through an electronic analyzer.
G. I. R 13

17,861
Gell, C.F. TABLE OF EQUIVALENTS FOR ACCELERATION TERMINOLOGY. RECOMMENDED FOR GENERAL INTERNATIONAL USE BY THE ACCELERATION COMMITTEE OF THE AEROSPACE MEDICAL PANEL, AGARD. Aerospace Medicine, Dec. 1961, 32(12), 1109-1111.

17,861
A table of equivalents for the terminologies of acceleration in common usage is presented. The terminologies group themselves into two basic configurations which are set up as Tables A and B. Table A contains the two acceleration terminologies that are commonly used in the field of aeronautics when reference is made to the direction of acceleration of a mass. Table B refers to the inertial reaction of the tissues and fluids of the intact mammalian body in response to the acceleration applied to the whole body. In the first instance the small letter g is used; in the second, the capital letter G is recommended.
T.

17,862
Trites, D.K. PROBLEMS IN AIR TRAFFIC MANAGEMENT. I. LONGITUDINAL PREDICTION OF EFFECTIVENESS IN AIR TRAFFIC CONTROLLERS. Aerospace Medicine, Dec. 1961, 32(12), 1112-1118. (FAA Civil Aeromedical Research Institute, Aeronautical Center, Oklahoma City, Okla.).

17,862
A five-year follow-up of Ss from an experimental selection testing program of air traffic controller (ATC) trainees was made to determine if current job performance evaluations, retention in ATC work, incidents of unsatisfactory work, and medical history information could be predicted by the data collected during the earlier period (1956 to 1957). The necessary information was obtained for 149 of the 197 original trainees. The results of a statistical correlation study of the data were presented.
T. G. R 3

17,863
Black-Schaffer, B., Hensley, G.T. & Simson, L.R. PROTECTION OF THE ADULT MOUSE AGAINST 1800 G ACCELERATION BY HYPOTHERMIC IMMERSION. Aerospace Medicine, Dec. 1961, 32(12), 1119-1126. (Pathology Dept., College of Medicine, University of Cincinnati, Cincinnati, Ohio).

17,863
Deep hypothermia combined with immersion was used to protect adult mice against 15 min. of 1,800 g. The method was described in detail. After spinning, the mice, while being warmed, were subjected to positive pressure respiration with pure oxygen. After recovery of spontaneous respiration the mice were necropsied and selected tissues were fixed and sectioned for histophathologic examination. The results were tabulated and discussed in detail.
T. G. I. R 6

17,864
Bullard, R.W. EFFECTS OF HYPOXIA ON SHIVERING IN MAN. Aerospace Medicine, Dec. 1961, 32(12), 1143-1147. (Physiology Dept., School of Medicine, Indiana University, Indianapolis, Ind.).

17,864
A study on oxygen deficiency on cold exposed human Ss, particularly as regards shivering and metabolic heat production, was accomplished. A total of 42 experiments on six healthy male Ss was made. The men, clad only in shorts, were exposed to an ambient temperature of five degrees C (50 percent relative humidity) for 65- or 75-min. periods with no hypoxia or with different degrees of hypoxia induced by varying the oxygen consumption. Shivering, oxygen consumption, body temperature changes, and heart rate and pulmonary ventilation changes were recorded and analyzed.
T. G. R 14

17,865
Wamsley, J.R. & Flinn, D.E. TOXIC PSYCHOSIS. A CASE REPORT. Aerospace Medicine, Dec. 1961, 32(12), 1148-1150. (USAF School of Aerospace Medicine, Brooks AFD, Tex.).

17,865
Since differentiation between a functional psychosis and a transient organic psychosis is important for the future of the airman, it is important for flight surgeons and aviation medical examiners to understand the clinical differences between these two conditions. Some of the salient points are illustrated in a case study presented and discussed in this report.
R 2

17,866
Barmack, J.E. & Payne, D.E. INJURY-PRODUCING PRIVATE MOTOR VEHICLE ACCIDENTS AMONG AIRMEN: PSYCHOLOGICAL MODELS OF ACCIDENT-GENERATING PROCESSES. J. Psychol., July 1961, 52, 3-24. (Psychology Dept., City College, New York, N.Y. & Public Service Research Institute, Stamford, Conn.).

17,866
This paper describes "characteristics of an accident population which has sufficient homogeneity to be useful in identifying causal factors," and considers "theoretical explanations of the nature of the internal processes involved, using such empirical data as may have relevance to the theories." The accident population was 138 airmen drivers divided into four groups: single-vehicle nondrinking and drinking, multiple-vehicle nondrinking and drinking. Properties of accidents and drivers which were analyzed for each group include: accident site, speed, marital status, and family background. Also considered were preaccident psychic processes: impaired consciousness, degraded anticipation, and unconscious directing processes.
T. G. R 28

17,867
Clausen, J. & Karrer, R. PERCEIVED RATE OF ELECTRICAL PHOSPHENES AS DETERMINED BY MATCHING SQUARE WAVE AND SINE WAVE FLICKER RATES. J. Psychol., July 1961, 52, 25-45. (Training School, Vineland, N.J.).

17,867
This study investigated the relationship between frequency of square wave stimulation and resulting rate of perceived flicker. Specifically, several characteristics of the square wave were explored: stimulus polarity (positive, negative, alternating positive and negative, and biphasic pulses), frequency rate in terms of cps (5 to 30), pulse duration (4 to 130 msec.), frequency rate in terms of pulses per sec. (5 to 20), and state of light adaptation (dark adapted, .01 mL, 30 mL). Two Ss participated throughout. The general procedure involved matching a square wave stimulus to a series of sine wave stimuli by the method of constant stimuli. The findings were discussed in some detail; five principles were put forth to explain the major factors operating here. T. G. R 20

17,868
Epstein, W. PHENOMENAL ORIENTATION AND PERCEIVED ACHROMATIC COLOR. J. Psychol., July 1961, 52, 51-53. (Psychology Dept., University of Kansas, Lawrence, Kan.).

17,868
This note reported an experiment in which perceived achromatic color was examined under two conditions of perceived slant of the target, misperceived and accurately perceived. Twenty Ss viewed the target monocularly with head motionless and reported the color by selecting the appropriate Munsell paper; they also viewed it unimpeded binocularly and selected a match. The results were considered briefly in terms of Wallach's intensity-ratio theory and Hochberg and Beck's findings on brightness constancy.
R 4

17,869
Scodel, A. VALUE ORIENTATIONS AND PREFERENCE FOR A MINIMAX STRATEGY. J. Psychol., July 1961, 52, 55-61. (Psychology Dept., Ohio State University, Columbus, Ohio).

17,869
This study was aimed at eliciting differences in value orientations between those who play a minimax strategy in a two-person, zero-sum game and those who play a riskier strategy. Thirty-five pairs of Ss were run in the game; there were 25 trials in one position and 25 in the reverse (payoff schedule favored one position). All were given the Allport-Vernon-Lindzey Study of Values prior to the game. The plays between first and second half of the game were evaluated statistically for both positions. Also, the relation of the plays to the value scores was examined. The findings were compared briefly to some other studies involving correlations between values and behavior.
T. R 9

17,870
Forney, R.B. & Hughes, F.W. DELAYED AUDITORY FEEDBACK AND ETHANOL: EFFECT ON VERBAL AND ARITHMETICAL PERFORMANCE. J. Psychol., July 1961, 52, 185-192. (School of Medicine, Indiana University, Indianapolis, Ind.).

17,870
This experiment investigated the usefulness of delayed auditory feedback in the evaluation of centrally acting drugs. Accordingly, the influence of alchol on the performance of simple verbal and arithmetic tasks was studied under such a distraction. Ten adult Ss performed six tests: verbal output, forward count, reverse count, progressive count, addition and subtraction under alcohol (100 mg percent blood level of ethanol) and non-alcohol conditions. The distracting condition was a 0.28-sec. delay auditory feedback maintained at a sound level higher than one for comfortable listening. The results were evaluated statistically.
T. R 4

17,871
von Haller Gilmer, B. TOWARD CUTANEOUS ELECTRO-PULSE COMMUNICATION. J. Psychol., July 1961, 52, 211-222. (Psychology Dept., Carnegie Institute of Technology, Pittsburgh, Penn.).

17,871
This paper deals with some of the psychophysical and coding problems in the development of cutaneous electropulse communication. A brief history of both the practical and research efforts in this line also is presented. The specific aim of the psychophysical phase has been "to identify dimensions, parameters, and conditions for pain-free electrical stimulation of the skin commensurate with the demands of an easily learnable coding system." The results of some exploratory investigations are presented. For the coding and information processing phase, the problems include code interpretation, memory structure, cutaneous imagery, etc.
R 27

17,872
Mackavey, W.R., Bartley, S.H. & Casella, Carmine. MEASUREMENTS OF SIMULTANEOUS BRIGHTNESS CONTRAST ACROSS THE RETINA. J. Psychol., July 1961, 52, 241-250. (Psychology Dept., Michigan State University, East Lansing, Mich.).

17,872
This experiment measured the effect of an inducing target upon the brightness of a test target at each of nine locations of the inducing target: 0, 1, 2, 3, and 4-degree separation of test and inducing target on the temporal and nasal retina and at each of several luminances: 85, 175, and 350 cycles/ft.^{2} (data not shown for other luminances). The two Ss made 12 binocular matches at each position, eight with and four without the inducing target. These findings were related to relevant physiological data.
G. I. R 21

17,873
Carter, L.F. AUTOMATED INSTRUCTION. Amer. Psychologist, Nov. 1961, 16(11), 705-710. (System Development Corporation, Santa Monica, Calif.).

17,873
A full description is given of the System Development Corporation's (Santa Monica, Calif.) teaching machine and the kind of instructional techniques which its use makes possible. The machine consists of a computer which controls presentation of instructional material; a large, random-access slide projector which presents and projects the instructional material; the screen on which the material is projected; and a typewriter on which the response is made. The flexibility in instruction that is made possible is illustrated by example and by discussion.
I. R 4

17,874
Liebel, D.A. THE EJECTION SEAT IS NOT YET OBSOLETE. Society of Experimental Test Pilots Quarterly Rev., Winter 1960, 5(2), 5-10. (Convair, General Dynamics Corporation, San Diego, Calif.).

17,874
This article describes in detail the Aircrew Escape System known as the "B" seat in terms of the structural and operational characteristics. Also, the extensive series of developmental tests are summarized.

17,875
Hegenwald, J.F., Jr., Neumann, H.L. & Murphy, E.A., Jr. AERIAL AND SLED TESTING OF THE B-70 AIRCREW ESCAPE CAPSULE. Society of Experimental Test Pilots Quarterly Rev., Winter 1960, 5(2), 10-22. (Human Factors Group, North American Aviation, Inc., Los Angeles, Calif.).

17,875
The testing program of the B-70 Aircrew Escape Capsule was aimed at examining its mechanical components, first individually and then progressively within complete subsystems. Several of the tests were described briefly together with the major findings; these included: preliminary parachute tests, full-scale capsule aerial tests, sled ejection tests, zero speed ejection tests, and minimum speed ejection tests.
I.

17,876
Miller, C.O. THE OMNI-SONIC FLIGHT CAPSULE--A PRACTICAL REALITY. Society of Experimental Test Pilots Quarterly Rev., Winter 1960, 5(2), 22-38. (Vought Aeronautics Div., Chance Vought Aircraft, Incorporated, Dallas, Tex.).

17,876
This article reports on the work done at Vought Aircraft on the design, development, and testing of the Omni-Sonic Flight Capsule; it also argues for a more optimized recovery system through a flight rather than escape capsule approach. Highlights of the system discussed include: boost rocket installations, capsule-parent vehicle system integration, seat and restraint system design, automatic escape system design, and capsule-fuselage separation methods.
I. R 7

17,877
Starkey, D.G. & Luton, W.B. SELECTION AND TRAINING OF SPACE FLIGHT PERSONNEL. Society of Experimental Test Pilots Quarterly Rev., Winter 1960, 5(2), 50-68. (Vought Aeronautics Div., Chance Vought Aircraft, Incorporated, Dallas, Tex.).

17,877
This article reported the results of a study at Vought Astronautics on man's role in future space vehicles. The first phase was devoted to developing, categorizing, and synthesizing typical manned-space systems likely to exist during the next 15 years; four such systems resulted: one-manned low orbital reconnaisance, three-manned fully orbital reconnaisance, five-crew orbital space station, and three-manned lunar vehicle. The second was a mission, function, and task analysis of all anticipated missions for each such system. Next, criteria were established for selecting and evaluating astronaut candidates; these included educational, experiential, psychological, and physiological requirements. The training program, equipment, and costs were detailed also. T. I.

17,878
Holmstrom, F.M.G. 'SELECTION AND TRAINING OF SPACE CREWMEN. Society of Experimental Test Pilots Quarterly Rev., Winter 1960, 5(2), 68-75. (USAF School of Aviation Medicine, Brooks AFB, Tex.).

17,878
This paper discussed several areas of general and medical interest which relate to the selection and training of space crewmen. These studies, done at the USAF School of Aviation Medicine, were concerned with: disorientation in space resulting from visual, muscle and joint, and/or inner ear sensations; heart function under severe physical stress; and physiological training for space, e.g., pressure suit indoctrination.
I.

17,879
Watson, E. JET TRANSPORT CREW TRAINING. Society of Experimental Test Pilots Quarterly Rev., Winter 1960, 5(2), 75-86.

17,879
This paper summarized findings and recommendations of an Airline Pilots Association study which examined all phases of air crew training. Areas touched upon were: seniority, civil air regulations, training accidents, standardization, instrumentation, and high altitude indoctrination. A panel discussion on jet transport crew training also was included.
T.

17,880
Grewell, J. AUTOMATION IN AIR TRAFFIC CONTROL. Society of Experimental Test Pilots Quarterly Rev., Winter 1960, 5(2), 103-128. (FAA Bureau of Research and Development, Washington, D.C.).

17,880
Several research and development programs of the Federal Aviation Agency are described. The Aircraft Safety Research program will include studies of: crash safety, fire and explosion protection, structural problems, etc. The Aviation Weather program is aimed at modernizing weather services through improved equipment and information. The Air Defense and Air Traffic Control Integration program is aimed at increasing the capabilities of these systems. The work in Airborne Collision Prevention Systems also is outlined; it is divided into: collision avoidance systems, pilot warning instruments, and conspicuity devices. Finally, considerable detail is devoted to data processing equipment and function as related to air traffic control. I.

17,881
Luton, W.B. MANUAL FLIGHT TECHNIQUES FOR ATMOSPHERIC RE-ENTRY. Society of Experimental Test Pilots Quarterly Rev., Winter 1960, 5(2), 197-209. (Vought Aeronautics Div., Chance Vought Aircraft, Incorporated, Dallas, Tex.).

17,881
This article describes the Vought simulator (a fixed base, six-degrees-of-freedom, real-time cockpit simulator) and the re-entry flight techniques that have been investigated using it. The two major problems encountered in re-entry, head avoidance and energy management, are discussed in detail.
G. I.

17,882
Alexander, M., Zeigen, R.S. & Emanuel, I. ANTHROPOMETRIC DATA PRESENTED IN THREE-DIMENSIONAL FORMS. Amer. J. phys. Anthrop., June 1961, 19(2), 147-157. (USAF Aerospace Medical Div., Wright-Patterson AFB, Ohio).

17,882
This paper presented anthropological data in terms of three-dimensional forms of the face, head, and body as a whole (minus the head, hands, and feet). The basic approach consisted of selecting key dimensions for statistical analysis and establishing appropriate intervals of these dimensions for the sizing programs. The data were obtained from surveys of several thousand USAF flying personnel. Key measurements included: face--face length, lip length; head--head circumference; body--height, weight. Some applications of these forms and the associated data to such problems as oxygen mask and helmet sizing were discussed.
T. I. R 18

17,883
Heath, Barbara H., Hopkins, C.E. & Miller, C.D. PHYSIQUES OF HAWAII-BORN YOUNG MEN AND WOMEN OF JAPANESE ANCESTRY, COMPARED WITH COLLEGE MEN AND WOMEN OF THE UNITED STATES AND ENGLAND. Amer. J. phys. Anthrop., June 1961, 19(2), 173-184. (Foods and Nutrition Dept., University of Hawaii Agricultural Experiment Station, Honolulu, Hawaii).

17,883
University students (104 male and 104 female), 18 to 22 years, born in Hawaii of Japanese parents were somatotyped and compared with mainland American and English college men (4,000) and women (3,281). The essential steps in the somatotype rating technique were: computation of ponderal index by a nomogram, entering of height/weight into Sheldon reference table, and selection of the best of the few admissible ratings by visual inspection. The statistical analysis and interpretation of these data were presented in some detail; the main evaluative technique was analysis of variance.
T. G. I. R 7

17,884
Snyder, R.G. MANNED SPACE FLIGHT VEHICLES AND THE PHYSICAL ANTHROPOLOGIST. Amer. J. phys. Anthrop., June 1961, 19(2), 185-194. College of Engineering, University of Arizona, Tucson, Ariz.).

17,884
This paper briefly considers a number of the current and future areas of aerospace research which are of primary interest to the physical anthropologist. Some are: seating and restraint systems for aircrew members (including studies of human tolerance to various forces, e.g., acceleration, deceleration, multidirectional, and negative and positive g, and development of a restraint system to protect against these forces), anthropomorphic simulation devices and techniques for basic research (e.g., dummies), biomechanics under partial or zero g (e.g., initiating self-locomotion), and physical responses under extreme vibration or buffeting.
R 54

17,885
Garn, S.M. & Rohmann, Christabel G. THE NUMBER OF HAND-WRIST CENTERS. Amer. J. phys. Anthrop., Dec. 1960, 18(4), 293-299. (Fels Research Institute, Yellow Springs, Ohio).

17,885
This study was concerned with the number of hand-wrist ossification centers present at various ages during infancy and childhood, the extent to which hand-wrist status at one age relates to same at another age, and the degree to which the hand is in agreement with the remainder of the appendicular skeleton at these ages. Serial longitudinal radiographs of 154 Ss provided the basic materials. From these, the number of centers of the hand were determined at 1, 3, 6, 9, and 12 months and at half-year intervals through ten years; total number of appendicular ossification centers were enumerated at full birthdays; other relevant findings were obtained and observed. Correlation coefficients were computed to determine the relationships between these measures and age, and among the various measures. T. G. I. R 13

17,886
Collins, Emma H. THE CONCEPT OF RELATIVE LIMB DOMINANCE. Hum. Biol., Dec. 1961, 33(4), 293-318. (Anatomy Dept., Stritch School of Medicine, Loyola University, Chicago, Ill.).

17,886
This study examined the limb dominance of 917 Ss by comparing the limbs at all four joint levels—shoulder, elbow, wrist, thumb—during the initiation of simple simultaneous movements, and by evaluating answers to simple questions regarding handedness. All tests were self-administered through a questionnaire; each S observed and recorded his results (there was spot checking for accuracy). For each of the three handedness groups (left, right, ambi) limb dominance patterns were compared in terms of joint level dominance, most significant joint level, and degree of limb dominance. The patterns, their incidence and variation, were then discussed.
T. G. I.

17,887
Karpinos, B.D. CURRENT HEIGHT AND WEIGHT OF YOUTHS OF MILITARY AGE. Hum. Biol., Dec. 1961, 33(4), 335-354. (USA Medical Statistics Div., Office of the Surgeon General, Washington, D.C.).

17,887
This height-weight analysis of military youths was based on data abstracted from the medical examination reports of those examined for military service from January, 1957, through September, 1958. About 50 percent of the 273,000 medical reports were selected as the sample. Ss were 17 to 25 years of age, Negro and white, inductees and disqualified youths. The analysis was carried out by race and by single years of age within each race both for inductees and for all examinees. Means and standard deviations of height and weight were computed; frequency distributions were tabulated and plotted; comparisons with World War I and II data were made where possible.
T. G. R 17

17,888
Gagne, R.M. & Brown, L.T. SOME FACTORS IN THE PROGRAMING OF CONCEPTUAL LEARNING. J. exp. Psychol., Oct. 1961, 62(4), 313-321. (Princeton University, Princeton, N.J.).

17,888
The effects of variations in programming conceptual learning materials on effectiveness of learning as measured by performance in a problem-solving situation were investigated. The materials pertained to four number series; the task was to learn to state and use formulae for the sum of any number of terms in such series and to transfer these principles to a novel problem-solving situation. High school boys (33) were divided into three groups with different learning programs: rule and example, guided discovery, and discovery. After an introductory program, the same learning programs and the same problem-solving tests (four problems) were administered to all. Time and error scores were compared for both sessions by a t-test, and data from the problem-solving were evaluated by analysis of variance. T. R 21

17,889
Kamen, J.M., Pilgrim, F.J., Gutman, N.J. & Kroll, Beverley J. INTERACTIONS OF SUPRATHRESHOLD TASTE STIMULI. J. exp. Psychol., Oct. 1961, 62(4), 348-356. (USA Quartermaster Food & Container Institute for the Armed Forces, Chicago, Ill.).

17,889
Twelve experiments were conducted to determine how each basic taste quality--salt (NaCl), sweet (sucrose), sour (citric acid), and bitter (caffeine)--is affected by each of the other taste qualities. Four concentrations of each solution, barely perceptible to extreme, composed the primary series and four concentrations from none to moderate, the secondary series. In each interaction experiment, the 16 solutions consisted of each concentration in a given primary series with each concentration in one of three remaining secondary ones. Each experiment was repeated twice with 40 Ss per replication; the single stimulus method was used with a nine-interval intensity rating. A separate analysis of variance was performed on the ratings data for each interaction. Design and methodology were discussed. T. G. R 5

17,890
Arnoult, M.D. & Price, C.W. PATTERN MATCHING IN THE PRESENCE OF VISUAL NOISE. J. exp. Psychol., Oct. 1961, 62(4), 372-376. (Texas Christian University, Fort Worth, Tex. & University of Mississippi, University, Miss.).

17,890
This experiment investigated how accurately and rapidly complex visual patterns can be identified under various noise levels. Ss (80) were divided into ten groups; the task was to match a test pattern (presented for 0.7 sec.) with one of four surrounding prototype patterns which had been distorted to represent noise conditions of 0, 5, 10, and 20 percent. Four prototypes were assigned to each of the four noise conditions and seven test patterns constructed for each prototype, totalling 112 test patterns. Performance was measured by percentage errors and information transmitted as a function of noise level. The random distribution of errors among the incorrect alternatives was tested by chi square. The findings were compared to those of W. A. Hillix in a similar study. T. G. I. R 4

17,891
Eijkman, E. & Vendrik, A.J.H. DYNAMIC BEHAVIOR OF THE WARMTH SENSE ORGAN. J. exp. Psychol., Oct. 1961, 62(4), 403-408. (Medical Physics Dept., Roman Catholic University, Nijmegen, The Netherlands).

17,891
This experiment investigates the adaption of the warmth sensation. The stimulus is microwave radiation applied to the inner surface of the forearm; this stimulation gives more accurate knowledge of the time course of temperature at the receptor layer of the skin than does infrared or thermode. Thresholds are measured using a yes-no procedure; S decides whether or not a stimulus is presented to him during an indicated interval of time; eight stimulus exposure times are used, ranging from 0.1 to 10 sec. These psychophysical threshold data are related to the electrophysiological results obtained by other investigators.
G. R 9

17,892
Simpson, W. & Voss, J.F. PSYCHOPHYSICAL JUDGMENTS OF PROBABILISTIC STIMULUS SEQUENCES. J. exp. Psychol., Oct. 1961, 62(4), 416-422. (University of Wisconsin, Madison, Wisc. & College of Wooster, Wooster, Ohio).

17,892
Two experiments were conducted to extend psychophysical investigation to judgments of probabilistic events and to relate probabilistic discrimination and probability learning. Ss' (students) task was to judge the probability of occurrence of a given light in sequences of 50 lights where one of two lights was shown on each occurrence. The probability of a particular light in a sequence was from .10 to .90 in .10 steps. At each probability value, stimulus sequences were presented in random order in probability steps of .02. The data from each probability condition were examined by analysis of variance technique. The findings were considered in terms of probability learning and decision-making.
T. G. R 8

17,895
Ancker, C.J., Jr. & Gafarian, A.V. QUEUING WITH MULTIPLE POISSON INPUTS AND EXPONENTIAL SERVICE TIMES. Operat. Res., May-June 1961, 9(3), 321-327. (System Development Corporation, Santa Monica, Calif.).

17,895
The basic system in which an operator is presented with a sequence of situations (in the form of a display activated by a computer) that he is required to examine for problems and that he then must resolve by taking appropriate action is analyzed mathematically. The problem thus becomes: "m distinct types of tasks arrive randomly and independently at a facility where all are processed with service times that are random and independent. Queue discipline is first-come, first-served." Both the arrival times and the service-time distributions are negative exponential functions.
R 4

17,896
Saunders, L.R. PROBABILITY FUNCTIONS FOR WAITING TIMES IN SINGLE-CHANNEL QUEUES, WITH EMPHASIS ON SIMPLE APPROXIMATIONS. Operat. Res., May-June 1961, 9(3), 351-362. (Balm Paints, Ltd., Melbourne, Australia).

17,896
Three applications of the integral-equation method of solving waiting-time problems are presented: for k-Erlang service distributions, constant holding-time distributions, and hyperexponential distributions. In each of these cases the arrival-time distributions are exponential, although a wide range of arrival and service time distributions can be accommodated by this method.
R 5

17,897
Takacs, L. THE PROBABILITY LAW OF THE BUSY PERIOD FOR TWO TYPES OF QUEUING PROCESSES. Operat. Res., May-June 1961, 9(3), 402-407. (Columbia University, New York, N.Y.).

17,897
"A simple combinatorial method is given for the determination of the joint distribution of the length of the busy period and the number of customers served during this period for two types of single-server queuing processes: 1) customers arrive at a counter according to a Poisson process and the service times have a general distribution; 2) customers arrive at a counter according to a recurrent process and the service times have an exponential distribution."
R 1

17,898
Knott, Virginia B. SIZE AND FORM OF THE DENTAL ARCHES IN CHILDREN WITH GOOD OCCLUSION STUDIED LONGITUDINALLY FROM AGE 9 YEARS TO LATE ADOLESCENCE. Amer. J. phys. Anthrop., Sept. 1961, 19(3), 263-284. (Iowa Child Welfare Research Station, Iowa City, Iowa).

17,898
Group and individual changes in the size and form of the maxillary and mandibular dental arches are presented for 29 white children with satisfactory occlusion. The measurements were obtained from casts made semiannually between 9 and 12 years and annually thereafter through 15 years. Three measurements were made: arch width (from specified landmarks), arch depth (from three marked points), and ratio of depth to width. Group findings were expressed as means, standard deviations, and ranges at ten ages; individual trends are shown through growth curves. Also, correlation coefficients were computed to determine the association between these measurements and age.
T. G. R 13

18,056
Box, G.E.P. & Behnken, D.W. SOME NEW THREE LEVEL DESIGNS FOR THE STUDY OF QUANTITATIVE VARIABLES. Contract DA 11 022 ORD 2059, MRC Tech. Rep. 169, Aug. 1960, 33pp. USA Mathematics Research Center, University of Wisconsin, Madison, Wisc.

18,056
A symmetrical factorial design is an experimental arrangement in which a small integral number p of levels is chosen for each of k factors (i.e., variables) and all p^k combinations of these levels are run. In this paper a particular class of three-level incomplete factorials (a selected subset of factorial combinations) specifically selected for the study of quantitative variables is discussed. The class of factorials to be examined, the method for generating the designs, blocking the designs, inclusion of center points, analysis for the designs, and calculation of the estimates are defined and discussed.
T. G. I. R 11

18,096
Pask, G. & von Foerster, H. A PREDICTIVE MODEL FOR SELF ORGANIZING SYSTEMS. Contract NONR 1834(21), Proj. NR 049 123, Tech. Rep. 4, June 1960, 87pp. Electrical Engineering Research Lab., University of Illinois, Urbana, Ill.

18,096
The activity of systems that exhibit the phenomena of competition and cooperation (self-organizing) is described in terms of the play of a game and some of the ideas behind this type of game theoretic description are clarified. Arguments are developed with reference to two pieces of experimental work. The first of these is called a social interaction experiment in which the players are human Ss who interact subject to given constraints. The second set of experiments concern artifacts; in the simplest case players are replaced by automata. Activity within learning (and evolutionary) systems is examined.
I. R 33

18,099
Northrop Aircraft, Inc. A METHOD FOR PREDICTING WEAPON AND SUPPORT SYSTEM MAINTAINABILITY. Rep. NAI 57 848, Sept. 1957, 93pp. Operational Plans Development Section & Weapon Systems Analysis Department, Northrop Aircraft, Inc., Hawthorne, Calif.

18,099
This is a progress report of a study of means to develop more maintainable aircraft. An analytical method of determining a suitable "yardstick" in the form of a maintainability index is described. To illustrate its usefulness, it has been applied to the communication and navigation, control surfaces, and landing gear systems of the T-38 aircraft. The collection of data and problems involved are discussed. A methodology is developed for determining aircraft availability considering various operational factors (estimated annual hours to be flown, size of maintenance crew, etc.) with curves presented relating maintainability index to these factors. Problems of indirect maintenance are also discussed.
T. G. R 24

18,105
Ehrman, J.R., Fosdick, L.D. & Handscomb, D.C. COMPUTATION OF ORDER PARAMETERS IN AN ISING LATTICE BY THE MONTE CARLO METHOD. J. math. Physics, Nov.-Dec. 1960, 1(6), 547-558. (University of Illinois, Urbana, Ill.).

18,105
The long-range and short-range order parameters were computed for the Ising lattice using a Monte Carlo sampling scheme. The square, the simple cubic, and the body-centered lattices were considered. In the three-dimensional calculations both the antiferromagnetic and ferromagnetic cases were considered as well as coupling to an external magnetic field of various strengths. The computations were performed on the high-speed computer, ILLIAC, located at the University of Illinois.
T. G. R 13

18,150
Kamins, M. DETERMINING CHECKOUT INTERVALS FOR SYSTEMS SUBJECT TO RANDOM FAILURES. Contract AF 49(638) 700, Res. Memo. 2578, June 1960, 85pp. Rand Corporation, Santa Monica, Calif.

18,150
The present study was aimed at determining appropriate frequencies of checkout for systems with exponential failure characteristics with consideration for reliability, stresses, costs, and operating plans. First, simple algebraic maintenance models were developed which could account for time in all situations relevant to checkout. Next, cost models were developed which could be used with the above ones to determine a maximum ratio of readiness to cost. Finally, monitored and periodic checkout methods were compared via these models. Many sample computations of checkout intervals were included.
T. G. R 13

18,154
Hufford, G. THE CLASSIFICATION OF DIFFERENTIAL OPERATORS. Contract AF 33(616) 2987, Proj. 7231, Task 71788, WADD TN 60 103, Dec. 1960, 33pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio. (Stanford University, Stanford, Calif.).

18,154
"This technical note contains two parts. The first part consists of a survey of the more important and frequently used definitions of the types of scalar and matrix equations, that is notions of ellipticity, parabolicity, and hyperbolicity. The second part reviews these definitions in the light of the fundamental solution matrix, and deduces a number of important properties of the principal parts of such matrices."
R 6

18,197
Rath, G.J., Resnick, A. & Savage, Terry R. THE FORMATION OF ABSTRACTS BY THE SELECTION OF SENTENCES. Rep. RC 184, June 1959, 15pp. IBM Research Center, Yorktown Heights, N.Y.

18,197
Two studies on the formation of abstracts by selection and rating of key sentences in an article were reported. The first compared sentence selection by men and machines. Six Ss picked the 20 most representative sentences from each of ten scientific articles and rated them in order of importance. The same articles were analyzed according to five auto-abstracting programs on the IBM 704 and the score for each sentence prepared. Intersubject differences, intermachine program differences, and the man-machine differences with respect to sentence selection were compared. The second study investigated the reliability of humans in preparing abstracts by the above method by asking five Ss to prepare abstracts on the same material at two different times and comparing the results. T. G. R 4

18,203
Novotny, H.R. & Alvis, D.L. A METHOD OF PHOTOGRAPHING FLUORESCENCE IN CIRCULATING BLOOD OF THE HUMAN EYE. Rep. 60 82, Sept. 1960, 4pp. USAF School of Aviation Medicine, Brooks AFB, Tex. (Department of Medicine, Indiana University Medical School, Indianapolis, Ind.).

18,203
This report describes some preliminary observations on the use of intravenous fluorescein and retinal photography to study retinal blood flow. The limitations of the apparatus are discussed as well as the advantages of the method for obtaining more precise measurement of changes in retinal metabolism than has previously been possible.
I. R 2

18,222
Horne, E.P. & Whitcomb, M.A. (Eds.). VISION RESEARCH REPORTS. Publ. 835, 1960, 182pp. National Academy of Sciences-National Research Council, Washington, D.C.

18,222
This publication brings together the summaries of 19 scientific papers presented at the 36th, 37th, and 39th Annual Meetings of the Armed Forces-National Research Council Committee on Vision. Some of the papers included are: "Recognition of Forms against a Complex Background," "The Visibility of the Vanguard Satellite," "Visual Acuity during Ocular Pursuit," "The Intensity Factor in Vision," and "The Interactive and Inductive Effects in Color Vision."
T. G. I. R 258

18,246
The Institute of Radio Engineers, Inc. 1960 IRE INTERNATIONAL CONVENTION RECORD. PART 4. AUTOMATIC CONTROL INFORMATION THEORY. IRE International Convention, New York, N.Y., March 21-24, 1960, 203pp. The Institute of Radio Engineers, Inc., New York, N.Y.

18,246
This publication presents those Institute of Radio Engineers convention papers devoted to the subject matter areas of: control theory, control applications, radar and coding theory, and detection theory and applications to physics.
T. G. I. R 55

18,247
Schwartz, M. SEQUENTIAL PRECEDURES IN RADAR PRE-TRACKING. Report from: "1960 IRE International Convention Record. Part 4. Automatic Control; Information Theory," 1960, p.104. The Institute of Radio Engineers, Inc., New York, N.Y. (Polytechnic Institute of Brooklyn, Brooklyn, N.Y.).

18,247
This paper briefly summarizes some work on sequential analysis for detection of radar targets. Two such procedures are proposed and described--modified sequential pretrack and completely sequential pretrack. Both employ a double threshold technique and parallel closely the statistical treatment of sequential analysis.
R 4

18,248
Meltzer, S.A. & Thaler, S. DETECTION RANGE PREDICTIONS FOR PULSE DOPPLER RADAR. Report from: "1960 IRE International Convention Record. Part 4. Automatic Control; Information Theory," 1960, 105-115. The Institute of Radio Engineers, Inc., New York, N.Y. (Research and Development Labs., Hughes Aircraft Company, Culver City, Calif.).

18,248
A mathematical model is constructed which describes most pulse doppler radar search systems. Its function is to predict detection range and it is applicable to the situation where thermal noise and/or sidelobe clutter limits this range. The characteristics of the doppler filter and the postdetection filter are detailed, and the variation of most radar parameters is provided for. Detection probabilities for single and cumulative scanning are calculated with both steady and scintillating targets.
G. I. R 2

18,249
Preston, G.W. THE SEARCH EFFICIENCY OF THE PROBABILITY RATIO SEQUENTIAL SEARCH RADAR. Report from: "1960 IRE International Convention Record. Part 4. Automatic Control; Information Theory," 1960, 116-124. The Institute of Radio Engineers, Inc., New York, N.Y. (General Atronics Corporation, Bala-Cynwyd, Penn.).

18,249
This paper describes a method of radar signal search and detection, the latter being accomplished by a new form of probability ratio sequential detector and the beam scanning controlled by the detector. Three ways are suggested to utilize the gain in effective transmitter power thus realized. Recent theoretical work is discussed and some quantitative applications are made.
T. G. I. R 8

18,250
Chien, R.T. GROUP CODES FOR PRESCRIBED ERROR PATTERNS. Report from: "1960 IRE International Convention Record. Part 4. Automatic Control; Information Theory," 1960, 125-134. The Institute of Radio Engineers, Inc., New York, N.Y. (IBM Research Center, Yorktown Heights, N.Y.).

18,250
The problem of constructing group codes for correcting error patterns was studied. A transformation technique was first employed to classify the patterns to equivalent classes. Twenty such classes were found, eleven of which yielded group codes. The method of designing group codes was illustrated and the case of r=3 was worked out.
T. R 1

18,251
Kilmer, W.L. SOME RESULTS ON BEST RECURRENT-TYPE BINARY ERROR-CORRECTING CODES. Report from: "1960 IRE International Convention Record. Part 4. Automatic Control; Information Theory," 1960, 135-147. The Institute of Radio Engineers, Inc., New York, N.Y. (Montana State College, Bozeman, Mont.).

18,251
This paper develops an analytical framework for binary error-correcting codes (i.e., binary message sequences augmented by periodic insertions of one or more parity check digits) which consists of a parity check matrix, an error pattern vector, and a parity check sequence vector. The error-correcting properties for error-burst and memoryless-binary-symmetric channels are considered in detail. Some procedures for instrumenting highly efficient types of linear-recurrent burst-correcting codes are outlined and examples of such code design given.
I. R 20

18,252
Potter, N.S. A GENERAL THEORY OF SIGNAL-TO-NOISE RATIO IMPROVEMENT WITH APPLICATION TO THE VISUAL DETECTION OF WEAK SIGNALS. Report from: "1960 IRE International Convention Record. Part 4. Automatic Control; Information Theory," 1960, 167-181. The Institute of Radio Engineers, Inc., New York, N.Y. (Weapons Systems Research Lab., Research and Development Div., W.L. Maxson Corporation, New York, N.Y.).

18,252
In this paper, which is a condensation of a more extensive investigation, a technique of maximizing the probability of detection of a signal in an intensity-modulated display, in operations involving weak signals and noisy environments, and in human monitored systems is developed. This optimization primarily considers detector output and the improvement of its signal-to-noise ratio. An example is given. Conventional and optimized systems are compared for their detection probabilities.
G. R 5

18,253
Stern, T.E. INFORMATION RATES IN PHOTON CHANNELS AND PHOTON AMPLIFIERS. Report from: "1960 IRE International Convention Record. Part 4. Automatic Control; Information Theory," 1960, 182-188. The Institute of Radio Engineers, Inc., New York, N.Y. (Department of Electrical Engineering, Columbia University, New York, N.Y.).

18,253
The purpose of this paper was "to indicate how the quantized nature of electromagnetic radiation, and the statistical nature of physical amplification processes limit the performance of any amplifying device." To analyze information on a quantum basis, a discrete "photon channel" was postulated. The results of this formulation were used to determine the communication efficiency of a "physically ideal" high-gain amplifier of the Moser type.
G. I. R 2

18,254
Gamo, H. AN ASPECT OF INFORMATION THEORY IN OPTICS. Report from: "1960 IRE International Convention Record. Part 4. Automatic Control; Information Theory," 1960, 189-203. The Institute of Radio Engineers, Inc., New York, N.Y. (IBM Research Center, Yorktown Heights, N.Y.).

18,254
"Coherent, partially coherent and incoherent illumination are characteristic conditions upon which the nature of optical images is dependent. Under these conditions, by use of the response function, sampling theorem and intensity matrix for optical images, the limit of resolution of neighboring objects is shown to be the same. The amplitude and phase information derived from images of an object is determined by the degree of coherence of illumination and the noise in intensity measurements. This is shown by use of experimentally obtained elements of an intensity matrix for images."
G. I. R 13

18,256
The Institute of Radio Engineers, Inc. 1960 IRE INTERNATIONAL CONVENTION RECORD. PART 10. ENGINEERING MANAGEMENT, ENGINEERING WRITING AND SPEECH, HUMAN FACTORS IN ELECTRONICS. IRE International Convention, New York, N.Y., March 21-24, 1960, 125pp. The Institute of Radio Engineers, Inc., New York, N.Y.

18,256
This publication presents those Institute of Radio Engineers convention papers devoted to the subject matter areas of engineering writing and speech, engineering management, and human factors in electronics.
T. G. I. R many

18,257
Haine, R.W. & Lob, W. THE APPLICATION OF CLOSED LOOP CONTROL TECHNIQUES TO ENGINEERING PROJECT PLANNING. Report from: "1960 IRE International Convention Record. Part 10. Engineering Management, Engineering Writing and Speech, Human Factors in Electronics," 1960, 60-70. The Institute of Radio Engineers, Inc., New York, N.Y. (Eclipse-Pioneer Div., Bendix Aviation Corporation, Ann Arbor, Mich.).

18,257
This paper proposes the use of a Project Schedule Chart as a formal tool for accomplishing engineering projects in accordance with the technical specifications, allocated funds, and time schedules. From such information, corrective action can be taken when important deviations occur. The tool can also be used as an aid in the analysis and evaluation of requirements for manpower and funding. In addition, other levels of management are shown to benefit through the application of these classic planning techniques.
T. I.

18,258
Gollomp, B.P. MANAGEMENT CONTROL OF ENGINEERING EFFORT THROUGH GRAPHIC METHODS. Report from: "1960 IRE International Convention Record. Part 10. Engineering Management, Engineering Writing and Speech, Human Factors in Electronics," 1960, 75-98. The Institute of Radio Engineers, Inc., New York, N.Y. (Bendix Support Equipment, Bendix Aviation Corporation, Teterboro, N.J.).

18,258
A system is described which employs graphic models for planning and control of engineering effort at the project and department levels of management. The subjective factors considered in this system include individual and group professional abilities, project complexity, and time pressure. The functions of the various parts of an engineering organization are defined and a control system which covers these many aspects is outlined. Some specific applications are detailed.
T. G. R 33 (approx.)

18,259
Ely, J.H. CODING EQUIPMENT TO FACILITATE MAINTENANCE. Report from: "1960 IRE International Convention Record. Part 10. Engineering Management, Engineering Writing and Speech, Human Factors in Electronics," 1960, 99-105. The Institute of Radio Engineers, Inc., New York, N.Y. (Dunlap and Associates, Inc., Stamford, Conn.).

18,259
This study was undertaken to determine what information to place on prime ground-based electronic equipment and to develop techniques for displaying this information in order to facilitate maintenance. Field observations were made, maintenance manuals examined, and relevant personnel interviewed. Marked discrepancy between observed and manual-proposed procedure was questioned in detail. From these data a set of recommendations was developed for the information that accordingly should be displayed. A comparison of trouble shooting a piece of equipment with and without these recommendations was included.
G. R 2

18,260
Miller, R.B. THE REPLACEABLE COMPONENT - KEY TO MAINTAINABILITY. Report from: "1960 IRE International Convention Record. Part 10. Engineering Management, Engineering Writing and Speech, Human Factors in Electronics," 1960, 106-111. The Institute of Radio Engineers, Inc., New York, N.Y. (International Business Machines Corporation, Poughkeepsie, N.Y.).

18,260
This paper establishes two major points: that maintenance should be treated as a subsystem of interrelated design decisions, and that the replaceable component establishes the fundamental design premise for the entire maintenance subsystem and therefore is the key to maintainability. The factors which are determined by the replaceable component, thus giving it a central role, are described. Some of these are: essential test points, contents of trouble-shooting diagrams, and trouble-shooting strategies.
I. R 6

18,261
Berry, P.C. & Wulff, J.J. A PROCEDURE FOR PREDICTING RELIABILITY OF MAN-MACHINE SYSTEMS. Report from: "1960 IRE International Convention Record. Part 10. Engineering Management, Engineering Writing and Speech, Human Factors in Electronics," 1960, 112-120. The Institute of Radio Engineers, Inc., New York, N.Y. (Psychological Research Associates, Inc., Arlington, Va.).

18,261
A procedure is described which "permits the calculation of overall man-machine reliability to be made either on the basis of assigned performing unit reliability or on the basis of measured performing unit reliability." The predicted reliability estimates the proportion of time that the over-all output of the system will be in tolerance during the useful life of the system. It also can be supplemented with other data to yield an even more complete description of over-all reliability.
G. I. R 5

18,262
Grodsky, M.A. A METHOD FOR ANTICIPATING HUMAN FACTORS REQUIREMENTS IN MANNED WEAPONS SYSTEMS. Report from: "1960 IRE International Convention Record. Part 10. Engineering Management, Engineering Writing and Speech, Human Factors in Electronics," 1960, 121-125. The Institute of Radio Engineers, Inc., New York, N.Y. (Martin Company, Baltimore, Md.).

18,262
This paper states the need for forecasting human factors requirements early in the development of a weapons system. Two methods for establishing these requirements, one observational and one analytical, are compared. The forecasting criteria are described and a method for such forecasting is detailed.
R 6

18,277
Weiss, E.C., Wulff, J.J., McLaughlin, J.T., Walker, W.T., III, et al. DESIGN AND EVALUATION OF A SELF-TUTORING METHOD FOR ON-SITE TRAINING IN SAGE AN/FST-2 TROUBLE-SHOOTING. Contract AF 19(604) 5616, Proj. 1975, Task 76892, AFCCDD TN 60 26 & PRA Rep. 60 31, 1960, 35pp. Psychological Research Associates, Inc., Arlington, Va.

18,277
A study was conducted to provide materials and functional specifications for a self-instructional device for the development of trouble-shooting skills required by USAF maintenance technicians for the Coordinate Data Transmitting Equipment associated with the SAGE system. A survey was made of trouble-shooting problems to determine specific training requirements. A study design was then designed to satisfy the requirements and a practical test of trouble-shooting performance was devised and evaluated. A training program including the design criteria of a self-instructional device and content programs were developed and an empirical demonstration of the effectiveness of the "system" was conducted.
T. G. I.

18,285
Metzner, J.J. & Morgan, K.C. RELIABLE FAIL-SAFE BINARY COMMUNICATION. SECOND SCIENTIFIC REPORT. Contract AF 19(604) 6168, AFCRL TN 60 791, July 1960, 69pp. Department of Electrical Engineering, New York University, New York, N.Y.

18,285
A new binary decision-feedback system is described which is very effective for high reliability transmission when the channel is subject to fading, intermittent, strong bursts of noise, or other changing conditions. In a technical part of the report, certain general results concerning the performance of such systems, together with specific examples, are presented. Necessary coding and decoding procedures are discussed for various classes of codes, including sliding parity check and a subclass of these termed "rotational parity check codes." Estimates of the computational and storage requirements are included.
G. R 40

18,293
Marcus, R.S. & Walsh, J.F. DECISION MAKING STUDIES VIA WHIRLWIND COMPUTER MODELS. Contract AF 33(616) 5477, Proj. 7849, Task 50678, Tech. Memo. 5, Aug. 1960, 47pp. Electronic Systems Lab., Department of Electrical Engineering, Massachusetts Institute of Technology, Cambridge, Mass.

18,293
This memorandum summarized work accomplished on a decision-making study for the period August, 1958, through May, 1959. Whirlwind computer models were used to investigate the formulation of satisfactory strategies for complicated game-like situations, such as a bomber defending itself against enemy attacks. The difficulties of a Game Theory solution led to the use of "trial and error" procedures on the computer simulated model. Experiments on simple decision-making problems were discussed. Further work along these lines was suggested.
I. R 2

18,350
Billmeyer, F.W., Jr. USE OF A DIGITAL READOUT UNIT IN CONVERTING SPECTROPHOTOMETRIC DATA TO COLOR COORDINATES. J. opt. Soc. Amer., Feb. 1960, 50(2), 137-143. (Polychemicals Dept., E.I. du Pont de Nemours & Company, Wilmington, Del.).

18,350
This paper describes the use and performance of the Librascope Digital Readout Unit for the General Electri Recording Spectrophotometer, which, in conjunction with the IBM 650, carries out the conversion of spectrophotometric data to color coordinates. The essential features of the readout unit are illustrated as well as the format of the readout data on IBM cards. The two categories of computations performed on these data are application of correction factors to individual points and integration to CIE tristimulus values. Evaluation of the readout unit's performance showed its advantages to lie in terms of speed, flexibility, error frequency, and accuracy.
T. G. I. R 8

18,351
Kincaid, W.M., Blackwell, H.R. & Kristofferson, A.B. NEURAL FORMULATION OF THE EFFECTS OF TARGET SIZE AND SHAPE UPON VISUAL DETECTION. J. opt. Soc. Amer., Feb. 1960, 50(2), 143-148. (University of Michigan, Ann Arbor, Mich.).

18,351
This paper presents an hypothesized neural mechanism of human vision for formulating the effects of target size and shape upon visual detection under a variety of conditions. The foundations of this hypothesis, which lie in the work of earlier researchers, are discussed and further developed. The quantitative formulations thus obtained are shown to lead to testable predictions for the more general case of noncircular targets and for different background luminances.
G. R 8

18,353
Hebbard, F.W. & Marg, E. PHYSIOLOGICAL NYSTAGMUS IN THE CAT. J. opt. Soc. Amer., Feb. 1960, 50(2), 151-155. (School of Optometry, University of California, Berkeley, Calif.).

18,353
To further evaluate the essential nature of physiological nystagmus in vision, the present study was aimed at determining whether it exists in the cat. In addition, the effect on nystagmus of certain drugs and the contribution of individual muscles to this function were studied. Finally, the presence of tremor in a few other muscles was briefly investigated. The eye movements were recorded from the cats (prepared by the encephalé isolé technique) using the optical-lever method. These records were compared to those obtained after detaching most of the extraocular muscles, and those under the influence of curare and neostigmine. The significance of nystagmus was discussed briefly.
I. R 24

18,381
Seidenstein, S., Chernikoff, R. & Taylor, F.V. THE RELATIONSHIP OF A RETINAL-GAIN INDEX TO SYSTEM PERFORMANCE. Proj. RR 006 09 41 5351, NRL Rep. 5548, Sept. 1960, 7pp. USN Research Lab., Washington, D.C.

18,381
This work was aimed at determining the nature of the relationship of optical, display, and retinal gain to tracking precision in a compensatory tracking system. Five Ss maintained coincidence between a horizontally moving marker dot and a center line under 12 combinations of viewing distance (i.e., optical gain) and display gain. Both position- and aided-control dynamics were used. The various combinations of gains and types of control were presented in a balanced order over the 26 sessions. Integrated-error scores were examined by the Friedman two-way analysis of variance. Findings were discussed primarily from the control systems viewpoint.
T. G. I. R 1

18,382
Braunstein, M.L. ROTATION OF DOT PATTERNS AS STIMULI FOR THE PERCEPTION OF MOTION IN THREE DIMENSIONS: THE EFFECTS OF NUMEROSITY AND PERSPECTIVE. Ph.D. Dissertation, 1960, 88pp. Cornell Aeronautical Laboratory, Inc., Buffalo, N.Y.

18,382
This study dealt with displays of projections of points as these points were rotated about a vertical axis. The effects of numerosity and of perspective (the ratio of the distance from projection point and the most distant plane of the display to the distance from projection point to closest plane of the display) on judgments of the strength of the depth impression and of the coherence of the displays were investigated. Five levels of numerosity (2, 3, 4, 5, and 6) and four of perspective (1.00 or parallel, 1.13, 1.67, and 3.00) were presented in pairs to the S who was asked either to choose which gave the stronger impression of appearing in space or which was the most coherent. The results were discussed in relation to theories of depth perception. T. G. R 20

18,386
Morgan, K.Z. (Chm.). MAXIMUM PERMISSIBLE BODY BURDENS AND MAXIMUM PERMISSIBLE CONCENTRATIONS OF RADIONUCLIDES IN AIR AND IN WATER FOR OCCUPATIONAL EXPOSURE. Handbook 69, June 1959, 95pp. US National Bureau of Standards, Department of Commerce, Washington, D.C. (Oak Ridge National Lab., Oak Ridge, Tenn.).

18,386
This report, made by the National Committee on Radiation Protection (NCRP), is an abridgment of the International Commission on Radiological Protection (ICRP) Internal Radiation report. It is both a revision and extension of the earlier reports of NCRP and ICRP made necessary by new data and methods in this area. The first section discusses the basic rules and recommendations concerning exposure to ionizing radiation. The second states the assumptions and restrictions which apply to the maximum permissible values in the main table. This table, for each radionuclide, presents the organ of reference, maximum permissible burden in the total body, and maximum permissible concentrations for a 40-hour and a 168-hour week.
T.

18,393
Rudner, R.S., Moore, O.K. & Anderson, S.B. LOGICAL ANALYSIS, THE SENTENTIAL CALCULUS, AND HIGH-SPEED COMPUTER TECHNIQUES IN SMALL GROUP RESEARCH. Contract NONR 49403, Aug. 1953, 32pp. Department of Psychology, Tufts University, Medford, Mass.

18,393
This report discusses possible and actual uses of logical analysis, the sentential calculus, and high-speed computers in small-group research. Particular attention is given to those aspects of group performance and theory construction that have to do with tasks analogous to those found in command and control spaces in the United States Navy ships.
I. R 25

18,394
Reza, F.M. AN INTRODUCTION TO PROBABILITY THEORY DISCRETE SCHEMES. RADC TN 59 129, Aug. 1959, 67pp. USAF Rome Air Development Center, Griffiss AFB, N.Y.

18,394
This article surveys the fundamental notions of probability through the use of set theory concepts at a nonprofessional level. The elementary concepts of set algebra and the basic operations on sets are defined and illustrated. Included are the mathematical notations used frequently in conjunction with these definitions and the Venn diagrams used to illustrate the operations as well as the properties of sets. Some treatment is given to the "function" relationship of elements in a set, to the role of sample space, and to a number of specific problems involving different choice and probability conditions.
I. R 6

18,397
McKendry, J.M., Corso, J.F., Grant, G. & Scheihing, F.A. AN EXPERIMENTAL INVESTIGATION OF EQUIPMENT PACKAGING FOR EASE IN MAINTENANCE. SUPPLEMENT I TO NAVTRADEVCEN 330 1, DESIGN FOR MAINTAINABILITY. Contract N61339 330, NAVTRADEVCEN TR 330 1 1, April 1960, 113pp. USN Training Device Center, Port Washington, N.Y. (HRB Singer, Inc., State College Penn.).

18,397
This report summarized the findings of a study which examined the maintenance problem in terms of equipment packaging. Four packaging techniques were devised: the standard method, a component grouping method, a circuit grouping method, and a logical flow technique. Experienced and inexperienced technicians were given a series of troubles to locate on both a simple and complex piece of equipment, each packaged in the four ways above. Fault localization time and number of components successfully eliminated were the measures employed to evaluate the packaging techniques.
T. G. I. R 3

18,398
Guedry, F.E., Jr., Collins, W.E. & Sheffey, P. Lynn. PERCEPTUAL AND OCULOMOTOR REACTIONS TO INTERACTING VISUAL AND VESTIBULAR STIMULATION. Proj. 6X95 25 001, Task 15, Rep. 463, March 1961, 22pp. USA Medical Research Lab., Fort Knox, Ky.

18,398
To ascertain perceptual and oculomotor effects of interacting visual and vestibular stimuli, six Ss were given a test series of ten clockwise rotations per day for five days. Odd-numbered trials were conducted in complete darkness; even-numbered trials were in darkness except for a five-sec. period of full room illumination two sec. after turntable stopped. A standard series of ten trials of both clockwise and counterclockwise rotation preceded and followed the 50 test trials. Vestibular nystagmus and signals indicating subjective velocity were recorded and analyzed in terms of changes in the stimulation. The use of nystagmus alone as an indicator of perceptual problems arising from vestibular stimulation was discussed.
G. I. R 25

18,400
Gogel, W.C. CONVERGENCE AS A CUE TO ABSOLUTE DISTANCE. USAMRL Proj. 6X95 25 001, Task 13, Rep. 467, May 1961, 16pp. USA Medical Research Lab., Fort Knox, Ky.

18,400
The role of convergence and accommodation in the perception of absolute distance was investigated. Perceived absolute distance was measured by using a visual ruler consisting of a monocularly viewed alley. The apparent distance of a binocular object was judged with respect to the monocular alley for convergence values of four degrees or less by 12 Ss. Control judgments were used in order to be certain that depth was perceived in the alley. The judgments were analyzed for the following cases: 1) when accommodation was held constant, and 2) when both absolute accommodation and accommodative differences were in agreement with convergence.
G. I. R 12

18,401
Gogel, W.C. CONVERGENCE AS A CUE TO THE PERCEIVED DISTANCE OF OBJECTS IN A BINOCULAR CONFIGURATION. USAMRL Proj. 6X95 25 001, Task 13, Rep. 468, Feb. 1961, 15pp. USA Medical Research Lab., Fort Knox, Ky.

18,401
The perceived absolute distance of binocularly observed objects as a function of convergence was measured. Ss judged the distance of one, two, or three binocular objects with respect to a monocularly observed alley containing adequate distance cues. Four to twelve Ss were used in three experiments. The sensitivity (slope) of the function relating convergence and perceived distance was examined for the effect of number of binocular objects used. It was also noted that not all Ss showed evidence of such a relation.
G. I. R 11

18,402
Caldwell, L.S. THE RELATIONSHIP BETWEEN THE MAXIMUM FORCE EXERTABLE BY THE HAND IN A HORIZONTAL PULL AND THE ENDURANCE OF A SUB-MAXIMAL HOLDING RESPONSE. USAMRL Proj. 6X95 25 001 09, Task 09, Rep. 470, April 1961, 13pp. USA Medical Research Lab., Fort Knox, Ky.

18,402
To determine the relationship between measures of maximum force of horizontal pull by the hand and the duration of a submaximal holding response at a variety of body positions, five elbow angles (95 to 155 degrees) were combined factorially with two thigh angles (0 and 20 degrees) and two knee angles (110 and 115 degrees) to produce 20 different body positions. At each position each of ten Ss was measured to determine his peak force and the time he could maintain a given force on a dynamometer handle. The measures of peak forces and durations of holding response were correlated and analyzed in relation to body position. Implications of the findings for assessment of effects of anatomical variables on working efficiency were discussed.
T. I. R 6

18,403
Crampton, G.H. & Schwam, W.J. TURTLE VESTIBULAR RESPONSES TO ANGULAR ACCELERATION WITH COMPARATIVE DATA FROM CAT AND MAN. USAMRL Proj. 6X95 25 001, Task 06, Rep. 471, April 1961, 17pp. USA Medical Research Lab., Fort Knox, Ky.

18,403
To examine responses of the turtle (Terrapene c. carolina) to angular acceleration, four turtles were subjected to a series of calibrated angular accelerations in the horizontal plane designed to survey the relevant features of the head movement response to vestibular stimulation. In addition, an examination was made for ocular vestibular nystagmus. Finally, the head response was compared with representative records of ocular nystagmus from a cat and a man. Recommendations were made concerning the usefulness of the turtle for studying vestibular effects of accelerations existing during orbital space flight.
G. I. R 25

18,404
Harker, G.S. THE APPARENT FRONTOPARALLEL PLANE, STEREOSCOPIC CORRESPONDENCE AND INDUCED CYCLOROTATION OF THE EYES. USAMRL Proj. 6X95 25 001, Task 05, Rep. 472, May 1961, 17pp. USA Medical Research Lab., Fort Knox, Ky.

18,404
It was demonstrated that stereoscopic measures of apparent cyclorotation of the eyes taken with an apparent frontoparallel criterion in the presence of an inducing stereoscopic grid were uniquely large when compared with measures obtained with a coplanar criterion. An explanation of these data and those of Binocular Depth Contrast was offered in terms of perceptual factors termed the "equi-distance tendency" and the line-of-sight-dependency of stereopsis. These tendencies have been defined and investigated in other visual perception research.
T. G. I. R 13

18,405
Fletcher, J.L. TTS FOLLOWING PROLONGED EXPOSURE TO ACOUSTIC REFLEX ELICITING STIMULI. USAMRL Proj. 6X95 25 001, Task 02, Rep. 473, April 1961, 6pp. USA Medical Research Lab., Fort Knox, Ky.

18,405
To determine whether or not acoustic reflex (AR) activity can be maintained for relatively long periods of time, the AR eliciting stimulus (tones of 700 and 3,000 cps at 100 db sensation level) was presented in one ear with the fatiguing sound (white noise at 120 db SPL) being administered simultaneously in the other ear. Six experimental conditions of alternating or continuous stimulation were used. Each session consisted of a pre- and postexposure 4,000 cps audiogram of the test ear with one of the six experimental conditions intervening. Threshold shift data were analyzed by variance methods for differences among conditions. Discrepancies between the results of this experiment and those where AR contraction was maintained were discussed. I. R 8

18,406
Davis, T.R.A. CHAMBER COLD ACCLIMATIZATION IN MAN. USAMRL Proj. 6X64 12 001, Task 01, Rep. 475, May 1961, 8pp. USA Medical Research Lab., Fort Knox, Ky.

18,406
To determine the physiological effects of chronic cold exposure on unclothed humans, ten nude Ss were exposed eight hours daily for 31 days to a temperature of 11.8 degrees C during the month of March. Another group of six Ss were acclimatized similarly to a temperature of 13.5 degrees C in September. At intervals during the periods, measurements were made of shivering, oxygen consumption, and rectal and skin temperatures to a standard cold exposure of two hours. Changes in shivering, heat production, basal metabolism, and temperatures were analyzed in relation to the question of whether man can be artificially acclimatized.
T. G. R 20

18,407
Evans, W.O. A TECHNIQUE FOR THE INVESTIGATION OF SOME EFFECTS OF PSYCHOTROPIC AND ANALGESIC DRUGS ON REFLEXIVE BEHAVIOR IN THE RAT. USAMRL Proj. 6X95 25 001, Task 08, Rep. 476, May 1961, 9pp. USA Medical Research Lab., Fort Knox, Ky.

18,407
A technique was presented which is capable of discriminating between analgesic and nonanalgesic drugs using the rat as S and an experimental determination of the technique was presented. Variable intensities of electric shock to the rat's feet were used to elicit two distinguishable reflexive responses: a "flinching" response at low and a "jumping" response at higher shock values. A modified method of limits was used to obtain thresholds for the two responses without drugs and with drugs. The experimental results were discussed in terms of the effect of analgesics on the reduction of emotional response to pain and in terms of the function of serotonin and norepinepherine in the production of analgesia.
T. G. R 14

18,409
Loeb, M. & Fletcher, J.L. THE INFLUENCE OF DIFFERENT ACOUSTICAL STIMULI ON THE THRESHOLD OF THE CONTRALATERAL EAR: A POSSIBLE INDEX OF ATTENUATION BY THE INTRATYMPANIC REFLEX. USAMRL Proj. 6X95 25 001, Task 02, Rep. 478, May 1961, 6pp. USA Medical Research Lab., Fort Knox, Ky.

18,409
Broad band noise, narrow band noise, square wave and sine wave stimuli of equal sensation levels were employed in an attempt to elicit the intratympanic reflex and thus increase the absolute threshold for a pure tone in the contralateral ear. Sixteen Ss served in four experimental sessions (one for each reflex-eliciting stimuli) and the contralateral loss (threshold shift) produced by each stimuli was measured and analyzed. Implications of the findings for protecting hearing in those exposed to impulse noise were discussed.
G. R 7

18,410
Sadoff, M., McFadden, N.M. & Heinle, D.R. A STUDY OF LONGITUDINAL CONTROL PROBLEMS AT LOW AND NEGATIVE DAMPING AND STABILITY WITH EMPHASIS ON EFFECTS OF MOTION CUES. NASA TN D 348, Jan. 1961, 53pp. National Aeronautics and Space Administration, Washington, D.C. (Ames Research Center, Moffett Field, Calif.).

18,410
An investigation was conducted in several types of simulators (pitch-chair, fixed-cockpit, and centrifuge) and in flight to assess the effects of incomplete or spurious motion cues on pilot opinion and task performance over a wide range of longitudinal, short-period dynamics. Most of the tests were conducted with a conventional center stick control; however, a brief evaluation was made of a pencil-type side-arm controller.
G. I. R 25

18,412
McKee, J.W. A THREE-AXIS FIXED-SIMULATOR INVESTIGATION OF THE EFFECTS ON CONTROL PRECISION OF VARIOUS WAYS OF UTILIZING RATE SIGNALS. NASA TN D 525, Jan. 1961, 54pp. National Aeronautics and Space Administration, Washington, D.C. (Langley Research Center, Langley Field, Va.).

18,412
A study was made of control of a vehicle with no inherent stability or damping. A side-arm controller providing proportional acceleration control was used. Vehicle rate signals were used to provide control feedback or system damping and were used in the instrument display either separate from or summed with displacement signals.
G. I. R 5

18,415
Wallner, L.E. & Kaufman, H.R. RADIATION SHIELDING FOR MANNED SPACE FLIGHT. NASA TN D 681, July 1961, 45pp. National Aeronautics and Space Administration, Washington, D.C. (Lewis Research Center, Cleveland, Ohio).

18,415
To assess the possible shielding weight penalties, a study was made of radiation hazards to which astronauts will be exposed on future journeys into space. Cosmic radiation, solar flares, the Earth's Van Allen belts, and nuclear radiation from a reactor were considered for both short and long travel times, such as would be of interest on lunar and Mars missions. Shield mass requirements for reasonable biological protection, shield design requirements, the effect of travel time on shielding requirements, and the influence of radiation shielding on mission analysis were considered.
T. G. I. R 56

18,417
Taylor, L.W., Jr. & Day, R.E. FLIGHT CONTROLLABILITY LIMITS AND RELATED HUMAN TRANSFER FUNCTIONS AS DETERMINED FROM SIMULATOR AND FLIGHT TESTS. NASA TN D 746, May 1961, 65pp. National Aeronautics and Space Administration, Washington, D.C. (USAF Flight Research Center, Edwards AFB, Calif.).

18,417
A simulator study and limited flight tests were performed to determine the levels of static stability and damping necessary for pilot control of the pitch, roll, and yaw attitudes of a vehicle for a short period of time. Novel piloting techniques were found which enabled the pilot to control the airplane at conditions that were otherwise uncontrollable. The influence of the more important aerodynamic coefficients and other factors (learning and interruption of pilot's display) on controllability limits was also investigated. Information concerning human transfer functions applicable to marginally controllable tasks was presented as an aid in assessing the controllability of any specific configuration.
T. G. I. R 13

18,418
Brissenden, R.F., Burton, B.B., Foudriat, E.C. & Whitten, J.B. ANALOG SIMULATION OF A PILOT-CONTROLLED RENDEZVOUS. NASA TN D 747, April 1961, 51pp. National Aeronautics and Space Administration, Washington, D.C. (Langley Research Center, Langley Field, Va.).

18,418
A simulator investigation was made of the controls and instruments required for the rendezvous of a space ferry with an orbiting space station in the presence of various initial conditions and with ranges up to 50 miles. A human pilot controlled a fixed-base simulator in six degrees of freedom. A single rocket and reaction attitude controls were assumed. A two-axis, pencil-type side-arm controller and rudder pedals were used by the pilot with data presented on dialed instruments for range and range rate, line-of-sight rates between vehicle and station, vehicle attitudes and angular rates, and the angles subtended by the line-of-sight.
T. G. I. R 9

18,419
Wingrove, R.C. & Coate, R.E. PILOTED SIMULATOR TESTS OF A GUIDANCE SYSTEM WHICH CAN CONTINUOUSLY PREDICT LANDING POINT OF A LOW L/D VEHICLE DURING ATMOSPHERE RE-ENTRY. NASA TN D 787, March 1961, 36pp. National Aeronautics and Space Administration, Washington, D.C. (Ames Research Center, Moffett Field, Calif.).

18,419
The guidance system studied is based on the concept of fast continuous trajectory computation from conditions existing along the trajectory. A method of display compares desired touchdown points with the maximum range capability and heating or acceleration boundaries, so that a proper decision and choice of control inputs can be made. Results from piloted fixed-simulator tests for typical re-entries with lunar mission velocities and for recoveries from aborts are presented.
G. I. R 16

18,420
Posner, J. (Ed.). PROCEEDINGS OF MEETING ON PROBLEMS AND TECHNIQUES ASSOCIATED WITH THE DECONTAMINATION AND STERILIZATION OF SPACECRAFT. JUNE 29, 1960, WASHINGTON, D.C. NASA TN D 771, Jan. 1961, 57pp. National Aeronautics and Space Administration, Washington, D.C.

18,420
This report presented the deliberations and recommendations of a meeting of representatives of agencies concerned with space vehicles and those investigating decontamination procedures. Adequate safeguards against biological contamination of celestial bodies with terrestrial microorganisms and the reverse of this problem were considered. An attempt was made to determine the current status of decontamination and sterilization procedures and to arrive at areas of research required to increase knowledge in this field.
T. R 12

18,421
Randt, C.T. (Dir.). FIRST PLANNING CONFERENCE ON BIOMEDICAL EXPERIMENTS IN EXTRATERRESTRIAL ENVIRONMENTS. WASHINGTON, D.C., JUNE 20, 1960. NASA TN D 781, Feb. 1961, 85pp. National Aeronautics and Space Administration, Washington, D.C.

18,421
Thirty of the nation's leading experimental biologists conferred with the NASA Office of Life Science Programs staff to establish objectives, important areas of inquiry, and program priorities for space environment biomedical studies. Emphasis on the following were recommended: detection and study of extraterrestrial life, effects of simulated extreme environments, cellular and biological system studies in space conditions, ways and means of decontaminating space probes and vehicles, effects of space on biological rhythms and animal orientation, and photosynthesis in ecosystems. Space related work was recommended for earth-bound laboratories as well as for simulated environments and for upper atmospheric balloons.
I.

18,423
Faye, A.E., Jr. ATTITUDE CONTROL REQUIREMENTS FOR HOVERING DETERMINED THROUGH THE USE OF A PILOTED FLIGHT SIMULATOR. NASA TN D 792, April 1961, 20pp. National Aeronautics and Space Administration, Washington, D.C. (Ames Research Center, Moffett Field, Calif.).

18,423
A piloted simulator investigation was conducted to establish control requirements for hovering flight. Realistic controllability boundaries of control power and damping values were established about each of the three axes (one at a time) under ideal conditions. The effect on these single-axis boundaries when simultaneous control about two axes was presented to the pilot with the controls harmonized, not harmonized, and with gyroscopic coupling was assessed. A comparison of simulator controllability results with VTOL airplane flight results was made.
T. G. I. R 4

18,424
Brissenden, R.F., Cheatham, D.C. & Champine, R.A. TOLERABLE LIMITS OF OSCILLATORY ACCELERATIONS DUE TO ROLLING MOTIONS EXPERIENCED BY ONE PILOT DURING AUTOMATIC-INTERCEPTOR FLIGHT TESTS. NASA TN D 810, April 1961, 12pp. National Aeronautics and Space Administration, Washington, D.C. (Langley Research Center, Langley Field, Va.).

18,424
A limited amount of data on the levels of oscillatory accelerations found to be tolerable and intolerable by one pilot during flight tests of a prototype automatic interceptor was presented. The data analyzed were taken from accelerations imposed at the pilot's head. The pilot was an observer only during flight with no complex task to perform.
G. I. R 5

18,428
Parlett, L.P. HOVERING FLIGHT INVESTIGATION OF TWO METHODS OF CONTROLLING A MAN-CARRYING DUCTED-FAN VEHICLE OF THE FLYING-PLATFORM TYPE. NASA TN D 841, June 1961, 10pp. National Aeronautics and Space Administration, Washington, D.C. (Langley Research Center, Langley Field, Va.).

18,428
Flight tests were made to compare two methods of controlling a ducted-fan vehicle of the flying-platform type. The control methods were 1) kinesthetic, in which pilot stood on vehicle and furnished control movements by shifting his body weight; and 2) stick control, in which the seated pilot moved an airplane-type control stick linked to valves which differentially varied the thrust of four air jets. Ten men of widely varying flight experience served as Ss. Successful flight durations of approximately three min. and S's preferences for type of control were obtained for each S.
I. R 3

18,431
Crane, H.L. ANALOG-COMPUTER INVESTIGATION OF EFFECTS OF FRICTION AND PRELOAD ON THE DYNAMIC LONGITUDINAL CHARACTERISTICS OF A PILOT-AIRPLANE COMBINATION. NASA TN D 884, May 1961, 47pp. National Aeronautics and Space Administration, Washington, D.C. (Langley Research Center, Langley Field, Va.).

18,431
With an electric analog computer, an investigation was made of the effects of control frictions and preloads on the transient longitudinal response of a fighter airplane during abrupt, small attitude corrections. The simulation included the airplane dynamics, powered control system, feel system, and a simple linearized pseudopilot. Control friction at the stick pivot and at the servo valve as well as preloads of the stick and valve were considered individually and in combinations. The results were presented in the form of time histories and vector diagrams.
T. G. I. R 5

18,439
Douglas Aircraft Company, Inc. MAN AND SPACE. A SYSTEM TO DETERMINE MINIMUM SPACE REQUIREMENTS FOR THE SEATED OPERATOR OF A FLIGHT VEHICLE. Presented at: SAE National Aeronautic Meeting, 1960, Paper 173 A, Rep. ES 40025, Jan. 1961, 4pp. Douglas Aircraft Company, Inc., Santa Monica, Calif.

18,439
A system for determining minimum space requirements for the seated operator of a flight vehicle is presented graphically. Scale drawings of anthropometric manikins are given with the basic functional envelope development for a single body size. A typical composite functional envelope which would accommodate all sizes from the fifth to 95th percentiles is also shown.
I. R 9

18,440
Uhlaner, J.E. & Zeidner, J. THE ARMY NIGHT SEEING TESTER—DEVELOPMENT AND USE. DA Proj. 2L95 60 001, HFRB Tech. Res. Rep. 1120, May 1961, 41pp. USA Human Factors Research Branch, Adjutant General's Research & Development Command, Washington, D.C.

18,440
To implement the requirement for an effective and simple test on night visual acuity, research was conducted concurrently on basic experimentation into human individual differences in the night seeing process and on the development of instruments to test night seeing ability. Major factors involved in night seeing and useful relationships discovered through the experimental program were discussed. Development of instrumentation for testing night seeing resulted in the engineering of ANST-II, a compact, rugged, portable, and easy to use model. Field tests were conducted to demonstrate its usefulness in meeting Army night seeing testing needs.
T. G. I. R 50

18,441
Berkner, L.V. (Chm.). PROCEEDINGS OF A CONFERENCE ON RESULTS OF THE FIRST U.S. MANNED SUBORBITAL SPACE FLIGHT. June 1961, 76pp. National Aeronautics and Space Administration, Washington, D.C.

18,441
This document is a record of the proceedings of a conference on the results of the first US manned suborbital space flight. Three major topics are presented: 1) Mercury program summary, 2) biomedical data (preflight, inflight, and postflight), and 3) pilot performance (training, preflight preparation, inflight performance, and pilot's flight report).
T. G. I. R 4

18,442
Morrill, C.S. & Davies, Barbara L. TARGET ACQUISITION AND TRACKING IN THREE DIMENSIONS USING A TWO-DIMENSIONAL DISPLAY SURFACE. Contract AF 33(600) 39852 Proj. 750, Rep. 5, Jan. 1961, 22pp. Mitre Corporation, Lexington, Mass.

18,442
This report analyzed the effects of two internally compatible and two internally incompatible display-control systems on operator performance during target-acquisition and target-tracking tasks using three dimensions of information presented on a two-dimensional display surface. (A system is compatible when identical directional movements of handwheel and thumb wheel produce movements of azimuth-range and elevation symbol in same direction.) Four groups of ten Ss performed two tasks: 1) acquiring lock-on to the target, and 2) tracking a moving target in azimuth, range, and elevation. Measures for task one (time to acquire lock-on and composite initial reversals) and task two (lock-on time and length of time when all dimensions were in coincidence) and effects of practice were analyzed. T. G. I. R 9

18,443
Hanson, H.E. & Dee, T.E., Jr. THE INFLUENCE OF THERMAL-PROTECTIVE ENSEMBLES ON PHYSIOLOGICAL STRESS IN A DESERT ENVIRONMENT. Proj. 7X83 01 006, Tech. Rep. EP 146, Feb. 1961, 17pp. USA Environmental Protection Research Div., QM Research & Engineering Center, Natick, Mass.

18,443
To assess the heat stress imposed while wearing either a conventional or thermal-protective clothing ensemble, sweat production, rectal temperatures, and pulse rates were measured over 24 consecutive days on nine men resting or walking in a natural desert summer environment. The findings were discussed in reference to combat clothing design needs brought about by modern weapons technology.
T. R 8

18,444
Clark, R.E. THE LIMITING HAND SKIN TEMPERATURE FOR UNAFFECTED MANUAL PERFORMANCE IN THE COLD. Proj. Ref. 7X83 01 009, Tech. Rep. EP 147, Feb. 1961, 4pp. USA Environmental Protection Research Div., QM Research & Engineering Center, Natick, Mass.

18,444
To establish the lower limit of hand skin temperature for unaffected manual performance and to determine the stability of this temperature when duration of exposure is varied, the hands of 12 enlisted men were cooled to 55 degrees F and 60 degrees F surface temperature on different experimental days. Performance times to complete a standard knot-tying task were obtained when Ss' hands first reached the appropriate skin temperature after 20, 40, and 60 min. exposure. Changes in manual performance as functions of hand skin temperature and duration of cold exposure were analyzed. Implications of the data for development of auxiliary hand heating devices were discussed.
G. R 4

18,445
Clark, R.E. & Cohen, A. MANUAL PERFORMANCE AS A FUNCTION OF RATE OF CHANGE IN HAND SKIN TEMPERATURE. Proj. Ref. 7X83 01 009, Tech. Rep. EP 144, Jan. 1961, 10pp. USA Environmental Protection Research Div., QM Research & Engineering Center, Natick, Mass.

18,445
To determine the role of rate of cooling in manual performance during the cooling process and subsequent rewarming, performance time on a knot-tying task was obtained for 20 enlisted men. Two rates of hand cooling (0 degrees F and 20 degrees F) were used while body temperature, other than hands and forearms, was maintained at "normal" (75 degrees F and 50 percent relative humidity). Immediately after each S had performed the task at 45 degrees F hand skin temperature, his hands were rewarmed to 55 degrees F and "normal" skin temperatures and the task was repeated. Performance scores were the times to tie 15 knots. The findings were discussed in relation to the use of gloves during cold exposure.
T. G. R 16

18,446
Iampietro, P.F., Kreider, M.B., Vaughan, J.A., Masucci, F., et al. HEAT PRODUCTION FROM SHIVERING. Proj. Ref. 7X83 01 009, Tech. Rep. EP 145, Jan. 1961, 6pp. USA Environmental Protection Research Div., QM Research & Engineering Center, Natick, Mass.

18,446
To determine the maximum rate of heat production from shivering, to establish those ambient conditions that evoke the maximum heat production, and to determine the relative effects of windspeed and dry bulb temperature on heat production, healthy young men were exposed, nearly nude, for two hours or less to various environmental conditions (dry bulb temperature, 90 to 20 degrees F; windspeed, less than 1, 5, 10 mph). Oxygen consumption was recorded at intervals during exposure and calculations of heat production were made. The use of the results to evaluate the protection afforded by clothing ensembles was indicated.
G. R 11

18,447
Baumert, L., Easterling, M., Golomb, S.W. & Viterbi, A. CODING THEORY AND ITS APPLICATIONS TO COMMUNICATIONS SYSTEMS. Contract NASW 6, JPL TR 32 67, March 1961, 84pp. Jet Propulsion Lab., California Institute of Technology, Pasadena, Calif.

18,447
A general theory of binary sequences with desirable correlation properties is developed for application to the design of digital communication systems. The underlying mathematical problems are the existence, construction, and properties of "orthogonal matrices" (or Hadamard designs). The first detailed application is to the design of a ranging system with unambiguous, high-precision resolution over interplanetary distances which can nonetheless be quickly synchronized and yield its range data in real time. The second major application is to the design and analysis of optimum digital telemetry systems.
G. I. R 31

18,451
Ades, H.W. ELECTROENCEPHALOGRAPHIC FINDINGS IN RELATION TO EPISODES OF ALTERED CONSCIOUSNESS IN AVIATORS. Proj. MR005.13 3001, Subtask 1, Rep. 3, Feb. 1961, 24pp. USN School of Aviation Medicine, Pensacola Air Station, Fla.

18,451
Observations of aviators who had had unexplained lapses of consciousness while piloting aircraft led to the EEG exploration of these individuals and of the possible relationship between this clinical phenomenon and unexplained aircraft accidents. Baseline EEGs were taken on 1,375 aviation candidates admitted to training over a period of eight and one-half months and on four small groups composed of individuals who were referred by a flight surgeon because of a particular episode. EEG tracings were analyzed for factors identifying those pilots having unconscious episodes. The significance of the findings for selective procedures and reduction of aircraft accidents was discussed.
T. I. R 6

18,453
Waters, L.K. & Wherry, R.J., Jr. EVALUATION OF TWO FORCED-CHOICE FORMATS. Proj. MR005.13 5001, Subtask 2, Rep. 10, Feb. 1961, 6pp. USN School of Aviation Medicine, Pensacola Air Station, Fla.

18,453
To investigate the effect of response format on S resistance to a forced-choice self-rating scale, two such scales were used with two response formats: S checked one of two statements as being more applicable; S indicated on a five-point scale of applicability the degree to which each statement applied. For each of two groups, one of the two scales was administered twice, once with each response scale. The Ss chose the response sheet they felt gave the fairer description. The choice frequencies for each response format were analyzed. Ratings on a ten-point scale for each response format were also obtained and analyzed for preferences.
T. R 5

18,454
Kasparek, Catherine F. & Graybiel, A. AEROMETEORISM: A FOLLOW-UP REPORT. Proj. MR005.13 3001, Subtask 5, Rep. 2, Jan. 1961, 7pp. USN School of Aviation Medicine, Pensacola Air Station, Fla.

18,454
This present report gave the incidence of death or injury to persons on the ground as a result of falling aircraft and of falling fragments or contents of aircraft in the period 1953 to 1959. It was a followup of a similar one published in 1954 which reported all known cases of aerometeorism up to 1953. Data were obtained from the USN, USAF, and CAB. No mention was made of property damage. Various examples of the accidents that caused aerometeorism were recounted.
T. R 2

18,457
Elkin, E.H. THE EFFECT OF TARGET VELOCITY, EXPOSURE TIME AND ANTICIPATORY TRACKING TIME ON DYNAMIC VISUAL ACUITY. Contract NONR 494(18), Feb. 1961, 68pp. Institute for Psychological Research, Tufts University, Medford, Mass.

18,457
The effect on dynamic visual acuity of increasing angular velocities of the target under varying target exposure conditions were studied. Four target velocities (30, 60, 90, and 120 degrees/sec.), two anticipatory tracking times (0.2 and 1.0 sec.), and two exposure times (0.2 and 0.5 sec.) were used. Minimum separable thresholds were determined for each condition on 12 Ss who monocularly tracked Landolt-C rings which swept in arcs of varying angular distance about them. Average thresholds were computed and compared with each other and with relevant findings of previous studies. Three equations expressing acuity-velocity relationship were derived. Static visual acuity was measured and correlated with the Ss' dynamic visual acuity thresholds.
T. G. I. R 27

18,458
Zwislocki, J.J. AN INVESTIGATION OF CERTAIN MEANS OF SOUND ATTENUATION AT THE EAR. Contract NONR 669(11), Jan. 1961, 71pp. Syracuse University Research Institute, Syracuse, N.Y.

18,458
This report consists of several chapters that deal with the theoretical, experimental, and practical aspects of acoustic ear protection and voice communication in noise. The theory and experiments have led to the development of a practical device called a "resonator plug" with a sound attenuation provided that is equivalent to that of a 100 times larger earmuff. In conjunction with hearing aid receivers, the resonator earplugs can be used for communication purposes or for hearing testing. Various chapters are devoted to the psychophysical and physical evaluations of the earplug and psychophysical tests of the receiver-resonator system.
G. I. R 19

18,459
Hicks, S.A. THE EFFECTS OF TWELVE HOURS CONFINEMENT IN STATIC ARMORED PERSONNEL CARRIERS ON SELECTED COMBAT RELEVANT SKILLS: STUDY III. OCD Proj. TB1 1000, Tech. Memo. 1 61, Feb. 1961, 17pp. USA Ordnance Human Engineering Labs., Aberdeen Proving Ground, Md.

18,459
To determine changes in general psychomotor performance as related to basic infantry skills after 12 hours confinement in static (stationary) Armed Personnel Carriers, 40 enlisted men were tested before and after confinement. The tests used were designed to measure stamina, eye-arm coordination, gross motor coordination, and rifle accuracy. Two activity levels were maintained for different experimental groups: 1) no activity of any kind, 2) activities designed to keep the men busy such as map reading, watchkeeping, telephone operation, and the like. Each activity level was maintained under conditions of engine off and engine normally idling. Differences due to confinement and activity level were discussed.
T. G. R 5

18,460
Owen, D.B. DISTRIBUTION FREE TOLERANCE LIMITS FOR AN ADDITIONAL FINITE SAMPLE AS OBTAINED FROM THE HYPERGEOMETRIC DISTRIBUTION. SCR 285, Feb. 1961, 12pp. Sandia Corporation, Albuquerque, N.M.

18,460
Distribution free tolerance limits on any continuous population are reviewed. Distribution free tolerance limits on an additional sample of m observations are then considered. Formulas are given for the proper probability statement regarding the additional m observations in order to obtain the probability from tables of the hypergeometric probability distribution.
T. R 14

18,461
Ray, J.T., Martin, O.E., Jr. & Alluisi, E.A. HUMAN PERFORMANCE AS A FUNCTION OF THE WORK-REST CYCLE. A REVIEW OF SELECTED STUDIES. Contract AF 33(616) 6050, Projs. 7184 & 6190, Tasks 71582 & 71566, Publ. 882, Oct. 1960, 32pp. National Academy of Sciences - National Research Council, Washington, D.C. (Lockheed Aircraft Corporation, Marietta, Ga.).

18,461
Studies relating to the effects of different work-rest cycles on man's performance are reviewed. Included are only those studies in which 1) observations of performance extend for 24 hours or longer and 2) results pertain to the general problem of optimizing performance through the scheduling of work and rest periods. Some conclusions are made but the number of possible generalizations relating to optimum work-rest scheduling are limited. The need for additional long-term experimentation is indicated.
G. R 76

18,462
Morris, Ailene. THE NEL SIZE-CONTRAST TEST FOR MEASURING VISUAL PERFORMANCE. S F001 05 01 (NEL N6 3), NEL Rep. 1038, March 1961, 12pp. USN Electronics Lab., San Diego, Calif.

18,462
A portable, easily administered test was devised for measuring visual performance under various observation conditions. Test scores obtained vary with observation range and optical magnification and are predictable by standard visibility calculation procedures. A further application of the test was in establishing a visual efficiency index for various optical image transmission devices such as periscopes and closed-circuit television systems.
G. I. R 4

18,464
Frey, A.H., Granda, R.E. & Hiltz, F.L. EXPERIMENTAL STUDY OF ATMOSPHERIC ION EFFECTS ON HUMAN BEHAVIOR. QUARTERLY PROGRESS REPORT 2. Contract NONR 3202(00), Proj. NR 144 158, May 1961, 12pp. General Electric Company, Ithaca, N.Y.

18,464
This was an initial report on techniques for control of interacting variables in a more extensive study of atmospheric ion effects on human behavior. The results from a preliminary study were presented. The tasks were control of a simplified tracking system and radar detection by three practiced Ss under conditions of positive, negative, and minimal ionization. Additional stress in the form of occasional random electric shocks was introduced. The controls found necessary for experimental purposes were discussed under two categories: environmental and subject.
I. R 7

18,465
Herrick, R.M. ACCURACY OF LEVER-DISPLACEMENT BEHAVIOR OF RATS FOLLOWING EXPOSURE TO POSITIVE ACCELERATIONS. WepTask R360FR102/2021/R01101001 (6006M), Subtask MR005.15 0002.16, Rep. 5, Rep. NADC MA 6111, April 1961, 11pp. USN Aviation Medical Acceleration Lab., Johnsville, Penn.

18,465
To determine how well animals can perform a finely-coordinated movement following exposure to positive acceleration, rats were trained to depress a response lever handle through an arc of at least 23.62 degrees but not greater than 28.76 degrees and then to release the lever handle. Then the lever-pressing behavior was evaluated immediately following exposure to positive acceleration levels of 2, 5, 6, 15, and 20 g on successive days. The response data were presented as percentage of lever-presses made to each lever position during a one-hour test period on a control day and on a day immediately following exposure.
G. R 6

18,466
Mitchell, R.T. & Mitchell, Rhoda R. VISUAL ACUITY UNDER BLUE ILLUMINATION. Contract AF 19(604) 7400, Rep. 58G 0018, Feb. 1961, 13pp. Lincoln Lab., Massachusetts Institute of Technology, Lexington, Mass.

18,466
To compare visual acuity under white and blue illuminations and to determine the magnitude of any adverse effect (if found) under the specific conditions of the blue lighting system adopted for use in SAGE operations rooms, two experiments were conducted. In the first, visual acuity was determined for seven Ss under blue and white illuminations of equal intensities at distances ranging from 5 to 15.5 ft.; acuity targets were arrays of Landolt rings. In the second experiment, visual acuity was determined for the same Ss under blue and white lighting at the optical equivalents of 13 inches and 26 ft. using the Bausch & Lomb Orthorater. Acuity scores were also obtained in the blue light at the far distance with the Ss wearing negative spherical lenses of five power. T. G. R 8

18,467
Smith, S.W. TIME REQUIRED FOR TARGET DETECTION IN COMPLEX ABSTRACT VISUAL DISPLAY. Contract DA 36 039 SC 78801, Memo. 2900 235 R, April 1961, 34pp. Institute of Science and Technology, University of Michigan, Ann Arbor, Mich.

18,467
The purpose of this study was to determine the effects on search time of two display variables: 1) number of objects present in a display, and 2) similarity between the object sought (target) and nontarget objects (pseudotargets). Projected displays consisting of discrete, sharply defined, randomly distributed objects were presented to four observers. (The objects were all brighter than the field with all pseudotargets identical.) The task was to locate the target as rapidly as possible. In three series of tests, number of objects was varied from 1 to 1,024 in the first, four sizes and four contrast values were varied for 256 objects in the second, and target shape was varied in the third (triangle, square, pentagon, and hexagon).
T. G. I. R 11

18,468
Archibald, E.R. & Ward, W.E. CHIMPANZEE TEMPERATURE-HUMIDITY TOLERANCE TESTS. CONTROL TESTS AT 80°F, 50 PERCENT RELATIVE HUMIDITY. Proj. 6892, Task 68921, AFMDC TR 61 11, April 1961, 47pp. USAF Aeromedical Field Lab., Holloman AFB, N.M.

18,468
As part of a program to establish optimum, maximum, and minimum tolerable temperatures at various relative humidities for large biological specimens, physiological data were collected from five restrained, immature chimpanzee Ss under thermally-neutral environmental conditions. Physiological measurements recorded were respiration rate, heart rate, and rectal and skin temperatures. Blood and urine collections were made for a metabolic profile study in conjunction with the test series. Seven tests were run; test parameters were 80 degrees F with 50 percent relative humidity for a duration of 20 hours. Instrumentation procedures and general test techniques were described.
T. G. R 7

18,469
Goldiamond, I. PERCEPTION (IN EXPERIMENTAL FOUNDATIONS OF CLINICAL PSYCHOLOGY). ESD TR 61 21, 1961, 75pp. Arizona State University, Tempe, Ariz.

18,469
This report is to appear as a chapter in the forthcoming book, The Experimental Foundations of Clinical Psychology, edited by Arthur Bachrach. Perception is defined procedurally and the implications of this definition are considered with special reference to some clinical areas. The effects upon perceptual formulations of current advances related to communications and conditioning research are considered and applied to training, research, and other analytical problems. Specific consideration is given to the theory of signal detection, operant conditioning research in discrimination and generalization, and other recognition and verbal behavior (word) research.
T. R 168

18,470
Weiner, H. SOME EFFECTS OF RESPONSE COST CONTINGENCIES, DIFFERENTIAL RATES OF VARIABLE-INTERVAL REINFORCEMENT, AND REINFORCEMENT SCHEDULE INFORMATION UPON INSTRUMENTAL OBSERVER RESPONSES. INTERIM REPORT. NIMH Grant M 3850, Rep. AIR 332 61 IR 138, Jan. 1961, 22pp. Behavioral Research Lab., American Institute for Research, Washington, D.C.

18,470
This report was second in a series of experimental studies concerned with the operant control of human monitoring behavior. Specifically, the concern here was with modifications in the instrumental observer responses of four human monitors (detection and reporting of red light signals appearing in various positions on a scope face by pressing and releasing a lever) under differential conditioning sequences of no cost and observer response cost (loss of points), with or without schedule information, and as a function of differential rates of nontransient variable-interval reinforcement. Both three- and six-ply schedules were employed to remove intersubject variability and to provide an independent multielement baseline to gauge the effects.
T. G. I. R 2

18,471
Winterberg, R.P. & Wulfeck, J.W. INVESTIGATION OF ADDITIVE COLOR PHOTOGRAPHY AND PROJECTION FOR MILITARY PHOTO-INTERPRETATION. II. LABORATORY COMPARISON OF SIMULATED PANCHROMATIC, COLOR AND INDIVIDUAL ADDITIVE COLOR IMAGE SEPARATION. Contract NONR 3137(00), Tech. Rep. 2, March 1961, 28pp. Dunlap and Associates, Inc., Santa Monica, Calif.

18,471
To assess the relative value of panchromatic, full color, and three additive color separations as formats for projecting photographed images, a large sample of chromatic targets were shown against six achromatic backgrounds. The targets were presented in eight sizes for each format. Two Ss were tested and retested for the entire series, using object detection and resolution of detail as criteria for evaluating differences in performance. Four additional Ss were tested on one size only. The findings were discussed in relation to theoretical expectations and to problems of photo interpretation.
T. G. I. R 3

18,472
Morse, P.M. (Dir.). RESEARCH AND EDUCATIONAL ACTIVITIES IN MACHINE COMPUTATION BY THE COOPERATING COLLEGES OF NEW ENGLAND. PROGRESS REPORT NUMBER 8. Jan. 1961, 127pp. Computation Center, Massachusetts Institute of Technology, Cambridge, Mass.

18,472
This progress report on the activities of the Computation Center is introduced by a tabular presentation of computer usage and users by origin from September 15, 1960, through January 31, 1961. Following sections are devoted to reviews of 1) research activities, 2) educational activities, 3) operations staff report, 4) activity of current computer problems, 5) computer and associated equipment, and 6) publications of the center.
G.

18,473
Morsh, J.E., Madden, J.M. & Christal, R.E. JOB ANALYSIS IN THE UNITED STATES AIR FORCE. Proj. 7734, Task 17013, WADD TR 61 113, Feb. 1961, 59pp. USAF Personnel Lab., Lackland AFB, Tex.

18,473
A revised method of job analysis, used by the Air Force in its recently revised Occupational Analysis Manual, is described in this paper. The research and development leading to its present form is included. The method centers around the use of the task inventory and also includes many desirable features of traditional methods. The uses of job analysis data, statistical treatment, and special problems for future research are discussed. Evidence is presented on the reliability of the information obtained and on its economical use. The method also facilitates quantitative analysis and the organization of information into a form of utility to a maximum number of using agencies.
I. R 27

18,474
Keating, D.A. & Roundy, R.W. CLOSED ECOLOGY. Proj. 6373, Task 63120, WADD TR 61 129, March 1961, 14pp. USAF Life Support Systems Lab., Wright-Patterson AFB, Ohio.

18,474
The concepts of closed ecology as well as the design requirements for three degrees of closure in closed ecological systems are presented in a manner basic to the reader's understanding of such aerospace life support systems. The concepts are presented in terms of design philosophy rather than actual design. Design of such systems is dependent upon future research.
I. R 6

18,475
Moss, S.M., Kraft, C.L. & Howell, W.C. THE INFLUENCE OF OVERLAY CONFIGURATION ON THE ESTIMATION OF HEADING AND SPEED. Contract AF 33(616) 6166, Proj. 7184, Task 71583, WADD TR 61 141, March 1961, 19pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio. (Laboratory of Aviation Psychology, Ohio State University, Columbus, Ohio).

18,475
To determine the influence of PPI overlay configurations on judgments of target heading and speed, separate experiments were undertaken for each type of judgment. In both studies the overlay conditions were 1) clear display, 2) range rings, 3) angle marks, and 4) range rings with angle marks. Additional variables in Experiment I (heading judgment) were target speed (two lengths of trail) and method of displaying speed (lead versus trail coding). In Experiment II (speed judgment) additional variables included speed range and separation of standard and comparison stimuli. Twenty and nine Ss respectively served in the two experiments. All configurations were presented in random sequence (film strip); rate of presentation was controlled by S. Response time and error scores were recorded and analyzed. T. G. I. R 8

18,476
Hall, J.F., Jr. & Polte, J.W. PHYSIOLOGICAL INDEX OF STRAIN AND BODY STORAGE IN HYPERTHERMIA. Proj. 7164, Task 71830, WADD TR 60 599, Jan. 1961, 17pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio.

18,476
To determine the relationship between a modified Craig index of physiological strain (combination of terminal heart rate, rise in rectal temperature, and sweat production) for nonacclimatized, nonventilated, sitting-resting Ss, five such Ss (wearing one clo body insulation) were exposed five times to each of three heat stress levels (38, 54, and 71 degrees C) at ten mm Hg vapor pressure. The obtained measurements were analyzed in terms of 1) the degree and statistical significance of inter- and intraindividual variability involved in using such an index; 2) the relationship between the index and body heat storage; and 3) the correlations between body heat storage and mean skin, body, and rectal temperatures, as well as heart and sweat rate.
T. G. R 8

18,477
Kidd, J.S. SOME SOURCES OF LOAD AND CONSTRAINTS ON OPERATOR PERFORMANCE IN A SIMULATED RADAR AIR TRAFFIC CONTROL TASK. Contract AF 33(616) 6166, Proj. 7184, Task 71583 WADD TR 60 612, March 1961, 15pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio. (Laboratory of Aviation Psychology, Ohio State University, Columbus, Ohio.)

18,477
Two general factors relevant to human performance in a man-machine system were subjected to experimental analysis: 1) the influence of task load on operator capacity and 2) the effects of situational constraints on operator adaptability. The performance of six two-man control teams was observed in a simulated radar air traffic control center as they guided incoming aircraft through a 50-mile approach course. Experimental variables were two levels of traffic input rate, two levels of control zone size, two conditions of interoperator organization, and three conditions in which arrival sequencing procedure was modified. Performance measures were safety (frequency of separation errors) and flight delay (excess flight time).
T. G. I. R 12

18,478
Wood, E.H., Sutterer, W.F., Marshall, H.W., Lindberg, E.F., et al. EFFECT OF HEADWARD AND FORWARD ACCELERATIONS ON THE CARDIOVASCULAR SYSTEM. Contract AF 33(616) 5938, Proj. 7220, Task 71742, WADD TR 60 634, Jan. 1961, 52pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio. (Mayo Clinic, Rochester, Minn.).

18,478
To measure cardiac output and related physiological variables in human Ss exposed to acceleration stress in various body orientations, seven Ss were studied under three conditions: 1) headward (positive) acceleration of one-min. duration, 2) of ten-min. duration, and 3) forward (transverse) acceleration for ten-min. duration. In all cases the Ss were in a seated position on a human centrifuge. The indicator-dilution technique with sudden single injections of dye into the right atrium and continuous recording of the resulting curves from arterial blood was used to evaluate changes caused by acceleration.
T. G. I. R 18

18,479
Erlick, D.E. & Palmore, J., Jr. JUDGMENTS OF THE RELATIVE FREQUENCY OF TWO RANDOM SEQUENTIAL EVENTS: EFFECTS OF RATE OF PRESENTATION. Proj. 6190, Task 71556, WADD TR 60 714, March 1961, 8pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio. (Antioch College, Yellow Springs, Ohio).

18,479
The effect of presentation rate on a man's ability to determine which of two mutually exclusive random sequential events has occurred more frequently was investigated using rates of 1, 2, 4, and 8 events per second. Two specific studies were carried out using the same relative differential frequencies between the events but varying the absolute number of events in the total series. Two symbols (the letters A and B) representing the two distinct events were presented, as described above, to 68 individual Ss. The task was to judge which event occurred more frequently during a given presentation. Percent correct identification was used as a performance measure.
T. G. R 3

18,480
Beer, M., Jayson, R.M., Carter, V.E. & Kresse, F.H. SURVEY OF ESCAPE TRAINING IN THE AIR FORCE. Proj. 7222, Task 71748, WADD TR 60 792, March 1961, 71pp. USAF Behavioral Science Lab. & USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio.

18,480
To study the effectiveness of the present U.S. Air Force ejection training program, the following sources were canvassed for relevant information: literature on ejection training, training films, aircrew personnel, training instructors, and accident statistics. Questionnaire data were obtained from all personnel who had ejected successfully during a stated period and standardized direct interviews, based on the questionnaire, were administered to all personnel in a Fighter Interceptor Squadron. On the basis of an analysis of the information, specific deficiencies in training procedures, training media, and content of the program were identified. Recommendations were included.
T. R 7

18,481
Licklider, J.C.R. AUDIO WARNING SIGNALS FOR AIR FORCE WEAPON SYSTEMS. Contract AF 33(616) 5611, Proj. 6190, Task 71556, WADD TR 60 814, March 1961, 52pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio. (Bolt Beranek and Newman, Inc., Cambridge, Mass.).

18,481
This report presents technical information on the design, selection, and use of audio warning signals. It describes a procedure for specifying the acoustical characteristics of warning signals required to meet the exigencies and conditions expected for a given Air Force system (ground-based, airborne, or spaceborne). The main bases for the procedure are experience and rational analysis. The procedure brings together applicable design criteria, constraints imposed by the system, and conditions under which the system must operate. The above considerations are then interacted with characteristics of human sensation, perception, and reaction; acoustical specifications may be determined. A magnetic tape recording illustrates the procedure.
T. I. R 7

18,482
Besco, R.O. THE EFFECTS OF COCKPIT VERTICAL ACCELERATIONS ON A SIMPLE PILOTED TRACKING TASK. Contract AF 33(600) 42058, Rep. NA 61 47, April 1961, 19pp. North American Aviation, Inc., Los Angeles, Calif.

18,482
To determine the effects of cockpit vertical acceleration on pilot performance on a single axis pitch tracking task, an experiment was performed using a dynamic flight simulator. The aerodynamic and flight control response data used were representative of the B-70 as of June, 1960, development. Four engineering test pilots performed the compensatory tracking tasks which were varied in frequency and amplitude of command signal excursions. Tests were made under the following motion conditions: no motion, motion due to aircraft response only, aircraft motion plus mild turbulent air, and aircraft motion plus heavy turbulence. Tracking errors were analyzed.
T. G. R 7

18,483
Graham, C.H., Sperling, H.G., Hsia, Y. & Coulson, A.H. THE DETERMINATION OF SOME VISUAL FUNCTIONS OF A UNILATERALLY COLOR-BLIND SUBJECT: METHODS AND RESULTS. J. Psychol., 1961, 51, 3-32. (Department of Psychology, Columbia University, New York, N.Y.).

18,483
Previously published articles have presented data on threshold luminosity, cff, and binocular brightness matches of an S having normal vision in one eye and dichromatic vision in the other. The present article gives the basic description of the experiments and data on color mixture, color naming, wave length discrimination, and binocular color matching in this area.
T. G. I. R 26

18,485
Kostanzer, A.R. AN EVALUATION OF TWO READOUT ARRAY METHODS FOR PRESENTING BINARY AND DECIMAL INFORMATION. Prob. NEL N5 5, Subtask 5742, NEL TM 463, April 1961, 15pp. USN Electronics Lab., San Diego, Calif.

18,485
To investigate the readability of four display registers using binary-coded-decimal and decimal number systems in combination with horizontal and vertical readout arrays, 12 Ss were given a paper-and-pencil test to test for differences among the four display registers. Performance was analyzed in terms of time scores (total time) and number of errors. The findings were discussed in relation to design of a display register for high-speed digital computers.
T. G. I.

18,487
Havron, M.D. & Jenkins, J.P. INFORMATION REQUIREMENTS METHODS AS APPLIED TO DEVELOPMENT OF DISPLAYS AND CONSOLES. Contract NONR 2525(00), Rep. 12, HSR RR 61/4 SM, March 1961, 183pp. Human Sciences Research, Inc., Arlington, Va.

18,487
An integration of methods used in information requirements studies and human factors research on displays and consoles is presented. The first three chapters deal with information requirements methodology, operator tasks and characteristics of information, and concepts necessary to systems analysis oriented towards display and console development. The following chapters define and discuss a set of steps recommended for proceeding from system concept to the development of an instrumented operational console. Critical gaps in methodology are discussed. Appendices provide information to support the procedures.
I. R 137

18,488
Vaughan, W.S., Jr. METHODOLOGY FOR DETERMINING INFORMATION AND DISPLAY REQUIREMENTS FOR COMMAND OF AN ADVANCED SUBMARINE. A CASE STUDY IN SYSTEM RESEARCH METHODOLOGY. Contract NONR 2525(00), Rep. 4, HSR RM 59/24 SM, Dec. 1960, 20pp. Human Sciences Research, Inc., Arlington, Va.

18,488
A sequence of research steps was described which comprise a methodology for developing information requirements and display recommendations from assumptions about a system and its tactical employment. A next-generation attack submarine was used as the system under consideration. Each of the steps was defined by operational procedures that can be replicated. Some gaps in procedures which require development of appropriate research were discussed.
R 2

18,489
Schreiber, A.L. MEASURING THE RELEVANCE OF AN ITEM OF INFORMATION TO THE COMMAND OF A COMPLEX MAN-MACHINE SYSTEM. Contract NONR 2525(00), Rep. 10, HSR TN 61/1 SM, Jan. 1961, 21pp. Human Sciences Research, Inc., Arlington, Va.

18,489
A rationale and a mathematical formulation for determining the relevance of an item of information to systems operators were derived. Expected values of terminal states provided the basis for calculations. Although this approach was made in the development of command consoles and displays, it may be applied to any kind of proposed system to determine command information requirements when current methods may not be adequate.
G. R 7

18,490
Vaughan, W.S., Jr. & McGrath, J.E. A COMPARISON OF TWO DIVERSE METHODOLOGICAL APPROACHES TO RESEARCH ON COMPLEX SYSTEMS. Contract NONR 2525 (00), Rep. 2, HSR RM 59/22 SM, Nov. 1959, 16pp. Human Sciences Research, Inc., Arlington, Va.

18,490
This paper describes some general methodological biases frequently seen in systems research and their research consequences. The two approaches chosen to represent diverse methodology are those of strict empiricism and pure mathematics—variable hunter, tracker and model builder, solution grinder. A plea is made for integration of these methodological approaches.
I.

18,491
Havron, M.D. EVALUATION OF COMBAT SYSTEMS: ESTABLISHMENT OF CRITERIA AND THEIR USE IN SELECTION OF KEY SYSTEM FACTORS. Contract NONR 2525(00), Rep. 11, HSR RR 61/3 SM, March 1961, 49pp. Human Sciences Research, Inc., Arlington, Va.

18,491
This report, one of a series on system research methodology, deals with several problems research planners face in the selection of criteria for evaluation of combat systems. Three areas are discussed: the logical basis for criteria, the relationships between system variables and criteria, and the evaluation of criterion variables for their importance. It is shown by example how criteria derived from the duel may be used in early design planning to evaluate the relative improvement that may be realized in system effectiveness through increasing the capabilities of certain subsystems.
T. G. I. R 26

18,492
Kidd, J.S. WORK TEAM EFFECTIVENESS AS A FUNCTION OF MECHANICAL DEGRADATION OF THE INTRATEAM COMMUNICATION SYSTEM. FINAL REPORT. Contract AF 19(604) 6665, RF Proj. 1096, ESD TN 61 57, May 1961, 18pp. Ohio State University Research Foundation, Columbus, Ohio.

18,492
A simulated radar air traffic control task was used as a setting for assessing the effects on team performance of mechanical degradation of the communications system. Three experiments were performed: 1) channel noise, signal-to-noise ratio, and traffic density factors were evaluated; 2) various frequency pass band conditions were compared; and 3) the degree of channel interruption and techniques for overcoming this type of interference were evaluated. System performance indices (percent excess flight time, average number of aircraft handled, separation errors) were used to assess the effects of the variables under study. The importance of feedback and the role of sender-receiver cooperation in overcoming communications barriers were discussed.
T. R 22

18,493
Swets, J.A. DETECTION THEORY AND PSYCHOPHYSICS: A REVIEW. Psychometrika, March 1961, 26(1), 49-63. (Massachusetts Institute of Technology, Cambridge, Mass.). (APCCDD TR 61 3).

18,493
The application in psychophysics of the general theory of signal detection is discussed. It is pointed out at the beginning that the theory of signal detection (TSD) is a combination of two distinct theoretical structures: statistical decision theory and the theory of ideal observers. The way in which these two aspects of TSD have been applied to human behavior is discussed with emphasis on theory and experimental method.
R 59

18,496
Solomon, P. MOTIVATIONS AND EMOTIONAL REACTIONS IN EARLY SPACE FLIGHTS. Psychophysiological Aspects of Space Flight, 1961, 272-277. (Harvard Medical School, Boston, Mass.).

18,496
This is a speculative discussion of the role of motivation in the emotional reactions of a pioneer space traveler and an analysis of the more dangerous emotional reactions from the point of view of their unconscious derivations and their possible means of prophylaxis.
R 14

18,497
Stevens, S.S. TO HONOR FECHNER AND REPEAL HIS LAW. Science, Jan. 1961, 133(3446), 80-86. (Psychological Labs., Harvard University, Cambridge, Mass.).

18,497
This article reviews Fechner's version of the psychophysical law that describes the operating characteristics of the sensory system as a logarithmic function. Evidence from recent studies is then presented to show that a power function is the proper description. Examples are given of ways in which the power function has done better than the log function in serving scientific purposes.
T. G. R 33

18,498
Landahl, H.D. A NOTE ON MATHEMATICAL MODELS FOR THE INTERACTION OF NEURAL ELEMENTS. Bull. Math. Biophysics, 1961, 23, 91-97. (University of Chicago, Chicago, Ill.).

18,498
This note considers how recent findings on the mechanism of synaptic transmission affect the interpretation of mathematical models of neural net activity. A plausible model for the initiation of axonal impulses is introduced, and the output is obtained as a function of the input incoming pulses. It is shown that given certain temporal aspects of the excitatory process, a discontinuous model or a continuous model may be obtained. The conditions under which a linear relation between strength of excitation of one axon and excitatory factor of the next holds are discussed.
G. R 10

18,499
Frankenhaeuser, Marianne & Beckman, M. THE SUSCEPTIBILITY OF INTELLECTUAL FUNCTIONS TO A DEPRESSANT DRUG. Rep. 90, Feb. 1961, 8pp. Psychological Lab., University of Stockholm, Stockholm, Sweden.

18,499
To study the effects of nitrous oxide on certain intellectual functions, the performance of 32 Ss on tests of verbal, numerical inductive, and spatial factors during the inhalation of the drug and of a control mixture were compared. Over-all performance effects were analyzed and also speed and accuracy effects. The problem of a possible differential susceptibility to the drug of the various intellectual functions was attacked by a statistical analysis of changes in performance during inhalation. A comparison between impairments in performance in male and female Ss was also made.
T. G. R 10

18,501
Miller, J.W. & Ludvigh, E. THE PERCEPTION OF MOVEMENT PERSISTENCE IN THE GANZFELD. J. opt. Soc. Amer., Jan. 1961, 51(1), 57-60. (Hughes Aircraft Company, Fullerton, Calif. & Kresge Eye Institute, Detroit, Mich.).

18,501
The apparent persistence of seen movement in a homogeneous visual field (Ganzfeld) was described. The Ss observed the movement of a single, black, spherical stimulus in an otherwise empty field and reported when its movement stopped. The time interval between real and apparent cessation of movement was called "time delay." The hypothesis advanced states that apparent speed of the stimulus in the Ganzfeld is dependent upon the square of its real velocity, its duration, and its size. The data were discussed in terms of "contrast of velocity."
T. G. R 9

18,502
Hall, C.E. COMPARING TWO METHODS OF WEIGHTING A SET OF SCORES. J. exp. Educ., March 1961, 29(3), 323-325. (Walter V. Clarke Associates, Inc., East Providence, R.I.).

18,502
A simplified technique is presented for weighting a set of scores when it is necessary to combine a collection of test or item scores into a single score. An example is given in which this technique is compared with another longer procedure.
T. R 3

18,503
Curtis, H.A. & Kropp, R.P. A COMPARISON OF SCORES OBTAINED BY ADMINISTERING A TEST NORMALLY AND VISUALLY. J. exp. Educ., March 1961, 29(3), 249-260. (Florida State University, Tallahassee, Fla.).

18,503
This report was first in a series of studies designed to ascertain the feasibility of administering group standardized tests, commonly used in public schools, by television. An attempt was made to reproduce visually on a screen the test results obtained by normal presentation. The same test (School Ability) was administered to a class of ninth grade students under three conditions: 1) normal procedures (pupils given test booklets), 2) presenting items one at a time on the screen for durations equalling total test time of normal procedure, and 3) presenting three items at a time with timing as before. Many other types of tests were also administered. Half-test scores for the experimental test were analyzed for differences due to test administration. T. R 4

18,504
Norris, R.C. & Hjelm, H.F. NONNORMALITY AND PRODUCT MOMENT CORRELATION. J. exp. Educ., March 1961, 29 (3), 261-270. (George Peabody College for Teachers, Nashville, Tenn.).

18,504
This study was undertaken in an attempt to pin down any empirical effects of nonnormality in distribution which affect the product moment correlation. Larger numbers of samples were used than have been used previously; sample sizes were in the range of ones frequently encountered in educational and psychological research (15, 30, and 90) and were drawn from ten populations of size 10,000. A population having approximately no correlation and one having substantial correlation were established for each of these bivariate forms: normal, rectangular, leptokurtic, slightly and markedly skewed. The obtained sampling distribution was determined and compared with the appropriate theoretical sampling distributions.
T. G. R 12

18,508
Starks, T.H. & David, H.A. SIGNIFICANCE TESTS FOR PAIRED-COMPARISON EXPERIMENTS. Biometrika, 1961, 48 (1 & 2), 95-108. (E.I. du Pont de Nemours and Company, Inc., Wilmington, Dela. & Virginia Polytechnic Institute, Blacksburg, Va.).

18,508
The significance tests for paired-comparison experiments presented here deal with the evaluation of individual treatments, pairs of treatments, the treatment with the highest score, contrasts of treatment scores, and the separation of treatment effects. The methods are based for the most part on the binomial distribution and its asymptotic approximations. These methods are developed under the null hypothesis expressing treatment equality. The three methods developed for the multiple comparison of treatment scores are analogous to methods used for multiple comparison of sample means in the analysis of variance.
T. R 16

18,511
Klein, S.J. RELATION OF MUSCLE ACTION POTENTIALS VARIOUSLY INDUCED TO BREAKDOWN OF WORK IN TASK-ORIENTED SUBJECTS. Percept. Mot. Skills, 1961, 12, 131-141. (USN Air Material Center, Philadelphia, Penn.).

18,511
To determine whether the relationships between muscle action potentials (MAP) and breakdown of work are dependent upon how MAP are induced, different levels of MAP were induced within the same S by varying the rate at which he lifted a constant weight in an ergographic task and the temperature of a thermal stimulus to the working hand. Breakdown of work, the extent to which the S held the weight suspended against gravity, was measured in mm and correlated with the concomitant MAP under eight separate conditions. Results were discussed in terms of their implications for the phenomenon of "freezing" in stressful situations.
T. G. I. R 16

18,513
USA Quartermaster Research & Engineering Command. ALL PURPOSE AIR-SUPPORTED TENTS AND THEIR APPLICATION FOR GLOBAL MILITARY USE. Jan. 1961, 43pp. USA Quartermaster Research & Engineering Command, Natick, Mass.

18,513
This document presents some of the significant accomplishments made by the USA Quartermaster Corps in research and development of military tentage. An air-supported tent is described; the tent can be adapted to a variety of multipurpose uses, compatible with modern, mobile Army concepts. Separate sections of the report are devoted to: 1) operational requirements for tents to support modern combat concepts, 2) new air-supported shelter concepts and capabilities, 3) current utilization, 4) new designs and adaptations, 5) research and development aspects, and 6) potential uses.
I.

18,514
Black, J.W. AURAL RECEPTION OF SENTENCES OF DIFFERENT LENGTHS. Quart. J. Speech, Feb. 1961, XLVII(1), 51-53. (Ohio State University Research Foundation, Columbus, Ohio). (Rep. 90).

18,514
To investigate the question of the effect of length of oral sentences on listener identification in quiet and in noise, four groups of 48 listeners were tested. Stimulus materials consisted of ten sentences of 3, 5, 7, 9, 11, 13, 15, and 17 words (80 sentences in all) recorded in random order. One-half of each group heard the sentences in quiet and one-half in masking noise of 10, 8, 6, or 4 db of signal-to-noise ratios. The task was to write the last three words of each statement. The number of correct responses was analyzed by variance analysis techniques.
T. R 1

18,516
Freedman, S.J. PERCEPTUAL CHANGES IN SENSORY DEPRIVATION: SUGGESTIONS FOR A CONATIVE THEORY. J. nerv. ment. Dis., Jan. 1961, 132(1), 17-21.

18,516
This is one of a series of papers given at a symposium on sensory deprivation in which attempts are made to relate the new findings coming from experimentation in this field to existing knowledge. Observations on perceptual disturbances or changes which have been found by several experimenters are reviewed here and discussed in relation to various aspects of perception. An explanation of the process at work in producing the disturbances is offered.
R 22

18,517
Riesen, A.H. STUDYING PERCEPTUAL DEVELOPMENT USING THE TECHNIQUE OF SENSORY DEPRIVATION. J. nerv. ment. Dis., Jan. 1961, 132(1), 21-25. (Department of Psychology, University of Chicago, Chicago, Ill.).

18,517
This paper is one of a series given at a symposium on sensory deprivation. Evidence from visual deprivation experimentation is presented here in support of the hypothesis that with encephalization of the visual sensory system visually guided behavior develops in ontogeny as a function of patterned visual stimulation. Theorectical implications of the observations are discussed in terms of learning theory.
R 11

18,518
Held, R. EXPOSURE-HISTORY AS A FACTOR IN MAINTAINING STABILITY OF PERCEPTION AND COORDINATION. J. nerv. ment. Dis., Jan. 1961, 132(1), 26-32. (Department of Psychology, Brandeis University, Waltham, Mass.).

18,518
This paper is one of a series given at a symposium on sensory deprivation in which attempts were made to relate the experimental findings in this area to existing knowledge. Here, the influence of past exposure on current behavior is discussed using results from deprivation and rearrangement (such as the classic experiment on inverting the visual field). The analysis of the conditions that generate the effects of both types of sensory experimentation leads to a provisional neural model to account for these effects.
I. R 16

18,519
Teuber, H.-L. SENSORY DEPRIVATION, SENSORY SUPPRESSION AND AGNOSIA: NOTES FOR A NEUROLOGIC THEORY. J. nerv. ment. Dis., Jan. 1961, 132(1), 32-40. (Psychophysiology Lab., New York University-Bellevue Medical Center, New York, N.Y.).

18,519
This paper is one of a series given at a symposium on sensory deprivation in which attempts were made to relate the experimental findings in this area to existing knowledge. Here, isolation studies, recombination experiments, and defect experiments are reviewed with regard to their perceptual findings and discussed in relation to a neurologic theory of perception.
I. R 75

18,520
Sells, S.B. & Berry, C.A. (Eds.). HUMAN FACTORS IN JET AND SPACE TRAVEL. A MEDICAL-PSYCHOLOGICAL ANALYSIS. 1961, 386pp. The Ronald Press Company, New York, N.Y. (Texas Christian University, Fort Worth, Tex.).

18,520
This volume, the work of 13 contributors, is both an introduction to the field of aviation medicine and a source book on human factor aspects of jet and space travel at high speeds and high altitudes. Known solutions to some problems are described with discussions of unsolved problems as well as anticipated problems; the approach is psychological, physiological, medical and mechanical. Various chapters deal with environmental factors, individual operator performance, group behavior, human qualifications, preventive medicine, and accidents and safety.
T. G. I. R 435

18,522
Anikeeff, A.M. HUMAN ENGINEERING RECOMMENDATIONS FOR AN EFFECTIVE CONSOLE DESIGN. March 1961, 13pp. Information Systems Section, General Electric Company, Washington, D.C.

18,522
A number of generally applicable recommendations are presented which will improve a console design from the human factors point of view. Designers should feel reasonably safe in considering the recommendations during the preliminary design stage of equipment development while awaiting completion of a comprehensive system analysis. Areas covered are 1) vision, 2) lighting, 3) workplace layout, 4) controls, and 5) dials.
I. R 10

18,523
Zeleny, C.E. DESIGN STANDARDS FOR MAN-MACHINE TASKS IN SIGNAL CORPS SYSTEMS. SIXTH QUARTERLY PROGRESS REPORT. Contract DA 36 039 SC 78328, DA Proj. 3 99 00 110, Jan. 1961, 59pp. Applied Psychology Corporation, Arlington, Va.

18,523
This progress report sets forth the specific steps researchers have taken to achieve concrete human factors data on effectiveness of control and display systems. It illustrates the format and content of an equipment catalog for which this information has been assembled. Methods for producing task effectiveness are discussed. Representative data and work sheets are presented.
I.

18,524
Hitt, W.D. & Ray, H.W. AN OPERATING GUIDE FOR FACTOR ANALYSIS. May 1961, 38pp. Battelle Memorial Institute, Columbus, Ohio.

18,524
This operating guide is designed primarily for anyone with some understanding of factor analysis but lacking sufficient experience to complete an analysis without assistance. Three different factor-analytic techniques are described: 1) the centroid method, 2) Wherry's group-centroid method, and 3) Wherry's method for factoring large numbers of items. The first is described in detail; step-by-step procedures are given for the second; and the major steps of the third are set forth. One section is devoted to the problem of factor measurement, one to the use of factor analysis in predicting a criterion, and one to areas of application.
T. G. I. R 11

18,525
Siegel, A.I., Wolf, J.J. & Crain, K. TECHNIQUES FOR EVALUATING OPERATOR LOADING IN MAN-MACHINE SYSTEMS. A "MODEL" FOR DIGITAL SIMULATION OF ONE AND TWO-OPERATOR MAN-MACHINE SYSTEMS. Contract NONR 2492(00), March 1961, 96pp. Applied Psychology Services, Wayne, Penn.

18,525
A model designed to simulate two-operator systems was described. A high-speed digital computer was used to calculate and record simulated operator performance data (e.g., performance time, stress, etc.) for every action of each operator and to yield an indication of system effectiveness on the basis of these simulations. After development, the model was applied to the simulation of in-flight refueling of an F8U receiver aircraft by an A4D tanker aircraft. The maneuvers and actions of the F8U pilot during approach and probe insertion as well as the concomitant actions of the tanker aircraft pilot during this flight task were simulated. The results were presented and evaluated.
T. G. I. R 13

18,526
Siegel, A.I., Schultz, D.G. & Federman, P. POSTTRAINING PERFORMANCE CRITERION DEVELOPMENT AND APPLICATION. A MATRIX METHOD FOR THE EVALUATION OF TRAINING. Contract 2279(00), Jan. 1961, 48pp. Applied Psychological Services, Wayne, Penn.

18,526
This report demonstrates the use of "suitability" for the job (training graduates' ability to do the tasks of their job) as a basis for training evaluation by 1) describing a specific scheme (matrix method) for summarizing suitability in quantitative terms, and 2) illustrating the method through application to data previously collected on four Naval ratings. The matrix solutions described yield three indices, each reflecting a different aspect of the comparison between the skills of a trained man and the job's requirements. Listing of tasks as they are classified in the cells of the matrix and as they thereby contribute to the various training indices provides a further basis for consideration of changes in the training program. The results of the application study are discussed. T. G. I. R 4

18,527
McGrath, J.J. CROSS-VALIDATION OF SOME CORRELATES OF VIGILANCE PERFORMANCE. SUPPLEMENTARY NOTE TO TECHNICAL REPORT 4. Contract NONR 2649(00), Proj. NR 153 199, Feb. 1961, 7pp. Human Factors Research, Incorporated, Los Angeles, Calif.

18,527
In an exploratory study of the correlates of vigilance performance, a number of significant correlations were found between psychological test scores and measures of vigilance performance. In subsequent cross-validation studies, the most promising of the predictor tests were administered to three groups of Ss taking part in studies of vigilance performance using the same task as the exploratory study. The data were analyzed for significant correlations. The findings were discussed in terms of selection procedures for the more vigilant performers for practical vigilance tasks.
T. R 12

18,528
McGrath, J.J. & Hatcher, J.F. IRRELEVANT STIMULATION AND VIGILANCE UNDER FAST AND SLOW STIMULUS RATES. Contract NONR 2649(00), Proj. NR 153 199, Tech. Rep. 7, Feb. 1961, 18pp. Human Factors Research, Incorporated, Los Angeles, Calif.

18,528
To test the hypothesis that novel, irrelevant auditory stimulation would improve performance on a visual vigilance task when a slow rate of presentation was used and would have the opposite effect when the rate was fast, 24 Ss served in four one-half hour watchstanding sessions. Their task was to detect slight increments in brightness of an intermittent light; increments (signals) occurred randomly at a rate of 24 per hour. Each session was preceded by a brief warm-up session and a two-min. test and was followed by a two-min. test. Stimulus rates were 20 per min. and 60 per min. of variety noise (music, conversation, etc.) and white noise. Number of signal detections were analyzed for the four conditions; results were discussed in terms of a filter-arousal theory of vigilance. T. G. R 7

18,529
Buckner, D.N. & McGrath, J.J. A COMPARISON OF PERFORMANCES ON SINGLE AND DUAL SENSORY MODE VIGILANCE TASKS. Contract NONR 2649(00), Proj. NR 153 199, Tech. Rep. 8, Feb. 1961, 28pp. Human Factors Research, Incorporated, Los Angeles, Calif.

18,529
To compare vigilance performances on a visual display, an auditory display, and three dual-mode or combined audio-visual displays, 27 Ss served in 15 one-hour watchstanding sessions (three under each of the five display conditions). Their task was to detect randomly spaced increments in the brightness of intermittent signals (light, tone, or both) which occurred at the rate of 24 per hour. The dual-mode signal conditions were: 1) signals appeared simultaneously on both displays; 2) signals appeared on one or the other display; and 3) one-third of the signals were visual, one-third were auditory, and one-third were both visual and auditory. Performance decrements were analyzed as a function of time and type of display.
T. G. R 9

18,530
McGrath, J.J. & Harabedian, A. SIGNAL DETECTION AS A FUNCTION OF INTERSIGNAL INTERVAL DURATION. Contract NONR 2649(00), Proj. NR 153 199, Tech. Rep. 9, Feb. 1961, 17pp. Human Factors Research, Incorporated, Los Angeles, Calif.

18,530
To determine whether the relationship between probability of signal detection and intersignal interval duration changes when the distribution of interval durations is changed, data from three studies of vigilance performance were analyzed. In the first study, the distribution of intersignal intervals was positively skewed (more brief than long intervals); in the second and third studies, the distributions were rectangular. The intervals were identified in three ways: 1) amount of time since previous signal was detected, 2) amount of time since previous signal occurred, and 3) amount of time since previous signal was missed. Probability of detection as a function of these intervals was analyzed. The results were discussed in terms of an expectancy theory of vigilance. T. G. R 6

18,531
Goldstein, D.A. & Newton, J.M. TRANSFER OF TRAINING AS A FUNCTION OF TASK DIFFICULTY IN A COMPLEX CONTROL SITUATION. Contract 3075(00), Jan. 1961, 16pp. Electric Boat Div., General Dynamics Corporation, Groton, Conn.

18,531
To determine the effect of task difficulty on transfer of training in complex control systems, submarine depth-keeping was chosen as the general task. Two submarines, differing with respect to their dynamic response characteristics as a function of differences in hull size, were simulated at each of two speeds (slow and fast). There were thus four separate conditions differing in the degree of control lag. Four groups of 20 Ss were trained on a depth-keeping task, one group on each hull-speed combination. Following training, three subgroups of five Ss from each group were tested on the other three systems with the remaining five Ss tested on the same system. Mean time-on-target scores per five-block trial were analyzed to identify 1) most difficult system and 2) system producing most transfer. R 4

18,532
Goldstein, D.A. LINEAR QUICKENING AS GUIDANCE IN TRAINING FOR MANUAL CONTROL OF COMPLEX SYSTEMS. Contract NONR 3075(00), March 1961, 29pp. Electric Boat Div., General Dynamics Corporation, Groton, Conn.

18,532
To determine the effectiveness of linear quickening as guidance in training for manual (unaided) control of complex systems, an experimental task was chosen which was somewhat analogous to a submarine depth-changing maneuver in that it represented changing the status of a complex system. Five experimental groups of ten Ss were used, each group differing with respect to the number and position of quickened trials received during an 18-trial training series. A sixth group (control) received no quickened training trials. Following training all groups were given six test trials on an unquickened system. Time-on-target scores were analyzed to evaluate the use of quickened training and different amounts and position of such training.
T. G. I. R 7

18,533
Goldstein, D.A. & King, W.J. TRANSFER RETENTION FOR VERBAL AND MOTOR TASKS. Contract NONR 3075(00), April 1961, 37pp. Electric Boat Div., General Dynamics Corporation, Groton, Conn.

18,533
To compare "Transfer Retention," both positive and negative, with "Regular Retention" over a range of no-practice intervals, both verbal-learning and continuous-tracking tasks were used. The experimental design, identical for both tasks, was a three by six factorial employing three levels of training task similarity: 1) all elements identical, 2) stimulus changed from training to test sessions with response identical, 3) the reverse procedure of change. Six no-practice intervals (ten min., one day, one week, one month, and four months) were used. With two replications for each cell, a total of 72 Ss served individually for two sessions: training and retention. The performance scores were analyzed and discussed for their implications for training. T. G. R 12

18,534
Karn, H.W. & Gregg, L.W. ACQUISITION OF PERCEPTUAL RESPONSES AS A FUNCTION OF LOADING, LOCATION, AND REPETITION. J. exp. Psychol., 1961, 62(1), 62-69. (Carnegie Institute of Technology, Pittsburgh, Penn.). (AFOSR TN 60 507).

18,534
To determine the ways perceptual responses are acquired, an experiment was designed which provided precise control over the nature of learnable cues and conditions of detection. Three circles located at points of an imaginary equilateral triangle were presented on a screen by means of a tachistoscope with instructions to the S to report presence or absence of a dot within each circle. Loading meant complete presence, complete absence, or random occurrence of dot in each circle. For each possible combination of loading and location, four groups of experimental Ss received 60 presentations at 0.1 sec. exposure following 0, 10, 20, or 30 preliminary presentations at one sec. Control Ss observed under random loading only. Error reduction as affected by these conditions was analyzed. T. G. R 5

18,535
Allen, M.J. A STUDY CONCERNING THE ACCOMMODATION AND CONVERGENCE RELATIONSHIP. Contract AF 33(616) 6146, Proj. 7163, Task 71823, ASD TR 61 111, May 1961, 16pp. USAF Life Support Systems Lab., Wright-Patterson AFB, Ohio. (Optometry Div., Indiana University, Bloomington, Ind.).

18,535
The design and technical details of a recording infrared optometer and haploscope for the study of the interrelationships of accommodation and convergence are reported. Electronic circuitry, optical design, and mechanical design are described. Some examples of data recording are presented to provide information on the performance characteristics of the apparatus.
G. I.

18,536
Ades, H.W., Tolhurst, G.C. & Harbold, G.J. FEASIBILITY STUDIES FOR HEARING CONSERVATION PROGRAM ABOARD CVA-TYPE AIRCRAFT CARRIERS. Proj. MR005.13 2005, Subtask 1, Rep. 8, BUMEPS Prob. A04AE13 3, Rep. 1, Aug. 1960, 54pp. USN School of Aviation Medicine, Pensacola Air Station, Fla.

18,536
A study was undertaken to explore the feasibility of implementing a hearing conservation program aboard CVA-type aircraft carriers. The study included evaluation of feasibility of conducting hearing tests in such a facility under full operating conditions, complete survey of the noise environment of the ship under the same conditions, and evaluation of several group and individual automatic types of audiometers to determine the optimal combination for testing large numbers of personnel.
T. G. I. R 9

18,537
Bates, J.H. RECENT ASPECTS IN THE DEVELOPMENT OF A CLOSED ECOLOGIC SYSTEM. Aerospace Medicine, Jan. 1961, 32, 12-24. (USAF School of Aviation Medicine, Brooks AFB, Tex.).

18,537
This paper reviews experimentation in progress at the USAF School of Aviation Medicine. The following information is emphasized: a brief history of a closed ecologic system, the development of present photosynthetic gas exchangers, results and problem areas associated with the use of these exchangers, and fundamental research on algal cells. The use of an algal photosynthetic gas exchanger in the closed ecologic system is recommended as a feasible approach to the problem of life support in space travel.
T. G. I. R 23

18,538
Berry, P.C. PSYCHOLOGICAL STUDY OF DECISION MAKING. Contract N61339 797, NAVTRADEVCEN TR 797 1, March 1961, 110pp. USN Training Device Center, Port Washington, N.Y. (Psychological Research Associates, Arlington, Va.).

18,538
In order to provide a basis for the development of training materials for those decision-making tasks (those that require evaluation of alternatives in preparation for action that is required) which may frequently face naval officers, a situational test was developed involving simulation of some of the duties of the Squadron Duty Officer of a naval air squadron. The test was used with 20 officers. Recordings were made of all communications made by or to the officer and were analyzed in three ways: 1) final action was rated, 2) ratings of communications were made on basis of relevance to decision-making, and 3) from transcript of actions the underlying strategy was inferred and compared to ideal. Reliabilities of analyses were studied. Recommendations for further development were included. T. G. I. R 28

18,539
Birkhead, N.C., Horvath, S.M., Issekutz, B., Jr., Kelly, M.E., et al. EFFECTS OF SHORT-TERM DIET MODIFICATION ON HUMAN RESPONSE TO HEAT STRESS. Contract AF 33(616) 7338, Proj. 7164, Task 71833, ASD TR 61 265, July 1961, 17pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio. (Research Div., Lankenau Hospital, Philadelphia, Penn.).

18,539
To evaluate the effects of short-term dietary modifications on tolerance to heat stress, the responses of nine young, healthy men to repeated exposures for two hours at 54 degrees C, 9 to 18 mm Hg vapor pressure were studied. Base line data for exposure while on a normal diet were obtained followed by exposures after 30 and 50 or 60 days on the experimental diet. Two Ss remained on normal diet for entire period; two were fed a normal calorie 60 percent fat diet; two, a 1,500-calorie diet; and five, a normal calorie four percent protein diet. Measures obtained were respiration rate, heart rate, blood pressure, degree of water loss, and temperatures (rectal, mean skin, body).
T. R 3

18,540
Blackwell, H.R. COMMENTS ON "SUBLIMINAL PROJECTION." J. Communication, ca. 1956, 68-76. (Vision Research Labs., University of Michigan, Ann Arbor, Mich.).

18,540
Comments are made upon the contemporary interest in the use of advertising slogans that are optically projected as additions to regular motion picture and television programs for such short durations that they are considered to be "subliminal," that is, below the threshold of vision. The basic nature of psychophysical discrimination data and the methods used to collect such data are discussed with reference to the credibility of the belief that subliminal projections offer possibilities or threats of effective control of human behavior.
G. R 3

18,541
Blackwell, H.R. THE EFFECTS OF CERTAIN PSYCHOLOGICAL VARIABLES UPON TARGET DETECTABILITY. FINAL REPORT. Contract NOBS 72038, ERI Rep. 2455 12 F, June 1958, 28pp. Institute for Research in Vision, Ohio State University, Columbus, Ohio.

18,541
Four studies were made of the effects of psychological variables upon visual detection thresholds for simple circular targets. The variables (knowledge of time of occurrence; of target size, duration, location, and frequency; and observer criterion) represented differences that exist between laboratory and field conditions. The effect of these differences in each case was expressed in terms of the contrast factor, that is, the factor by which target contrast must be multiplied in order to compensate for the presence of the difference. Cautions were given concerning practical use to be made of the factors as given here.
T. G. R 7

18,542
Blackwell, H.R. A GENERALIZED METHOD FOR SPECIFICATION OF INTERIOR ILLUMINATION LEVELS ON THE BASIS OF PERFORMANCE DATA. SUMMARY DESCRIPTION. Industr. Med. Surg., Nov. 1958, 27(11), 580-585. (Depts. of Psychology & Ophthalmology & Vision Research Labs., University of Michigan, Ann Arbor, Mich.).

18,542
A summary description of a generalized method for specifying the interior illumination requirements of practical visual tasks on the basis of visual performance criteria is presented. There are basically two components of the method: visual performance graphs for standard circular targets, and a device for equating various practical visual tasks to standard circular targets. Specification curves and sample illumination levels for practical visual tasks are given.
G. I. R 6

18,543
Blackwell, H.R. THE PROBLEM OF SPECIFYING THE QUANTITY AND QUALITY OF ILLUMINATION. Illum. Engng., Feb. 1954, XLIX(2), 93-97. (Institute for Research in Vision, Ohio State University, Columbus, Ohio).

18,543
Three principal bases that have been used for establishing illumination specifications are commented upon and their shortcomings indicated: aesthetic pleasantness, visual comfort, and visual performance. A proposal is made that basic visual tasks (as brightness discrimination) be identified and complete information relating performance of each of these tasks to quantity and quality of illumination be obtained. The next step would be to develop means of identifying practical visual tasks with one or another of the basic visual tasks.
R 8

18,544
Blackwell, H.R. DEVELOPMENT AND USE OF A QUANTITATIVE METHOD FOR SPECIFICATION OF INTERIOR ILLUMINATION LEVELS ON THE BASIS OF PERFORMANCE DATA. Illum. Engng., June 1959, LIV(6), 317-353. (Institute for Research in Vision, Ohio State University, Columbus, Ohio).

18,544
An eight-year program of research is reported here which has led to the development of a general method by which illumination levels may be determined for various practical tasks, based on visual performance criteria. The method is described in its most general form along with the procedures recommended for current use. The following sections indicate the nature of the contents: characteristics of visual performance, laboratory performance data for standard disc targets, field factors, the visual task evaluator, the standard visual performance curve, the standard lighting specification procedure, evaluation of sample visual tasks, and future development of the method.
T. R 24

18,545
Blackwell, H.R. USE OF PERFORMANCE DATA TO SPECIFY QUANTITY AND QUALITY OF INTERIOR ILLUMINATION. Illum. Engng., June 1955, L(6), 286-299. (Institute for Research in Vision, Ohio State University, Columbus, Ohio).

18,545
Descriptions of methods or ways of using basic visual performance data to specify the quantity and quality of illumination are presented. Brightness discrimination data is used to illustrate the method. General conclusions with respect to illumination specifications are compared with those in the literature.
T. G. R 9

18,546
Blackwell, H.R. & Blackwell, O.M. ROD AND CONE RECEPTOR MECHANISMS IN TYPICAL AND ATYPICAL CONGENITAL ACHROMATOPSIA. Vision Res., 1961, 1(1-2), 62-107. (Institute for Research in Vision, Ohio State University, Columbus, Ohio).

18,546
Spectral sensitivities and interactions of the receptor systems of 13 congenital achromats with reduced acuity were determined by psychophysical measurements with white and blue light. The tests included measures of luminosity, foveal and peripheral dark adaptation, the acuity function of luminance, and color vision tests (Farnsworth-Munsell 100-Hue Test and measurements on a Nagle-type anomaloscope). Patients were classified in three categories: 1) rod monochromats--functioning rods only; 2) blue monocone monochromats--blue-sensitive cones and foveal rods with normal scotopic curves; and 3) intermediates--rods and blue cones of insufficient number for color discrimination.
R 26

18,547
Blackwell, H.R. & Kristofferson, A.B. THE EFFECTS OF SIZE AND SHAPE ON VISUAL DETECTION FOR CONTINUOUS FOVEAL TARGETS AT MODERATE BACKGROUND LUMINANCE. FINAL REPORT. Contract NOBS 72038, ERI Proj. 2455, Rep. 2455 11 F, June 1958, 31pp. Institute for Research in Vision, Ohio State University, Columbus, Ohio.

18,547
A summary of experimental studies on the effects of target area and shape upon detection by the human eye was presented. The temporal forced-choice variant of the method of constant stimuli was used. The target was presented foveally with an exposure duration of 0.01 sec. at 9.82 ft.-L background luminance. Targets were of uniform luminance differing in area from 1 to 4,096 square min. and in shape over a wide range of target types (rectangles, multiple-legged figures, and simple geometrical figures). The data were analyzed as a function of size and an effort was made to derive empirical methods for analyzing the form factor. General theoretical formulations were made in terms of the element contribution theory of detection.
T. G. I. R 11

18,548
Blackwell, H.R. & Law, O.T., Jr. A STUDY OF POSSIBLE "PHOTOSENSITIZATION" OF THE HUMAN EYE BY WHITE LIGHT. FINAL REPORT. Contract NOBS 72038, ERI Rep. 2455 9 F, June 1958, 31pp. Institute for Research in Vision, Ohio State University, Columbus, Ohio.

18,548
To examine the meaningfulness of the classical distinction between the absolute and the difference thresholds for luminance changes and to study the possibility that the human eye can be "photosensitized" with white light, the value of the threshold luminance increment was measured for each of a number of background luminance levels and for a totally dark background. Target and background were white light; targets subtended one and 45 min. of arc; and exposure duration was 0.01 sec. Threshold luminance increment increases were analyzed as a function of background luminance and examined in terms of the two objectives as stated above.
T. G. I. R 10

18,549
Blackwell, H.R. & McCready, D.W., Jr. FOVEAL CONTRAST THRESHOLDS FOR VARIOUS DURATIONS OF SINGLE PULSES. FINAL REPORT. Contract NOBS 72038, ERI Proj. 2455, Rep. 2455 13 F, June 1958, 31pp. Institute for Research in Vision, Ohio State University, Columbus, Ohio.

18,549
Visual detection thresholds were determined for circular targets as a function of the level of background luminance, target size, and target exposure duration. The temporal forced-choice variant of the method of constant stimuli was used, the data being analyzed by a variant of the probit analysis. Two highly experienced observers made 81,000 observations in 162 sessions. Background luminance varied from zero to 100 ft.-L, target diameter from 0.802 to 51.2 min. of arc, and exposure duration from 0.001 to one sec. Tabular and graphical data from smoothed curves of the functional relations between all principal variables were obtained.
T. G. I. R 9

18,550
Blackwell, H.R. & Moldauer, Ann B. DETECTION THRESHOLDS FOR POINT SOURCES IN THE NEAR PERIPHERY. FINAL REPORT. Contract NOBS 72038, ERI Proj. 2455, Rep. 2455 14 F, June 1958, 18pp. Institute for Research in Vision, Ohio State University, Columbus, Ohio.

18,550
The effect of the extent to which a target falls eccentric to the fixational center upon the threshold contrast was studied. Visual detection thresholds for the foveal center and for 32 locations in the peripheral retina within a radius of 12 degrees from fovea were obtained on two observers. Nine levels of background luminance (zero to 75 ft.-L) were used with a circular target (one min. of arc), exposure duration of 0.01 sec., and the temporal forced-choice variant of the method of constant stimuli. The data were analyzed separately for each of eight meridians.
T. G. I. R 14

18,551
Blackwell, H.R. & Taylor, J.H. VARIATIONS IN SPECTRAL SENSITIVITY WITHIN THE HUMAN FOVEA. FINAL REPORT. Contract NOBS 72038, ERI Proj. 2455, Rep. 2455 10 F, June 1958, 33pp. Institute for Research in Vision, Ohio State University, Columbus, Ohio.

18,551
Spectral sensitivity curves were measured at each of three foveal locations in each of three human eyes, utilizing a circular target subtending one min. of arc. Target exposure duration was 0.1 sec.; an artificial pupil of 6.04 mm diameter was used; the method was the temporal forced-choice variant of constant stimuli. The data were analyzed for effect of location and of individual eyes. An interpretation of the findings was offered.
T. G. I. R 24

18,552
Fiedler, F.E. ASSUMED SIMILARITY MEASURES AS PREDICTORS OF TEAM EFFECTIVENESS IN SURVEYING. Contract N6ORI 07135, Tech. Rep. 6, Feb. 1953, 20pp. Bureau of Research and Service, College of Education, University of Illinois, Urbana, Ill.

18,552
This is one of a series of studies on group effectiveness; it attempts to determine in one way how much importance the interpersonal relations within a group have in determining total team effectiveness. Student surveying parties, comprising three to four men each, were studied; 71 Ss participated. Accuracy of work as rated by the instructor was used as the criterion. Interpersonal perception was measured by means of "Assumed Similarity" scores derived from responses to a personality questionnaire. Three scores were used here: assumed similarity of self to most preferred co-worker, to the nonpreferred co-worker, and between the preferred and rejected co-workers. Various hypotheses were tested by relating the scores to the criterion.
T. R 10

18,553
Cronbach, L.J., Hartmann, W. & Ehart, Mary E. INVESTIGATION OF THE CHARACTER AND PROPERTIES OF ASSUMED SIMILARITY MEASURES. Contract N6ORI 07135, Tech. Rep. 7, Feb. 1953, 13pp. Bureau of Research and Service, College of Education, University of Illinois, Urbana, Ill.

18,553
This is one of a series of studies on group effectiveness. A technical analysis of the instrument (personality questionnaire) from which "Assumed Similarity" scores were derived in earlier studies (see 18,552) is summarized. In addition to the reliability report, the extent to which assumed similarity is a general attitude and to what extent it depends instead on the content of test items, and the extent to which assumed similarity as measured in four ways reflects the same general quality are studied by statistical procedures.
T. R 8

18,554
Fiedler, F.E., Hartmann, W. & Rudin, S.A. CORRECTION AND EXTENSION OF THE RELATIONSHIP OF INTERPERSONAL PERCEPTION TO EFFECTIVENESS IN BASKETBALL TEAMS. Contract N6ORI 07135, Suppl. to Tech. Rep. 3, Feb. 1953, 7pp. Bureau of Research and Service, College of Education, University of Illinois, Urbana, Ill.

18,554
This was one of a series of studies on group effectiveness. Additional data were presented here on an earlier study on interpersonal perception relations to effectiveness of basketball teams. In the early study, interpersonal perception was measured by means of "Assumed Similarity" scores designed to indicate how similar one person considers himself to be to others, or how similar he considers two other persons to be. High school teams (14) were measured at the beginning of the season and 12 at the end of a season with a criterion measure of proportion of games won by a certain date. Additional analyses of the reliability of the criterion were presented.
T. G. R 1

18,555
Brown, R.H. MINOR STUDIES FROM THE PSYCHOLOGICAL LABORATORY OF CLARK UNIVERSITY. XXXIV. COMPLETE SPATIAL SUMMATION IN THE PERIPHERAL RETINA OF THE HUMAN EYE. Amer. J. Psychol., April 1947, LX, 254-259. (USN Research Lab., Washington, D.C.).

18,555
To determine the limits within which spatial summation occurs in the peripheral retina of the human eye, monocular intensity thresholds were measured for test flashes appearing on the side and in the temporal portion of the peripheral retina (30 degrees from the fovea) by a method of modified limits. Twelve circular areas (from 0.640 to 50.98 min. of visual angle in diameter) were used with intensity of the flash varied in constant logarithmic steps. Data from three Ss were analyzed by plotting logarithm of threshold intensity against logarithm of the radius of stimulus area and noting departures from perfect summation.
T. G. R 10

18,556
Brown, R.H. VISUAL SENSITIVITY TO DIFFERENCES IN VELOCITY. Psychol. Bull., March 1961, 58(2), 89-103. (USN Research Lab., Washington, D.C.).

18,556
An analysis of data available in the literature on thresholds for visual sensitivity to differences in velocity is presented. A consideration of angular speed leads to the conclusion that it is the basic unit of measurement involved in studies of differential threshold. Stimulus conditions and methodology used in measuring the threshold in ten major studies are carefully considered. The differential thresholds are then plotted as a function of angular speed. Sensitivity is calculated and expressed in terms of the ratio of the threshold to the speed. This Weber ratio for velocity is applied to tracking and other predictive behavior.
T. G. I. R 51

18,557
Briggs, G.E. SIMULATION FACILITY FOR HUMAN FACTORS RESEARCH. Contract AF 33(616) 7122, Proj. 60/87184), RF Proj. 1087, Rep. 4, June 1961, 53pp. Ohio State University Research Foundation, Columbus, Ohio.

18,557
This progress report summarized the work undertaken on a research study of human information-processing and decision-making functions in an environment that simulates a command-control system. The major accomplishment during the reporting period was a definition of the simulation facility known as ComCon. Three appendices provided detailed information on 1) IPAC (information processing and control simulator), a low-cost, flexible test model of the more elaborate system simulator, ComCon; 2) the characteristics of the digital display equipment; and 3) the data transmission characteristics of the IBM computer system in ComCon.
T. I.

18,558
Bryan, G.L., Rigney, J.W., Svenson, D.W. & Axelrod, W. AN ANALYSIS OF OFFICER BILLETS IN COMBAT INFORMATION CENTERS: METHODS. Contract NONR 228(02), Proj. NR 153 093, Tech. Rep. 14, Oct. 1954, 99pp. Electronics Personnel Research, University of Southern California, Los Angeles, Calif.

18,558
This report is one of a series to be concerned with the development of standards for the qualification of officers in Combat Information Center duties. The nature of the problem is discussed in the first portion; the remainder is devoted to an explanation and description of three job analysis methods that were developed. These methods are based on complementary viewpoints for describing a job and are designed to yield complementary results. Specific forms and instructions are appended.
I.

18,559
Bryan, G.L. (Princ. Investigator). AN EVALUATION OF A METHOD FOR SHIPBOARD TRAINING IN OPERATIONS KNOWLEDGE. Contract NONR 228(02), Proj. NR 153 093, Tech. Rep. 18, Sept. 1956, 36pp. Electronics Personnel Research, University of Southern California, Los Angeles, Calif.

18,559
Conflicting requirements and restrictions of the shipboard environment which limit the effectiveness of training programs were discussed. A study undertaken to evaluate a possible training method that would supplement current procedures was described. The standard multiple-choice item was modified by developing short verbal explanations to accompany each alternative which were then concealed by paper tabs that could be easily removed. A series of test items was administered to three groups as follows: 1) only one response was allowed, 2) responses continued until the keyed (correct) answer was located, and 3) same as the second group except that the explanations were added opposite each alternative. Suggestions for use of a trainer based on the findings were presented. T. I.

18,560
Bryan, G.L., Rigney, J.W. & Van Horn, C. AN EVALUATION OF THREE TYPES OF INFORMATION FOR SUPPLEMENTING KNOWLEDGE OF RESULTS IN A TRAINING TECHNIQUE. Contract NONR 228(02), Proj. NR 153 093, Tech. Rep. 19, April 1957, 23pp. Electronics Personnel Research, University of Southern California, Los Angeles, Calif.

18,560
To determine the relative effectiveness of three different kinds of explanations when employed in a multiple-choice trainer format (see 18,559), a selection of items from among those used in the previous study was made. For each item three kinds of explanations were written: 1) correct definition or description of chosen alternative, 2) principal reason why alternative was correct or incorrect, and 3) probable operational consequences of the course of action represented by the alternative. The tests were administered to three groups of Ss, one group responding to only one type of explanation. A criterion test was given one week later. Differences between the two tests were analyzed.
T. I. R 7

18,561
Buchanan, A.R., Heim, H.C. & Kraushaar, J.J. BIOMEDICAL EFFECTS OF EXPOSURE TO ELECTROMAGNETIC RADIATION. PART II - BIOMEDICAL EFFECTS ON THE EYE FROM EXPOSURE TO MICROWAVES AND IONIZING RADIATIONS. Contract AF 33 (616) 6305, Proj. 7163, Task 71823, ASD TR 61 195, June 1961, 158pp. USAF Life Support Systems Lab., Wright-Patterson AFB, Ohio. (Physics, Engineering, Chemistry Corporation, Boulder, Colo.).

18,561
This study consists of three sections each reporting the results of literature search on the following topics: 1) ocular effects of radiant energy, exclusive of the ultraviolet band of the electromagnetic system; 2) the effect of ionizing radiations on the biomedical processes of the eye; and 3) radiation physics (experimental techniques employed in obtaining and measuring irradiations and dosage levels).
I. R 246

18,562
Buckner, D.N. & Harabedian, A. HUMAN INFORMATION TRANSMISSION AS A FUNCTION OF SELECTED VISUAL AND AUDITORY STIMULUS DIMENSIONS. Contract NONR 2453(00), Rep. NR 145 120, July 1961, 29pp. Human Factors Research, Incorporated, Los Angeles, Calif.

18,562
To determine the effects on transmission efficiency of presenting information within a sensory mode versus across sensory modes and of presenting redundant information by a second mode, an experiment was conducted in which the amount of input information and the possible amount of output information was held constant and the manner of displaying the information (two visual and two auditory) was varied. Hue, brightness, pitch, and loudness stimuli were presented in various combinations of nonredundant and redundant conditions to nine groups of four Ss whose task was to manipulate a toggle switch in response to a given combination. Reaction time data were obtained and analyzed.
T. I. R 12

18,563
Buddenhagen, T.F. & Wolpin, M.P. A STUDY OF VISUAL SIMULATION TECHNIQUES FOR ASTRONAUTICAL FLIGHT TRAINING. Contract AF 33(616) 7028, Proj. 6114, Task 60863, WADD TR 60 756, March 1961, 210pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio. (Bell Aerospace Corporation, Fort Worth, Tex.).

18,563
Engineering requirements for visual simulation in astronautical flight training and basic techniques to accomplish such simulation were studied. An evaluation of the various techniques led to the choice of closed circuit television as an image transfer technique. A preliminary design concept was formulated to determine the areas in which development work will be required prior to the design of a complete simulator. A compilation of applicable techniques, a report of the probable visual environment of space, and an investigation of a method to predict the perceptual fidelity achieved by various simulation techniques were included.
T. G. I. R 122

18,564
Burns, W. REPORT OF THE ANNUAL MEETING OF THE UNITED STATES ARMED FORCES - NATIONAL RESEARCH COUNCIL COMMITTEE ON HEARING AND BIOACOUSTICS HELD IN WASHINGTON, 15-16 NOVEMBER, 1960. RNP 61/1003, HES 41, April 1961, 10pp. Royal Naval Personnel Research Committee, MRC, London, England.

18,564
A summary report of the annual meeting of the Council of the Armed Forces-National Research Council Committee on Hearing and Bioacoustics is presented. Major topics considered at this meeting are: 1) community noise problems resulting from turbojet transport aircraft, the psychoacoustic problems following the wide incidence of noise peculiar to these engines, and criteria for acceptable maxima of jet noise exposure for tolerability in residential areas; 2) assessment of noise exposure for avoidance of hearing loss; 3) acoustic implications of space travel; and 4) problems of vibration as an environmental factor.

18,565
Campbell, D.P. PSYCHOMETRIC ANALYSIS OF RESPONSE PATTERNS TO INTEREST INVENTORY ITEMS. Contract NONR 710 (17), Proj. NR 151 248, Tech. Rep. 10, Nov. 1960, 48pp. University of Minnesota, Minneapolis, Minn.

18,565
A psychometric analysis of answers to the Minnesota Vocational Interest Inventory (MVII), an interest inventory especially designed for nonprofessional workers, was made. The Ss were 1,333 skilled tradesmen, divided into groups of electricians, printers, painters, and tradesmen in general. An attempt was made to establish a dimension in the responses to the 190 triads of statements of activities of the MVII. The influence of response set on the MVII was made by tabulating patterns for each S across all triads and for each occupational group across Ss and triads. Finally, an exploration was made of the value of pattern scoring versus item scoring.
T. R 16

18,566
Carlyle, L. MAN AND SPACE. Presented at: SAE National Aeronautic Meeting, New York, N.Y., April 5-8, 1960, Rep. 173A, 11pp. Society of Automotive Engineers, Inc., New York, N.Y. (Douglas Aircraft Company, El Segundo, Calif.).

18,566
Procedures are described for determining functional human envelopes for flight in vehicles within the earth's atmosphere and beyond. As a first step, a comparison of various types of manned flight is made to determine functional and, consequently, volumetric requirements of a human occupant. The use of two-dimensional manikins based on anthropometric data is described and a composite (5th through 95th percentile of body sizes) functional envelope is developed. Allowances are made for heavy flight clothing and boots. The effect of a full-pressure garment is considered. Factors unknown as yet about interplanetary flight are considered in relation to this approach.
T. I.

18,567
Celentano, J.T. & Alexander, H.S. THE USE OF TOOLS IN SPACE - AN EMPIRICAL APPROACH. Paper 61 145 1839, June 1961, 11pp. Institute of the Aerospace Sciences, New York, N.Y. (North American Aviation, Inc., Downey, Calif.).

18,567
In order to predict certain aspects of man's performance in space with respect to the use of hand tools, personal propulsion devices, and other equipment for his use, the moment of inertia of man was determined experimentally. The method used was to compare the angular deceleration of objects with known moments of inertia to the deceleration of human Ss under the same conditions. Several Ss were measured about two axes: center of head through pelvis and lower abdomen through small of back. Some measures of torques applied by Ss on an air-bearing platform and the resulting reaction velocities were made and correlated with the above determinations.
T. I. R 3

18,568
Cooper, F.S., Liberman, A.M., Harris, Katherine S. & Grubb, Patti M. SOME INPUT-OUTPUT RELATIONS OBSERVED IN EXPERIMENTS ON THE PERCEPTION OF SPEECH. Presented at: Second International Congress on Cybernetics, Namur, Sept. 3-10, 1958, 12pp. Association Internationale de Cybernetique, Namur, Belgium. (Haskins Laboratories, New York, N.Y.).

18,568
Some ten years of work on the perception of speech sounds are reviewed in terms of such perceptual relationships as the intersensory transform between the auditory patterns of words and their spectrographic pictures, and the very close relationship that seems to exist between the perception of speech sounds and the articulatory gestures involved in their production. It is felt that these considerations provide the rationale for a further experimental approach to the problem of characterizing the phonemes of language in measurable terms.
I.

18,569
Crook, Dorothea J. & Simches, S.O. (Eds.). INTERDISCIPLINARY RESEARCH SEMINAR ON PSYCHOLINGUISTICS. OE Contract SAE 9494, 1961, 86pp. Tufts University, Medford, Mass.

18,569
This monograph presents eight papers, each of which seeks to relate the problem of second-language learning to various specialized areas and to suggest designs for future research, concluding with a critical bibliography. Topics covered are: 1) a psycholinguistic rationale for foreign language study in the elementary school, 2) structural linguistics, 3) psychoacoustics of speech, 4) learning, 5) ontogenetic development of language, 6) semantic and syntactic development, 7) psychometrics, and 8) research on foreign language instruction.
G. I. R 157

18,570
Crawford, B.M. MEASURES OF REMOTE MANIPULATOR FEEDBACK: ABSOLUTE JUDGMENTS OF WEIGHT. Proj. 7184, Task 71586, WADD TR 60 591 (II), March 1961, 11pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio.

18,570
Man's ability to estimate weights was determined for two lifting conditions: direct manual lifting and remote lifting by means of a Model 8 Master-Slave Manipulator. The effect of interpolated weight-lifting experience upon absolute judgments of weight was also examined. Twenty Ss were assigned randomly to four groups of five each; two groups used direct lifting and two used remote lifting. Absolute judgments of 2-, 6-, and 10-lb. stimuli were first obtained, then difference thresholds obtained for either a 1,000 or 3,000 gram weight (standard stimuli), and, finally, a second set of absolute judgments. The results were discussed in terms of possible redesign of the remote manipulator.
T. G. I. R 8

18,571
Crawford, B.M. MEASURES OF REMOTE MANIPULATOR FEEDBACK: DIFFERENTIAL SENSITIVITY FOR WEIGHT. Proj. 7184, Task 71586, WADD TR 60 591 (I), March 1961, 13pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio.

18,571
To determine difference thresholds and Weber ratios for both direct and remote lifting of weights, the psychophysical method of constant stimulus differences was used. A Model 8 Master-Slave Manipulator was used for remote lifting. Two standard weight stimuli (1,000 and 3,000 grams) were each compared with nine other weights—four lighter and four heavier—by each of 20 Ss. Absolute judgments of weight were also obtained for 2-, 6-, and 10-lb. weights. Difference thresholds for the direct and remote lifting were compared. Practical implications for a remote-handling system were discussed.
T. G. I. R 9

18,572
Curtiss-Wright Corporation, East Paterson, N.J. STUDY PROGRAM FOR SIMULATOR COMPONENT INTERCONNECTIONS. Contract AF 33(616) 6898, Proj. 6114, Task 60167, ASD TR 61 71, April 1961, 28pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio.

18,572
A technique of interconnecting wiring for flight simulators of the future is described. The technique can readily be used without sacrifice to any of the inherent design characteristics, operational reliability and fexibility, and maintainability considerations for such equipment. Patching logic and component distribution form an essential part of the techniques.
T. I.

18,573
Gruber, A. (Proj. Dir.). THE EVALUATION OF OPERATOR AND SYSTEM PERFORMANCE DURING THE PHASE I, CATEGORY II FIELD TESTING OF THE 412 L AIR WEAPONS CONTROL SYSTEM. A METHODOLOGICAL REPORT. Contract AF 19(604) 3029, AFESD TR 61 27, June 1961, 21pp. Dunlap and Associates, Inc., Stamford, Conn.

18,573
The approach and methods used to evaluate a multisite, semiautomatic air weapons control system are described. The specific topics presented are 1) system description, 2) approach and measures, 3) data collected, 4) additional data, 5) data collection system, and 6) reduction and analysis system.
T. I.

18,574
Hartman, B.O. & McKenzie, R.E. SYSTEMS OPERATOR PROFICIENCY. EFFECTS OF SPEED STRESS ON OVERLOAD PERFORMANCE. Rep. 61 40, June 1961, 9pp. USAF School of Aerospace Medicine, Brooks AFB, Tex.

18,574
To investigate the effects of periods of low activity or work load on operator proficiency during bursts of overload simulating emergency conditions, the performance of six experienced pilots on the Complex Behavior Simulator was evaluated. The task required manipulation of proper controls in response to light signals. Three base work rates (100, 200, and 400 signals per hour) well below the operator's capacity and one (2,000 per hour) that approximated his effective level were used. Bursts (4,000 per hour) lasting about 40 sec. were injected at varied intervals. Performance during bursts (response time) were analyzed for effect of speed and overload stress.
T. G. I. R 5

18,575
Hawkes, G.R. COMMUNICATION BY ELECTRICAL STIMULATION OF THE SKIN. VI. THE EFFECT OF INTENSITY LEVEL AND STIMULUS SPACING ON INFORMATION TRANSMITTED VIA STIMULUS DURATION. USAMRL Proj. 6X95 25 001, Task 05, Rep. 492, Aug. 1961, 9pp. USA Medical Research Lab., Fort Knox, Ky.

18,575
To investigate the effect of intensity level and stimulus spacing on absolute identifications of electrical cutaneous stimulus duration, two groups of Ss, one experienced and one naive, were required to make such judgments of brief (50 msec.) to relatively long (1.5 sec.) stimuli. Both weak (1.6 db sensation level) and strong (6.0 db sensation level) stimulus intensities were used. Stimuli were held at a specified subjective intensity level as nearly as possible when duration was varied and were equally spaced subjectively using data derived from the bisection technique. The use of stimulus duration for cutaneous signalling was discussed in relation to the findings.
T. G. R 10

18,576
Greer, F.L. LEADER INDULGENCE AND GROUP PERFORMANCE. Psychol. Monogr., 1961, 75(12), 1-35. (Defense Systems Dept., General Electric Company, Ithaca, N.Y.).

18,576
A series of four field research studies were reported which involved 272 Army infantry rifle squads and Air Force crews. Several specific hypotheses, derived from the theory of reciprocality of indulgences, were tested. The theory indicates that the more a leader satisfies the needs of his men the harder they will work for him and, therefore, the better the group will perform. The independent variables used were the perception by group members of the leader as a problem solver, the extent to which the leader was perceived as meeting the role expectations they had for an ideal leader, and similarity between leader and men on authoritarianism. Criterion variables were group performance scores on realistic field problems.
T. R 38

18,577
Mandler, G., Mandler, Jean M., Kremen, I. & Sholiton, R.D. THE RESPONSE TO THREAT: RELATIONS AMONG VERBAL AND PHYSIOLOGICAL INDICES. Psychol. Monogr., 1961, 75(9), 1-22. (University of Toronto, Toronto, Ontario, Canada & Harvard University, Cambridge, Mass.).

18,577
To investigate the relation between physiological and verbal indices of disturbance, anxiety, or emotionality, two studies were performed. In the first, 32 Ss were presented with 18 phrases (Heath's Phrase Association Test) and their verbal and physiological reactions (heart rate, GSR, peripheral blood flow, and finger temperature) were recorded concomitantly. In addition, these Ss were given paper-and-pencil self-rating scales of anxiety and visceral perception. In the second study, 28 Ss were given 40 phrases and their verbal reactions were recorded. A group Rorschach test was also given to these Ss. The data were analyzed for relations among various modes of verbal response to threat, differences among types of threat areas, and physiological response to them. T. R 19

18,578
Wenzel, D.G. & Davis, P.W. THE EFFECT OF CAFFEINE AND NICOTINE AS TENSION-INDUCING AGENTS AND THE ABILITY OF MEPROBAMATE TO COUNTERACT SUCH EFFECTS UPON PERFORMANCE. Contract NONR 583(09), Sept. 1961, 11pp. School of Pharmacy, University of Kansas, Lawrence, Kan.

18,578
The effects of nicotine (four cigarettes prior to testing), caffeine (300 mg), meprobamate (400 mg), and combinations of these (one and one-half hours before testing) on performance were investigated. The performance tests included tracking; manual dexterity with pins, collars, and screws; Whipple steadiness; nonsense syllables; and arithmetic sums. Nine Ss were used. Results were summarized in tabular form and trends discussed; there was no statistical treatment of the data.
T. R 22

18,579
Ekman, G. A METHODOLOGICAL NOTE ON SCALES OF GUSTATORY INTENSITY. Rep. 98, May 1961, 8pp. Psychological Lab., University of Stockholm, Stockholm, Sweden.

18,579
Subjective salt intensity of seven concentrations of sodium chloride in water was measured by the method of ratio estimation and by three variants of the method of magnitude estimation. Ten Ss participated in all the tests. Four scales of subjective intensity were constructed from each set of data and compared. Some interpretations of the findings were advanced and suggested for further consideration in the area of psychophysics.
T. G. R 8

18,580
Farley, N.E. (Chm.). THE SAFETY THE MOTORIST GETS. Rep. SP 165, June 1959, 37pp. Society of Automotive Engineers, Inc., New York, N.Y.

18,580
Four papers dealing with the question of what automotive engineers are doing to assure safety in the modern American automobile are included in this report. The specific aspects of the automobile that are treated are: 1) the chassis, 2) the body, 3) electrical-accessory, and 4) over-all car appraisal. Various phases of product development to meet the changing requirements of traffic conditions and the human factor in the vehicle-driver complex are discussed. Quality control methods that are used to assure that the safety designed in is actually built into the car are discussed thoroughly.
T. G. I.

18,581
Frankenhaeuser, Marianne. SUBJECTIVE TIME AS AFFECTED BY GRAVITATIONAL STRESS. Scand. J. Psychol., 1960, 1, 1-6. (Laboratory of Aviation and Naval Medicine, Karolinska Institutet, Stockholm, Sweden).

18,581
Subjective time as affected by positive radial acceleration in a human centrifuge was studied on seven Ss. A modification of the method of ratio production was used for measurement of subjective time with auditory signals (1 to 20 sec.) as stimuli. The task was to reproduce the entire duration and to reproduce half the duration of the stimulus signal. Tests were run before, during, and after centrifugation. Subjective time data were analyzed as a function of objective time for each condition.
G. R 14

18,582
Frankenhaeuser, Marianne, Graff-Lonnevig, V. & Hesser, C.M. PSYCHOMOTOR PERFORMANCE IN MAN AS AFFECTED BY HIGH OXYGEN PRESSURE (3 ATMOSPHERES). Acta physiol. scand., 1960, 50(1), 1-7. (Laboratory of Aviation and Naval Medicine, Karolinska Institutet, Stockholm, Sweden).

18,582
Psychomotor performance (simple and choice reaction times and mirror drawing) of ten subjects during a 30-minute exposure to oxygen at three atmospheres was compared with performance under normal breathing at one atmosphere. The possible importance of the observations as criteria of concomitant physiological events during exposure to high oxygen pressure was discussed.
T. R 20

18,583
Frankenhaeuser, Marianne & Jarpe, Gundla. PSYCHOPHYSIOLOGICAL EFFECTS OF CATECHOLAMINE INFUSIONS. Rep. 99, May 1961, 10pp. Psychological Lab., University of Stockholm, Stockholm, Sweden.

18,583
Psychophysiological reactions to a mixture of adrenaline and noradrenaline (average dose 6.9 + 6.9 micrograms/min.) given as a continuous intravenous drip for periods of about 40 min. were studied in 11 Ss. Control data were obtained from placebo infusions. Subjectively perceived and overtly noticeable changes as well as changes in time estimation were examined. Effects on heart rate, blood pressure, and urinary catecholamines were also assessed. Implications for the understanding of stress mechanisms were discussed.
T. R 13

18,584
Frankenhaeuser, Marianne, Jarpe, Gundla & Matell, G. EFFECTS OF INTRAVENOUS INFUSIONS OF ADRENALINE AND NORADRENALINE ON CERTAIN PSYCHOLOGICAL AND PHYSIOLOGICAL FUNCTIONS. Acta physiol. scand., 1961, 51, 175-186. (Laboratory of Aviation and Naval Medicine, Karolinska Institutet & Psychological Lab., University of Stockholm, Stockholm, Sweden).

18,584
To study psychophysiological effects of intravenously infused adrenaline and noradrenaline, six Ss were given a battery of psychological tests (motor performance, memory span, word fluency, etc.) during infusion. A third infusion of Ringer's solution was used as a control condition. In addition, effects on heart rate, blood pressure, and urinary cathechols were assessed. Interpretation of the results was offered.
T. I. R 21

18,585
Freedman, S.J. & Pfaff, D.W. THE EFFECT OF DICHOTIC NOISE ON AUDITORY LOCALIZATION. Presented at: Eastern Psychological Association Meetings, Philadelphia, April 1960, 9pp. Massachusetts Mental Health Center, Boston, Mass.

18,585
To study the effect of a constantly changing auditory field on the discrimination of dichotic time differences under different conditions of mobility, 12 Ss were tested. Two independent, portable noise generators were used for supplying continuous dichotic noise to each S as he 1) walked up and down a busy corridor for alternate five-min. periods, 2) lay on a bed with no head movement and little body movement, and 3) was wheeled in an armchair with body passive and head free. Ss were tested for dichotic time differences before exposure and at the end of each hour for three two-hour exposure periods. The relevance of this experiment to sensory deprivation was discussed.
G. R 12

18,586
Cohen, M. & Held, R. DEGRADING EYE-HAND COORDINATION BY EXPOSURE TO DISORDERED RE-AFFERENT STIMULATION. Presented at: Eastern Psychological Association Meeting, 1960, 5pp. Brandeis University, Waltham, Mass.

18,586
To study the effect of a partially disordered relation between hand and eye upon the accuracy of visually-guided hand movements, Ss viewed their hands through a rotary prism of continually varying power which produced a continually varying displacement of the retinal image of the hand. The test required the S to mark the apparent position of each of four target points as seen in a mirror which eliminated sight of his hand and also error recognition. Variables tested were 1) duration of exposure with monocular viewing of his actively moving hand and 2) the same for passively moving hand.
R 6

18,587
Frost, G.G. AN APPLICATION OF A DYNAMIC PILOT-MODEL TO SYSTEM DESIGN. Proj. 7184, Task 71584, ASD TN 61 57, April 1961, 9pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio.

18,587
Design, evaluation, and integration of controls and displays for advanced flight vehicles are recurrent problems for the human engineer. This report presents a method for solving these problems on a fast-time analog computer and describes one application. The basic concept of this approach centers about the use of a dynamic model of the pilot which can be instrumented on the computer along with the airframe and flight control dynamics, thus permitting design and evaluation of the total closed loop system during the early design stage.
T. G. R 4

18,588
Graybiel, A., Mask, J.C., Beischer, D.E. & Riopelle, A.J. OBSERVATIONS OF CANAL SICKNESS AND ADAPTATION IN CHIMPANZEES IN A "SLOW ROTATION ROOM". Proj. MR005.13 6001, Subtask 1, Rep. 55, Oct. 1960, 9pp. USN School of Aviation Medicine, Pensacola Air Station, Fla.

18,588
To complement the studies on man of the effects of varying speeds of constant slow rotation, two chimpanzees, one with normal and one with disturbed vestibular function, were subjected to rotations varying from 1.9 to 10.0 rpm in a slow rotation room. The animals were observed for manifestations of "canal sickness" as seen in man. The animals were further studied under conditions of subcritical stimulation for two days to ascertain whether adaptation would occur. The usefulness of the chimpanzee as an experimental animal for studying the phenomenon of canal sickness was discussed.
G. R 3

18,589
Glucksberg, S. & Klein, H.L. THE EFFECTIVENESS OF VARIOUS SPOTTING TECHNIQUES IN FIRE CONTROL: A PILOT STUDY. OCO Proj. TB 1 1000, Tech. Memo. 9 61, June 1961, 11pp. USA Ordnance Human Engineering Labs., Aberdeen Proving Ground, Md.

18,589
In an investigation of several spotting techniques as an aid to fire control, floodlights were used to simulate spotting bursts. The Ss (32) were required to estimate distances from specified lights to a target. Comparisons of accuracy were made under the following conditions: 1) one versus two lights, 2) simultaneous versus serial presentation of lights, 3) reference distance between lights given versus no given reference. Limitations of the technique were discussed with recommendations for further investigation.
T. G. I.

18,590
Davis, T.R.A THE EFFECT OF HEAT ACCLIMATIZATION ON ARTIFICIAL AND NATURAL COLD ACCLIMATIZATION IN MAN. USAMRL Proj. 6X64 12 001, Task 01, Rep. 495, Aug. 1961, 7pp. USA Medical Research Lab., Fort Knox, Ky.

18,590
To determine the effect of heat acclimatization on cold acclimatization, the seasonal changes in oxygen consumption, rectal temperature, and skin temperature in response to a one-hour nude exposure to 14.1 degrees C were measured once monthly in six Ss between October and February. The same measurements were obtained in another group nude-exposed eight hours daily to a chamber temperature of 13.5 degrees C. Following the period of chamber and seasonal cold acclimatization, both groups were subjected to 21 days of heat exposure with exercise followed by another measurement of response to cold. The results were discussed with reference to the simultaneous existence of cold and heat acclimatization.
G. R 12

18,591
Domey, R.G. & McFarland, R.A. DARK ADAPTATION AS A FUNCTION OF AGE: INDIVIDUAL PREDICTION. Amer. J. Ophthal., June 1961, 51(6), 1262-1268. (Harvard School of Public Health, Cambridge, Mass. & Guggenheim Center for Aviation Health & Safety, Cornell University, New York, N.Y.).

18,591
Dark adaptation thresholds were measured for 241 Ss ranging in age from 16 through 89 years. A multiple correlation was obtained between threshold sensitivity at the 40th min. (the criterion) and age combined with dark adaptation thresholds taken at intervals on one min. for the first ten min. The size of the correlation was examined in terms of the feasibility of applying the regression equation to individual performance during early stages of adaptation to predict terminal levels of dark adaptation sensitivity.
T. G. R 7

18,592
Clark, B. & Graybiel, A. VISUAL PERCEPTION OF THE HORIZONTAL DURING PROLONGED EXPOSURE TO RADIAL ACCELERATION ON A CENTRIFUGE. Proj. MR005.13 6001, Subtask 1, Rep. 54, Aug. 1960, 12pp. USN School of Aviation Medicine, Pensacola Air Station, Fla. (San Jose State College, San Jose, Calif.).

18,592
Four Ss were studied in a special seat in the Pensacola Slow Rotation Room during and following four hours of constant rotation to determine whether any change in the visual perception of the horizontal would occur. The method involved maintaining a constant change in magnitude and direction of force on the Ss throughout the experimental period. The task was to adjust a line of light that could be rotated in either direction about its center to the horizontal before, at ten-min. intervals during, and following rotation. The data were analyzed for evidences of systematic changes in visual perception.
T. G. R 11

18,593
McFarland, R.A. & Stoudt, H.W. HUMAN BODY SIZE AND PASSENGER VEHICLE DESIGN. Rep. SP 142A, ca. 1960, 8pp. Society of Automotive Engineers, Inc., New York, N.Y. (Harvard School of Public Health, Cambridge, Mass.).

18,593
This study deals with the derivation of seat and workspace dimensions of passenger cars from anthropological data descriptive of the general driving public. The 5th, 50th, and 95th percentiles of static body measurements of passenger-car drivers are interpolated from selected anthropometric studies on various segments of the United States population. The manner of utilizing such data in car design is discussed in general and specifically in regard to dimensions for driver's seat and workspace. Additional aspects of seat design, such as seat comfort, are mentioned.
T. I. R 22

18,594
McFarland, J.H., Werner, H. & Wapner, S. THE EFFECT OF MUSCULAR INVOLVEMENT ON SENSITIVITY: ASYMMETRICAL CONVERGENCE ON THE DISTRIBUTION OF VISUAL SENSITIVITY. Amer. J. Psychol., Dec. 1960, 73(4), 523-534. (Clark University, Worcester, Mass.).

18,594
To consider the role of muscular changes in the ocular system in relation to changes in the distribution of visual sensitivity, two experiments were performed to show effects of asymmetrical convergence on the distribution of sensitivity for scotopic and photopic conditions of illumination. Thresholds, in terms of illumination intensity necessary for correct localization of the breaks in a pair of Landolt rings (four stimulus patterns), were measured on 16 Ss. The stimulus patterns were presented once while wearing a ten-degree, base-out prism in front of left eye and once while wearing the prism in front of right eye. Fixation on centered point under these conditions caused muscular changes in the eye. An interpretation of the findings was offered.
T.

18,595
McDowell, A.A., Brown, W.L. & Wicker, J.E. EFFECTS OF RADIATION EXPOSURE ON RESPONSE LATENCIES OF RHESUS MONKEYS. Rep. 61 94, Sept. 1961, 3pp. USAF School of Aerospace Medicine, Brooks AFB, Tex. (University of Texas, Austin, Tex.).

18,595
To test an hypothesis of lengthened response latencies for irradiated monkeys in an instrumental conditioning situation, 64 monkeys that had previously been exposed to varying dosages of nuclear radiation, were tested for ten trials per day over a five-day period on response latency to a familiar food-rewarded wooden block placed randomly over either of two food wells. They were then tested for another period to either the same or to a novel nonrewarded block presented simultaneously. Mean response latencies were analyzed as a function of dosage and testing condition (normal versus novel).
T. G. R 9

18,596
McKendry, J.M., Grant, G. & Corso, J.F. SURVEY INFORMATION: (A) DESCRIPTION OF THE TRAINING DEVICE TECHNICIAN (B) ENGINEERS' ESTIMATES OF CIRCUITS AND SYSTEM MAINTAINABILITY. SUPPLEMENT II TO NAVTRADEVCEN 330 1 DESIGN FOR MAINTAINABILITY. Contract N61339 330, NAVTRADEVCEN TR 330 1 2, April 1960, 113pp. USN Training Device Center, Port Washington, N.Y. (HRB-Singer, Inc., State College, Penn.).

18,596
This supplement to a larger study, "Design for Maintainability," contains survey data gathered from a sample of training device technicians, design engineers, and field engineers. The data from the first group include background and training, work environment, organization of work group, familiarity and preferences with regard to test equipment and manuals, trouble shooting techniques, and the relation between fault localization time and fault correction time. Design and field engineers are questioned about system and equipment trouble shooting techniques. The questionnaires used in the survey are included.
T. G. I.

18,597
Yarbus, A.L. PERCEPTION OF AN IMMOBILE RETINAL IMAGE. Rep. T 352 R, March 1961, 3pp. Directorate of Scientific Information Services, Defense Research Board, Toronto, Ontario, Canada. (Institute of Biological Physics, Academy of Sciences of the USSR, Moscow, Russia). (Translated from: Biofizika, 1956, 1(5), 435-437).

18,597
An experimental test method for securing an immobile retinal image is described. A test is set up inside a special suction cup that can be fixed to the eyeball and moves along with it during eye motions. On the eyeward surface of a glass plate (mounted on the cup), various objects can be fastened which the S sees against the background of opal glass illuminated from the outside. Some preliminary results are summarized.
I. R 2

18,598
Zeidner, J., Sadacca, R. & Schwartz, A.I. HUMAN FACTORS STUDIES IN IMAGE INTERPRETATION: THE VALUE OF STEREOSCOPIC VIEWING. DA Proj. 2L95 60 001, HFRB Tech. Res. Note 114, June 1961, 37pp. USA Human Factors Research Branch, Adjutant General's Research & Development Command, Washington, D.C.

18,598
In the continuation of research concerned with development of techniques to improve performance of image interpreters, the usefulness of stereoscopic viewing was assessed in terms of quality of information obtained and the rate at which it is extracted. Tactical and strategic photographs were used in developing performance measures that were administered during July and August, 1960, to two matched groups of image interpreters at the USA Intelligence Center. For each measure, stereo pairs were provided to one of the two groups and nonstereo pairs to the other. Performance indices for the two groups were compared in as many ways as possible. Recommendations were included.
T. G. I. R 2

18,600
Parks, D.L. & Snyder, F.W. HUMAN REACTION TO LOW FREQUENCY VIBRATION. Contract NONR 2994(00), Tech. Rep. 1, Boeing Wichita Rep. D3 3512 1, July 1961, 65pp. Boeing Airplane Company, Wichita, Kan.

18,600
Systematically derived judgments of levels of vertical sinusoidal vibration severity (definitely perceptible, mildly annoying, extremely annoying, and alarming) from 1 to 27 cps were obtained under laboratory controlled conditions for each of 16 selected male Ss. The S, seated in a standard aircraft seat without normal seat cushions and mounted to a vibration platform, signalled (by pushing a button) his intensity judgment. An ECG system permitted monitoring of S's condition throughout the test. The results established four profiles of acceleration. Correlation of judgment with velocity, acceleration, and double amplitude with frequency was noted. Body effects were discussed.
G. R 95

18,601
Parks, D.L. A COMPARISON OF SINUSOIDAL AND RANDOM VIBRATION EFFECTS ON HUMAN PERFORMANCE. Contract NONR 2994(00), Tech. Rep. 2, Boeing Wichita Rep. D3 3512 2, July 1961, 34pp. Boeing Airplane Company, Wichita, Kan.

18,601
To investigate performance with two types of vertical vibration (sinusoidal and random) for possible performance correlations, ten male Ss performed a complex task while experiencing the vibrations. The task consisted of three subtasks: tracking without feedback delay, tracking with delayed control-display feedback, and response time. Results were analyzed for consistent trends in vibration effects which could be correlated with mechanical and psychological definitions of vibration for evidence of a human performance transfer function for vibration.
T. G. I. R 5

18,602
Story, Anne. W. MAN-MACHINE SYSTEM PERFORMANCE CRITERIA. ESD TR 61 2, May 1961, 61pp. USAF Operational Applications Research Branch, AFCCDD, Bedford, Mass.).

18,602
Four categories of criteria are developed for the evaluation of man-machine system performance. The applicability of these criteria during system design, building, and testing is discussed. Some illustrative evaluations of man-machine systems are surveyed. Problems that accrue through the use of simulative features in the assessment of system performance are considered.
R 23

18,603
Smith, E.A. & Connor, R.W. SURVIVAL CONSIDERATION FOR INTERPLANETARY MISSIONS. Presented at: SAE National Aeronautic Meeting, Los Angeles, Calif., Oct. 10-14, 1960, Rep. 244A, 21pp. Society of Automotive Engineers, Inc., New York, N.Y. (Norair Div., Northrop Corporation, Hawthorne, Calif.).

18,603
The problem of survival during interplanetary flight is briefly examined for a round-trip Mars mission. The effects of performance and payload requirements on the philosophies of escape and on-board survival are examined for a particular vehicle concept, and the resulting selection of on-board sruvival is discussed. Representative vehicle subsystems are described from the standpoint of three basic design techniques: duplication of vital systems, multiple uses of vital systems, and repair capability.
T. I. R 14

18,604
Niven, J.I. & Hixson, W.C. FREQUENCY RESPONSE OF THE HUMAN SEMICIRCULAR CANALS: I. STEADY-STATE OCULAR NYSTAGMUS RESPONSE TO HIGH-LEVEL SINUSOIDAL ANGULAR ROTATIONS. Proj. MR005.13 6001, Subtask 1, Rep. 58, March 1961, 32pp. USN School of Aviation Medicine, Pensacola Air Station, Fla. & National Aeronautics and Space Administration, Washington, D.C.

18,604
The use of a transition technique for quantifying nystagmic response to semicircular canal stimulation by high level, sinusoidal angular accelerations is presented. The frequency response characteristics are evaluated from cornea-retinal potential recordings obtained at rotation frequencies from 0.02 to 0.20 cps with a constant peak acceleration of 40 degrees/sec.^{2}. Interpretation of the data is directed toward an analysis of the performance of the cupula-endolymph system, rather than a description of its physical characteristics.
T. G. I. R 17

18,605
Schultz, D.G. & Siegel, A.I. POST-TRAINING PERFORMANCE CRITERION DEVELOPMENT AND APPLICATION. A SELECTIVE REVIEW OF METHODS FOR MEASURING INDIVIDUAL DIFFERENCES IN ON-THE-JOB PERFORMANCE. Contract NONR 2279(00), July 1961, 60pp. Applied Psychological Services, Wayne, Penn.

18,605
This report evaluates the current "state of the art" with respect to methods for the measurement of individual differences in on-the-job performance. Recent progress in this area is considered and a number of important issues which require investigation and clarification are pointed out. Specific topics reviewed are: 1) appraisal techniques in current use, 2) criterion analysis, and 3) the importance of observation of performance on the job. Current issues discussed are problems associated with the dimensionality of performance criteria.
R 108

18,606
Schultz, D.G. & Siegel, A.I. GENERALIZED THURSTONE AND GUTTMAN SCALES FOR MEASURING TECHNICAL SKILLS IN JOB PERFORMANCE. J. appl. Psychol., June 1961, 45(3), 137-142. (Applied Psychological Services, Wayne, Penn.).

18,606
Checklists for use in evaluating task performance in four related but different naval job specialties (ratings) are shown to meet the Thurstone and Guttman scalability requirements. The Scaled Technical Proficiency Check Lists evaluate the status of a technician with reference to tasks normally performed by men of equivalent pay grade and rating. The lists contain a relatively small number of items so that they are simple and convenient to use. Since the tasks included form a scale, the score obtained from them can be generalized to the "universe" of tasks of which they are representative.
T. G. R 10

18,607
Stern, J.A., Stewart, M.A. & Winokur, G. AN INVESTIGATION OF SOME RELATIONSHIPS BETWEEN VARIOUS MEASURES OF GALVANIC SKIN RESPONSE. J. psychosom. Res., 1961, 5, 215-223. (Washington University School of Medicine, St. Louis, Mo.).

18,607
To evaluate and compare some measures of conditioning and to relate GSR conditionability to the level of background activity, Ss were conditioned to a loud tone, the conditioned stimulus (CS), in association with a mild electric shock, the unconditioned stimulus (US), with a CS-US interval of one sec. Twenty adaptation trials of CS alone were followed by 20 conditioning trials for 13 of the Ss and 40 for six Ss; 20 extinction trials were given to all Ss. Measures recorded and analyzed were spontaneous fluctuations (fluctuations between tone trials greater than 500 ohms in amplitude), GSR response to tone (deflection of at least 500 ohms within specified time of stimulation), anticipatory response (500 or greater deflection one sec. after shock), and response to shock (same as to tone). T. G. R 10

18,608
Spencer, Domina E. FOG ON RUNWAYS. Illum. Engng., July 1961, LVI(7), 436-442. (University of Connecticut, Storrs, Conn.).

18,608
Quantitative predictions of the light incident at the center of the runway in fog and of the scattering and attenuation produced in the fog layer between runway and pilot were presented. Two configurations were studied: 150 ft. wide and 3,000 ft. long; 200 ft. wide and 1,300 ft. long. Problems such as the brightness distribution seen by the pilot and the response of the pilot will be dealt with in future papers.
G. I. R 3

18,609
Spencer, Domina E. FOG ON TURNPIKES. Illum. Engng., July 1961, LVI(7), 443-447. (University of Connecticut, Storrs, Conn.).

18,609
The lighting of a six-lane turnpike in fog is considered in this paper. The turnpike selected provides optimum visual conditions for lighting: luminaires containing fluorescent lamps are arranged in a long continuous line on the median strip in such a way that the entire turnpike is flooded with a carpet of light; yet the driver is shielded from direct glare. Quantitative predictions of incident light on the roadway and attenuation produced in the fog layer between driver and roadway are presented for types of fogs expected at ground levels.
G. I. R 3

18,610
Swets, J.A. IS THERE A SENSORY THRESHOLD? Science, July 1961, 134(3473), 168-177. (Research Laboratory of Electronics, Massachusetts Institute of Technology, Cambridge, Mass.).

18,610
The concept of a sensory threshold, a limit on sensitivity, is challenged in this paper. Recently developed methods that permit separating the response criterion and sensitivity measures and a psychophysical theory that incorporates the results obtained with these methods are discussed. These methods stem directly from the approach taken by engineers to the general problem of signal detection and involve statistical decision theory and the ideal observer theory. The relationship of the data thus obtained to various threshold theories is examined critically. Implications for practice are then considered.
G. R 21

18,611
Sampson, P.B. & Wade, E.A. LITERATURE SURVEY ON HUMAN FACTORS IN VISUAL DISPLAYS. Contract AF 30(602) 2358, Proj. 5577, Task 55257, RADC TR 61 95, June 1961, 131pp. Institute for Psychological Research, Tufts University, Medford, Mass.

18,611
This annotated bibliography was prepared as an assessment of the current state of knowledge (1940 to 1960) on the ability of the human operator to assimilate, process, and use information presented visually. Four major divisions, each containing introductory analyses and evaluations, were used: 1) information load and speed, 2) display format and content, 3) display integration, and 4) human complex processes as related to displays. Under these divisions, reports dealing with a variety of subtopics such as search and detection of visual targets, human information processing and channel capacity, coding, and decision-making were to be found.
R 150 (approx.)

18,612
Royal Naval Personnel Research Committee. LIST OF R.N. P.R.C. OPEN REPORTS 1942-1959. RNP Rep. 61/989, Jan. 1961, 26pp. Royal Naval Personnel Research Committee, MRC, London, England.

18,612
The Royal Naval Personnel Research Committee (RNPRC) reports listed here were prepared during the period December, 1942, when the Committee was formed, to December, 1959. They were presented in the order to which the RNP serial numbers were allocated. Administrative papers, which were also given serial numbers, were omitted. An author index and subject index were included.
R 300 (approx.)

18,613
Brown, R.H. SPATIAL EFFECTS IN HUMAN VISUAL RESOLUTION. J. gen. Psychol., 1946, 35, 77-86. (USN Research Lab., Washington, D.C.).

18,613
To determine how spatial effects operate in the visual resolution of a simple test object, foveal intensity thresholds were measured with white light for the resolution of a narrow bar on a dark background. The length of the bar subtended 7.92, 17.2, 28.0, or 51.0 min. of visual angle at the eye; each bar length was also varied in width from 0.129 to 5.06 min. of visual angle. Threshold data were analyzed as functions of visual angle subtended by the bar. The results were interpreted quantitatively by considering stimulus length a parameter in an equation for intensity discrimination.
T. G. R 15

18,614
Henriksson, N.G., Kohut, R. & Fernandez, C. STUDIES ON HABITUATION OF VESTIBULAR REFLEXES. EFFECT OF REPETITIVE CALORIC TESTS. Rep. 61 41, April 1961, 14pp. USAF School of Aerospace Medicine, Brooks AFB, Tex. (University of Chicago, Chicago, Ill.).

18,614
The phenomenon of habituation (progressive reduction of nystagmic response) to repetitive caloric stimulation was investigated in cats. The study included acquisition, retention, and transfer of the response decline in nystagmic reaction. Acquisition of habituation was obtained by repetitive calorization of right or left ears with hot or cold water at varying strengths and with anesthesia. Retention was tested by varying the time interval between irrigations from 1 to 21 days. Transfer was tested by habituating with one stimulus and testing with another. Practical and theoretic implications of the findings were discussed briefly.
G. I. R 22

18,615
Sleight, R.B. AIRCARS AND THE 'TERRESPHERE'. 5pp. Applied Psychology Corporation, Arlington, Va. (Reprinted from: Industr. Res., June-July 1961).

18,615
A class of near-ground craft that ride on cushions of air or sprout wings and propellors is described. Several aircar prototypes are discussed and the possibilities of a new system of transportation with its consequent problems are indicated. It is pointed out that a principal concern at this time should be with planning and facilities for a new transportation system.
I.

18,616
Thomson, K.F. (Chm.). SEMINAR ON HUMAN FACTORS IN MILITARY TRAINING - 16 MARCH 1961. 64pp. USN Training Device Center, Port Washington, N.Y.

18,616
The Human Factors Seminar, of which this report is an almost verbatim transcript, was held to provide an opportunity for invited officials and scientists of the Department of Defense to discuss and exchange information with key scientists of industry and the universities who are engaged in human factors work relating to training device design, methods and techniques for the advancement of military training, and for effective training in operational reliability of weapons systems. Specific topics discussed were the learning and training process, training device concepts, automated instruction, and training for operational reliability.

18,617
MacEwan, Charlotte. METHODS OF APPROACH AT THE UNIVERSITY OF WASHINGTON TO THE PROBLEM OF ANALYTIC ROTATION TO A SIMPLE STRUCTURE MATRIX. Contract NONR 477(08) & Public Health Research Grant M 743(06), July 1961, 97pp. University of Washington, Seattle, Wash.

18,617
The problem of analytic rotation in factor analysis has been attacked from various points of view in the methodological research reported here. A limited selection of research on mathematical rationales and/or computational procedures which have been developed was reported along with empirical tests of the effectiveness of some.
T. R 6

18,618
Newman, A.K. A LABORATORY STANDARD SIGNAL-TO-NOISE EQUALIZER. Contract AF 19(604) 4575, RF Proj. 882, Tech. Rep. 59, AFCCDD TN 60 59, Dec. 1960, 14pp. Ohio State University Research Foundation, Columbus, Ohio.

18,618
An instrument is described that was designed to measure and equate the peak voltage of a word, or the average peak voltage of a group of words, with the rms voltage of suitably filtered Gaussian noise in such a way as to produce a well-defined signal-to-noise ratio of zero db. Relative to this zero standard ratio, any practical ratio may be obtained by proper adjustments. The operation of the instrument is discussed; a block and various circuitry diagrams are included.
G. I.

18,619
Pritchard, B.S. & Blackwell, H.R. PRELIMINARY STUDIES OF VISIBILITY ON THE HIGHWAY IN FOG. FINAL REPORT. Grant 47B, Proj. 2557, Rep. 2557 2 F, July 1957, 44pp. Engineering Research Institute, University of Michigan, Ann Arbor, Mich.

18,619
A program of studies was reported which was intended to lay the foundation for an understanding of the problem of improving visibility on the highway in fog. The major effort was devoted to measurements of the precise optical properties of natural (and artificial) fogs, including transmittance and the polar distribution of light. Two new measurement devices were described and data gathered by means of these devices were presented. Two general methods for improving the design of street lights for use in fog were described and evaluated on a scale-model simulator. The usefulness of the simulator was discussed.
T. G. I. R 12

18,620
Crumley, L., Divany, R., Gates, S., Hostetter, R., et al. DISPLAY PROBLEMS IN AEROSPACE SURVEILLANCE SYSTEMS. PART I. A SURVEY OF DISPLAY HARDWARE AND ANALYSIS OF RELEVANT PSYCHOLOGICAL VARIABLES. Contract AF 19(604) 7368, AFESD TR 61 33, Rep. 256 R 2 Part I, June 1961, 263pp. HRB-Singer, Inc., State College, Penn.

18,620
One phase of a research program designed to determine the information presentation requirements of human data processing roles in future air and aerospace surveillance systems is presented. Display parameters and operator characteristics which are relevant to display selection are described and reviews of some of the pertinent literature are presented. The description and specification of operator roles is also included; these roles are based upon a conceptual model of a future air and aerospace surveillance system and a review of the state of the art in displays. A paper entitled "Data-Processing in Human Systems" is appended.
I. R 400 (approx.)

18,621
Riggs, L.A., Ratliff, F. & Keesey, U.T. APPEARANCE OF MACH BANDS WITH A MOTIONLESS RETINAL IMAGE. J. opt. Soc. Amer., June 1961, 51(6), 702-703.

18,621
To investigate the effect of involuntary eye movements on Mach bands (visual contour phenomenon), three different Mach patterns were made by photography containing steep, moderate, and shallow gradients, respectively. The patterns were split in such a way that the upper half could be viewed normally and the lower half with a motionless image. Tightly fitting contact lenses equipped with plane mirrors provided the basis for motionless image presentation. Time for disappearance of the bright band for both conditions and vividness of afterimage following varied time intervals were recorded. The findings were discussed in terms of physiological mechanisms of vision.
T. I. R 9

18,622
Robinson, D.R. & Cleary, J.P. EFFECTS OF HIGH INTENSITY SOUND ON CIRCULATION OF THE INNER EAR OF THE GUINEA PIG. Proj. 7231, Task 71786, ASD TN 61 58, May 1961, 5pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio.

18,622
The blood vessels of the spiral ligament of the cochlea of 38 guinea pigs were observed during intense sound stimulation (140 db with frequencies from 50 to 1,000 cps) over 30-min. periods of time. The changes were recorded on film by motion microphotography and analyzed. The findings were discussed in relation to metabolism and to difficulties encountered in experimental procedures. A case report was made of an unusual response of the cochlea of one guinea pig to moderate levels of low frequency sound.
I. R 3

18,623
Rabideau, G.F. & Schloredt, D.L. SPACE SYSTEMS TRAINING DEVICES. Presented at: SAE National Aeronautic Meeting, Los Angeles, Calif., Oct. 10-14, 1960, Rep. 245D, 9pp. Society of Automotive Engineers, Inc., New York, N.Y. (Space Technology Labs., Inc., Los Angeles, Calif. & Human Factors, Norair Div., Northrop, Hawthorne, Calif.).

18,623
The high priority given to the development of manned space systems and the difficulties inherent in the development of programs and devices for space crew training have created a need for a review of associated training requirements. This paper presents a number of hypotheses concerning the deiarable characteristics of such programs and devices for further verification. Several guide lines or principles are introduced to facilitate design and development of useful training curricula and equipment for manned space systems.
T. G. R 3

18,624
Romba, J.J. & Martin, P. THE PROPAGATION OF AIR SHOCK WAVES ON A BIOPHYSICAL MODEL. DA Proj. 5B9520001, Tech. Memo. 17 61, Sept. 1961, 26pp. USA Ordnance Human Engineering Labs., Aberdeen Proving Ground, Md.

18,624
Shock wave characteristics were studied in the field about and within the rhesus monkey body form. Measurements were obtained in free air, top of animal's head, the mid-brain and the lower thorax with distance and position of the explosive varied in relation to the animal's body. The study of shock wave transmission from one body level to another was accomplished and the problem of shock wave energy distribution in the field of the organism was emphasized. The effects of medium through which shock wave transmission occurred and of body tissue on the shock wave characteristics were observed.
T. G. I. R 8

18,625
Sells, S.B. & Barratt, E.S. (Eds.). BIOELECTRONICS ABSTRACTS. SURVEY OF BIOELECTRONIC APPROACHES TO THE STUDY OF BEHAVIOR. Rep. 2, 1961, 207pp. Texas Christian University Press, Fort Worth, Tex.

18,625
An annotated bibliography of references covering the spectrum of scientific interest in bioelectronics (application of electronic technology to the study of living tissue and the behavior of living organisms) was presented. Over 95 journals were searched for the period of 1956 to 1961, as well as summary works previous to 1956. The literature was classified according to major content areas with the principal divisions being 1) the generation of electrical potentials within organisms, 2) apparatus and techniques for recording those potentials and analysis of records obtained, and 3) the relation of bioelectronic data to other measures of behavior.
R 1,693

18,626
Simon, G.B. THE SIMULATOR AS A HUMAN FACTORS RESEARCH TOOL FOR MANNED SPACE FLIGHT. Paper 61 196 1890, June 1961, 11pp. Institute of the Aerospace Sciences, New York, N.Y. (Link Div., General Precision, Inc., Pleasantville, N.Y.).

18,626
This paper discusses the simulator as a human factors research tool for manned space flight. Some of the research that needs to be done with man in a simulation facility is indicated and the need for such research is clarified. Some of the characteristics of the simulation facility are described with a discussion of state-of-the-art limitations.
I.

18,627
Pigg, L.D. HUMAN ENGINEERING PRINCIPLES OF DESIGN FOR IN-SPACE MAINTENANCE. Paper 61 144 1838, June 1961, 17pp. Institute of the Aerospace Sciences, New York, N.Y. (USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio).

18,627
This paper deals briefly with results of a very limited program of research on problems related to human performance of maintenance actions in space systems. Several studies are reviewed which were carried out to determine the effect of weightlessness and frictionlessness on sensory processes, on basic psychomotor performance, on manual application of forces, and on discrimination and handling of inertial objects including stores, components, and tools. A second group of studies reviewed deal with the use of remote manipulative equipment, both task and operator variables being considered. Further research needs are discussed.
T. R 17

18,628
Grodsky, M.A. SOME EXPERIMENTS OF HUMAN MAINTENANCE BEHAVIOR. Paper 61 147 1841, June 1961, 39pp. Institute of the Aerospace Sciences, New York, N.Y. (Martin Company, Baltimore, Md.).

18,628
In this study of human maintenance performance the utility of a human maintenance model was first discussed and a conceptual model presented. An initial goal for investigation was chosen: efficiency and stability in the use of trouble-shooting information presented. Information concerning the distributions of failures and nonfailures that could occur in a 30-element system was presented to the S who illustrated the manner in which he used this information by performing certain tests on a simulated system checkout panel or, in a second test, by verbal report. Performance was scored by recording the minimum number of tests that evaluated equally probable elements in numerical order. Implications of the findings were discussed.
T. G. I. R 6

18,629
Marko, A.R. A TRANSISTORIZED HIGH QUALITY CARRIER AMPLIFIER FOR ELECTROCARDIOGRAM. Proj. 7222, Task 71751, WADD TN 61 55, March 1961, 7pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio.

18,629
A miniaturized electrocardiogram transistor amplifier employing a high efficiency, low level modulator circuit is described. The amplifier combines the advantages of a carrier system with the low noise level and high input impedance of a resistor-capacitance coupled straight amplifier. Circuit diagrams and operating characteristics are included.
T. G. I. R 3

18,630
Moser, H.M., Michel, J.F. & Fotheringham, W.C. INTELLIGIBILITY AND CONFUSABILITY OF VOWELS AND DIPHTHONGS UNDER VARIOUS CONDITIONS OF QUIET AND NOISE. Contract AF 19(604) 6179, AFCCDD TN 61 33, RF Proj. 1080, Tech. Rep. 60, March 1961, 19pp. Ohio State University Research Foundation, Columbus, Ohio.

18,630
To determine the intelligibility and confusability of certain vowels and diphthongs at low intensities and relatively difficult signal-to-noise ratios, 16 English vowels and diphthongs were recorded by four male and four female speakers. For each vowel and diphthong, 120 responses were obtained from a panel of six phonetically trained listeners at several levels of noise and quiet; each of five levels of noise were matched for listening difficulty with five levels of quiet. The range of difficulty was from approximately 25 to 85 percent correct. Order of intelligibility, stability of order among listening conditions, effect of speakers, and principle confusions were analyzed from the data.
T. G. R 17

18,631
Moser, H.M., Fotheringham, W.C. & Gonzalez, G.A. AN ANALYSIS OF THE PURPOSE OF AIR-TRAFFIC CONTROL MESSAGES. Contract AF 19(604) 6179, AFESD TN 61 40, RF Proj. 1080, Tech. Rep. 62, May 1961, 13pp. Ohio State University Research Foundation, Columbus, Ohio.

18,631
To describe air-traffic communication more definitively than has been done previously, particularly in terms of speaker intent and message origin, a sample of 8,861 air-traffic control messages from Idlewild, Miami, Mexico City, and Accra Ghana air-traffic control facilities were transcribed from tape. From an analysis of communication context, the purposes of the messages were inferred and categorized. Of this larger sample, representative subsamples from each facility totaling 873 messages were selected for further analysis of message length and origin.
T. R 3

18,632
Moser, H.M. & Leon, P. THE RECOGNITION OF FRENCH VOWELS BY AMERICAN LISTENERS. Contract AF 19(604) 6179, AFCCDD TN 61 42, RF Proj. 1080, Tech. Rep. 61, March 1961, 10pp. Ohio State University Research Foundation, Columbus, Ohio.

18,632
The effect of a French accent on the intelligibility of English one-syllable words was studied to predict probable errors in voice communication from French speakers to American listeners. The French accent was artificially created by substituting most nearly equivalent French vowel sounds in English words. Four educated adults from France whose speech was free from dialectical accent read the test words in various orders; listeners were 25 American college students. Correct responses, omissions, and other variant responses were analyzed.
T. G. R 7

18,633
Moser, H.M. & Gardner, H.J. INFLUENCE OF CONSONANTS ON THE RECOGNITION OF THE VOWELS (U) AND (I) - A STUDY OF INTERNATIONAL PRONUNCIATIONS FOR TWO AND THREE. Contract AF 19(604) 6179, AFESD TN 61 38, RF Proj. 1080, Tech. Rep. 63, May 1961, 39pp. Ohio State University Research Foundation, Columbus, Ohio.

18,633
With a view to the selection of the most recognizable pronunciations for the digits two and three, 30 native speakers of five different languages recorded 178 consonant-vowel and vowel-consonant stimuli which contained the vowels u and i. Ten Americans listened to different randomizations of the stimuli at three signal-to-noise ratios. The data were analyzed for generalizations regarding consonantal characteristics that contribute significantly to the vowels under study. Suggestions for improving the intelligibility of two and three were made.
T. G. R 3

18,634
Moser, H.M. & Fotheringham, W.C. NUMBER TELLING. Contract AF 19(604) 6179, AFCCDD TN 60 40, RF Proj. 1080, Tech. Rep. 58, Dec. 1960, 35pp. Ohio State University Research Foundation, Columbus, Ohio.

18,634
Intelligibility and confusability values of 16 variants of the English digits were studied in sufficient noise to produce 50 percent error. Ten speakers representing five different native-language backgrounds spoke the English digit variants to approximately 250 American listeners. The study provided 21,540 responses to each digit; about half of these were responses to stimuli that had been filtered above 2,800 cps. Order of digit intelligibility, effect of filtering on signal, and substitutions or confusions among digits and digit variants were analyzed. Tentative hypotheses accounting for the findings were stated.
T. R 5

18,635
Granda, A.M. ELECTRICAL RESPONSES OF THE HUMAN EYE TO COLORED FLICKERING LIGHT. J. opt. Soc. Amer., June 1961, 51(6), 648-654. (Hunter Laboratory of Psychology, Brown University, Providence, R.I.).

18,635
The electrical flicker responses of the eyes of three Ss to stimulation at various wavelengths and luminances were recorded by means of a frequency analyzer in such a manner that unwanted frequencies could be rejected in favor of the one desired for study. The results obtained were plotted against stimulus luminance, and criterion responses were used to plot spectral sensitivity points as a basis for comparison with the standard ICI photopic sensitivity curve. The use of the frequency analyzer in further ERG research was evaluated.
T. G. I. R 20

18,636
Lavender, H.J., Jr. & Dinan, J.A. EVALUATION OF THREE LANYARD CONFIGURATIONS FOR THE SAFE HANDLING OF TOOLS. June 1961, 21pp. Operational Missiles Subdivision, Avco Corporation, Wilmington, Mass.

18,636
To ascertain which of three different lanyard configurations (loop, wrist, belt) would be best for safe handling of tools, 12 Ss were required to perform the operational procedures involved in mating Minuteman, Mark 5. Each S used the tools under each lanyard configuration and with no lanyard for two performances. Operation times, subjective preferences and evaluations elicited from the Ss following the task, and general human engineering considerations ascertained by the experiment were analyzed. Recommendations were included.
T. I. R 3

18,637
Hoffman, P.G. HIGHWAY SAFETY - A REVIEW AND FORECAST. Presented at: First SAE David Beecroft Memorial Lecture, Chicago, Ill., Oct. 14, 1947, 21pp. Society of Automotive Engineers, New York, N.Y.

18,637
The problem of safety on streets and highways is discussed in this paper. An historical review of the aspects of the problem before development of the automobile and of changing conditions since that event is presented. Vehicle design and highway design are considered together with an analysis of safety data. A postwar program for improving safety is described and the results examined in light of future needs.
G.

18,638
Hornick, R.J. RESEARCH INTO THE EFFECTS OF VIBRATION ON MAN. Presented at: Symposium of the Midwest Human Factors Society, May 19, 1961. BRL Rep. 136, 9pp. Bostrom Research Laboratories, Milwaukee, Wisc.

18,638
This article describes the environmental problem of whole-body vibration and its importance in understanding the human component in a dynamic system. A research program concerned with this problem is described; equipment, methodology, and findings to date are summarized. Future investigations are noted.
R 10

18,639
Huebner, G.J., Jr. ENGINEERING FOR SAFETY WITH A PSYCHOLOGICAL YARDSTICK. Presented at: Detroit Section, Sept. 9, 1960, Rep. S265, 5pp. Society of Automotive Engineers, Inc., New York, N.Y. (Engineering Div., Chrysler Corporation, Detroit, Mich.).

18,639
A method for evaluating automotive developments in realistic terms of human use and safety is described. The essence of the method is the application of psychophysical methods to an engineering problem. Subjective judgments are elicited in planned programs of experimental comparisons; psychological strengths and weaknesses of the particular rating methods used are integrated into the design of the program; and complete mathematical (statistical) analysis of the resultant ratings are carried out. Several examples of the technique are provided.

18,640
Jones, F.P., Gray, Florence E., Hanson, J.A. & Shoop, J.D. NECK-MUSCLE TENSION AND THE POSTURAL IMAGE. Ergonomics, April 1961, 4(2), 133-142. (Institute for Psychological Research, Tufts University, Medford, Mass.).

18,640
The "postural images" of correctness, of comfort, and of height of seven male Ss were studied. The S was instructed to assume his best, most comfortable, or greatest height posture; the response was then recorded photographically and electromyographically. Quantification was achieved by measuring the angular relation of head to trunk and the change in electric potential of the sternocleidomastoid and upper trapezius muscles. Both sitting and standing postures were recorded with additional studies on the posture of effort (lifting), anticipation of movement, forced respiration, and standing on tiptoe. The data were analyzed in an effort to describe postural behavior in terms of stimulus and response.
T. G. I. R 4

18,641
Kubzansky, P.E. THE EFFECTS OF REDUCED ENVIRONMENTAL STIMULATION ON HUMAN BEHAVIOR: A REVIEW. Reprinted from: "The Manipulation of Human Behavior". 1961, 51-95. John Wiley & Sons, Inc., New York, N.Y.

18,641
A chapter from the book, The Manipulation of Human Behavior (John Wiley & Sons, Inc., 1961), is reprinted here. The concern is with experimental investigations of the effects upon human behavior of a reduction in either absolute or relative amounts of sensory or perceptual stimulation. The sources of interest in this problem are examined briefly; the experimental literature is reviewed; the current status of knowledge about the problem is assessed; and the implications for general understanding of behavior are reviewed.
R 81

18,642
Kaptur, V.D., Jr. & Myal, M.C. THE GENERAL MOTORS COMFORT DIMENSIONING SYSTEM. Presented at: SAE International Congress and Exposition of Automotive Engineering, Detroit, Mich., Jan. 9-13, 1961, Rep. 267B 16pp. Society of Automotive Engineers, Inc., New York, N.Y. (General Motors Corporation, Warren, Mich.).

18,642
Human engineering principles for automobile passenger compartments are discussed. The concept of dimensioning to the human is explained, and the application of design limits to the two- and three-dimensional tools is evaluated. The comfort dimensioning practices followed by General Motors are reviewed along with the description of the car-checking procedure.
T. G. I. R 8

18,643
Kaufman, R.A., Oehrlein, T.F. & Kaufmann, M.L. PREDICTING HUMAN RELIABILITY—IMPLICATIONS FOR OPERATIONS AND MAINTENANCE IN SPACE. Paper 61 146 1840, June 1961, 15pp. Institute of the Aerospace Sciences, New York, N.Y.

18,643
A method for grossly predicting reliability of the human operator in weapons systems was presented. It was hypothesized that equipment configuration (or its design characteristics) should be related to the frequency of human error associated with the equipment and that cost, weight, and volume of a given package within a system will yield an index of "design sophistication" of that package. The method was applied to a study of 12 subsystems of a ground-to-air guided missile.
T. G. R 7

18,644
Wingrove, R.C. & Coate, R.E. PILOTED SIMULATION STUDIES OF RE-ENTRY GUIDANCE AND CONTROL AT PARABOLIC VELOCITIES. Paper 61 195 1889, June 1961, 20pp. Institute of the Aerospace Sciences, New York, N.Y. (Ames Research Center, Moffett Field, Calif.).

18,644
The results of piloted simulation studies are presented and compared for two piloted re-entry guidance methods for controlling lifting vehicles through a planetary atmosphere to a desired touchdown point. One method continuously predicts from present conditions the remainder of the re-entry trajectory with trim conditions held constant, and the pilot judges what control inputs to apply from these predictions. The second method uses feedback control in combination with a predetermined fixed trajectory to guide the pilot in correcting trim conditions. Usable range, usable entry corridor, and pilot's time-tolerance to acceleration are compared for the two methods.
G. I. R 12

18,645
Hixson, W.C. & Niven, J.I. 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. Proj. MR005.13 6001, Subtask 1, Rep. 57, March 1961, 21pp. USN School of Aviation Medicine, Pensacola Air Station, Fla. & National Aeronautics and Space Administration, Washington, D.C.

18,645
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 developed for this concept is presented. The theoretical considerations involved in the use of the frequency response technique to analyze steady-state nystagmus response to simusoidal rotation are outlined along with a demonstration of an actual experimental procedure that can be used to quantify these relationships.
G. I. R 5

18,646
Wright, S. & Sleight, R.B. HOW CLOSE IS TOO CLOSE? 3pp. Applied Psychology Corporation, Arlington, Va. (Reprinted from: Traffic Safety, Sept. 1961).

18,646
A realistic approach to the question of how closely a driver should follow the car in front of his in order to combine both reasonable safety with reasonable speed is discussed. Present driving habits and advice presently given by various authorities are commented upon followed by discussions of the problems of 1) deciding on appropriate driving distances, and 2) estimating the distance when both cars are in motion. Some practical suggestions are offered in meeting both problems.
I.

18,647
Temple, T.R. INDUSTRIAL PSYCHOLOGY CONCERN PROBES WIDE RANGE OF PROBLEMS. June 28, 1961, 1p. The Evening Star, Washington, D.C.

18,647
A feature story is presented on the Applied Psychology Corporation of Arlington, Virginia. The range of problems dealt with by the company and also the type of personnel employed are discussed. A brief biography of the president and founder, Robert B. Sleight, is given.
I.

18,648
Thompson, John I. & Company, Washington, D.C. INDIVIDUAL ALUMINUM FEEDING CONTAINERS. PART II. (FINAL DESIGN) FEEDING CONTAINER ASSEMBLY FOR SPACE FLIGHT. Contract AF 33(616) 7080, Proj. 6373, Task 63121, WADD TR 60 522 (II), March 1961, 35pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio.

18,648
This report presents a system for an individual aluminum feeding container in which foods can be processed, stored, heated for serving, and for associated equipment for eating directly from the container. The components consist of a container, associated caps and seals, an expelling device, and a mouthpiece to transmit food from the container to the mouth. The system functions under zero gravity and withstands pressures and temperatures peculiar to space travel.
G. I. R 16

18,649
Loftus, J.P. & Hammer, Lois, R. WEIGHTLESSNESS AND PERFORMANCE. A REVIEW OF THE LITERATURE. Proj. 7184, Task 71585, ASD TR 61 166, June 1961, 34pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio.

18,649
The implications of weightlessness as encountered in space flight are discussed and the known research dealing with the psychological and physiological effects of zero gravity are critically reviewed. Topics are grouped under headings of orientation, psychomotor performance, and physiological functions, with a special section of methods of research. Major problem areas are discussed.
R 125

18,650
Graveline, D.E. & Barnard, G.W. PHYSIOLOGIC EFFECTS OF A HYPODYNAMIC ENVIRONMENT SHORT TERM STUDIES. Proj. 7222, Task 71745, WADD TR 61 257, March 1961, 11pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio.

18,650
By a technique involving complete immersion in water, a hypodynamic situation was produced in which normal weight sensations were altered and movement was relatively effortless. Four subjects were evaluated after 6, 12, and 24 hours of this environment. Tilt table, centrifuge, and heat chamber were made to investigate changes in cardiovascular functioning. Pertinent psychomotor evaluations, anthropometric measures, and urine and blood studies were also done. Inferences of the findings to the zero gravity environment were discussed.
T. G. I. R 5

18,651
Dreyer, J.F. FEASIBILITY STUDY AND DESIGN OF A SELF-ATTENUATING LIGHT VALVE. SUPERSEDES WADC TR 59 81. Contract AF 33(616) 6715, Proj. 7165, Task 71839, WADD TR 60 827, Feb. 1961, 20pp. USAF Life Support Systems, Lab., Wright-Patterson AFB, Ohio. (Polacoat Incorporated, Blue Ash, Ohio).

18,651
The principle of operation of a self-attenuating light valve composed of phototropic materials is described and its use as a protective device against the visible and ultraviolet radiation from an atomic flash or from the sun is evaluated. An estimate of its sensitivity is made by simple calculations of the energies involved. Some of the other practical considerations in the design of a valve employing the phototropic principle are discussed also. Additional information needed before such devices could be designed to provide complete eye protection under all operational conditions are listed.
T. G. R 14

18,652
Schwartz, N.F. A GAME THEORY APPARATUS FOR PSYCHOLOGICAL RESEARCH. Proj. 7183, Task 71618, ASD TR 61 239, July 1961, 6pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio.

18,652
An electrical apparatus designed to facilitate psychological research in games of strategy for game matrices no larger than three by three is described. Included are an operational procedure and an explanation of the circuitry with photographs of the equipment and simplified schemata. The apparatus provides push-button selection of matrix columns by one S and rows by his opponent who may be another S or the experimenter. These selections determine numerical payoff values of varying desirability. The conflict situation permits study of various aspects of human behavior such as strategy formation.
I.

18,653
Ormiston, D.W. A METHODOLOGICAL STUDY OF CONFINEMENT. Proj. 7184, Task 71582, WADD TR 61 258, March 1961, 21pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio.

18,653
Thirty-four Ss divided into two groups were individually confined for eight hours in a lighted five by eight ft. cubicule where they worked occasionally on tracking, monitoring, and time estimation tasks and noted somatic complaints. Visual illusion tests were administered before and after confinement. Another group of 20 Ss underwent all the tests but were not confined. A battery of personality tests were given to all Ss one to three months before the experiment. Correlations among the personality test scores, the changes in visual illusions, and the performance tasks were computed. The use of visual illusion changes as criterion measures of confinement stress and other methodological procedures were discussed.
T. G. R 12

18,654
Zeff, J.D., Neveril, R.B., Norell, M.W., Davidson, D.A., et al. STORAGE UNIT FOR WASTE MATERIALS. Contract AF 33(616) 6861, Proj. 6373, Task 63122, ASD TR 61 200, June 1961, 63pp. USAF Life Support Systems Lab., Wright-Patterson AFB, Ohio. (American Machine and Foundry Company, Niles, Ill.)

18,654
To provide basic design information and a laboratory model of a storage and/or disposal unit for handling wastes on space flights up to several days duration, a research program consisting of three phases was conducted. 1) An engineering evaluation of candidate methods for storage and for disposal of wastes was made. 2) A design study of a unit to service a two-man crew on a three-day mission was then completed. 3) The unit was fabricated and tested for feasibility. The results of all three phases were summarized herein.
T. G. I. R 8

18,655
Pigg, L.D. & Kama, W.N. THE EFFECT OF TRANSIENT WEIGHTLESSNESS ON VISUAL ACUITY. Proj. 7184, Task 71586, WADD TR 61 184, March 1961, 19pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio.

18,655
To determine the effects of sub- and zero g on visual acuity, Ss were exposed to short periods of weightlessness aboard an aircraft flown through "zero-g" trajectories involving transitions from one to two and one-half to zero g. Monocular and binocular acuity of near and far vision were measured on both Snellen and checkerboard targets during exposure. Control measurements were made on the ground and in flight at one g in counterbalanced sequence with the zero-g measurements.
G. I. R 4

18,656
McCormack, P.D. & Prysiazniuk, A.W. REACTION-TIME AND REGULARITY OF INTER-STIMULUS INTERVAL. Percept. Mot. Skills, 1961, 13, 15-18. (University of Manitoba, Winnipeg, Manitoba, Canada).

18,656
To determine the effects of degree of regularity of interstimulus interval on the established relation between reaction time and task duration, 24 Ss were required to depress a switch as fast as possible in response to the presentation of a light. Three conditions of interstimulus interval were used: 1) regular at 60-sec. intervals; 2) 30-, 45-, 60-, 75-, and 90-sec. intervals; and 3) 10-, 35-, 60-, 85-, and 110-sec. intervals. The length of the test period was 35 min. on each of three days. Reaction times were analyzed as functions of time on task, degree of regularity of stimulus presentation, and length of interstimulus interval.
T. G. R 7

18,657
Liberman, A.M., Harris, Katherine S., Kinney, Jo Ann S. & Lane, H. THE DISCRIMINATION OF RELATIVE ONSET-TIME OF THE COMPONENTS OF CERTAIN SPEECH AND NONSPEECH PATTERNS. J. exp. Psychol., May 1961, 61(5), 379-388. (Haskins Laboratories, New York, N.Y. & University of Connecticut, Storrs, Conn.).

18,657
To measure the discriminability of certain acoustic differences when they are cues for the perceived difference between phonemes and when they are entirely within a single phoneme category, and to compare the data with those obtained when essentially the same acoustic differences occur in nonspeech patterns, the speech sounds studied were synthetic approximations of syllables /do/ and /to/. The stimuli were first presented for identification by syllable name and then in ABX fashion with Ss instructed to decide whether the third stimulus (X) was identical with the first (A) or the second (B). The nonspeech stimuli were obtained by inverting the speech patterns on a frequency scale.
G. I. R 13

18,658
Krus, D.M., Wapner, S., Bergen, J. & Freeman, H. THE INFLUENCE OF PROGESTERONE ON BEHAVIORAL CHANGES INDUCED BY LYSERGIC ACID DIETHYLAMIDE (LSD-25) IN NORMAL MALES. Psychopharmacologia, 1961, 2, 177-184. (Clark University, Worcester, Mass.).

18,658
The influence of a steroid, progesterone, in altering the effects of lysergic acid diethylamide (LSD-25) on psychological behavior in 12 normal male humans was investigated. A test battery of 11 situations, sampling sensorimotor, perceptual, and conceptual behavior, was administered to each S under each of four conditions: placebo, progesterone, LSD, and progesterone preceding LSD. Data were treated by computing a separate analysis of variance for each test. Necessary research steps yet to be taken were outlined.
T. R 7

18,659
Langer, J., Wapner, S. & Werner, H. THE EFFECT OF DANGER UPON THE EXPERIENCE OF TIME. Amer. J. Psychol., March 1961, 74(1), 94-97. (Clark University, Worcester, Mass.)

18,659
To determine whether the space-time interrelationship is obtained when psychological space alone is changed, 16 Ss were required to judge a specific time interval while being moved toward and away from a precipitous edge. The presence of danger was used as the experimental condition; no-danger was movement away while danger constituted movement toward the edge. Two distances were used: 20 and 15 ft. The S wore a blindfold which he was required to raise before each trial; his task was to press a button at five-sec. intervals during each trial. Time judgments were analyzed for effect of danger (change in psychological space).
T. I. R 3

18,660
Loeb, M. & Hawkes, G.R. THE EFFECT OF RISE AND DECAY TIME ON VIGILANCE FOR WEAK AUDITORY AND CUTANEOUS STIMULI. USAMRL Proj. 6X95 25 001, Task 02, Rep. 491, Aug. 1961, 11pp. USA Medical Research Lab., Fort Knox, Ky.

18,660
To determine the influence of rate of stimulus onset and decay on vigilance for very weak auditory or cutaneous stimuli, 24 Ss were asked to respond to the presence of the signal by pressing a key. Electrical cutaneous signals of an intensity 1.2 db sensation level (perceived as very weak but rarely missed under alerted conditions) and broad-band auditory signals of a subjectively equal intensity and of 0.5-sec. duration were administered with varied interstimulus intervals (30, 45, 60, 75, 90, 105, 120 sec.). Reaction times, errors of omission, and false responses were analyzed as affected by time on task, rate of stimulus onset, and decay. Modality differences were discussed.
T. G. R 17

18,661
Hecker, C.J. PILOT INSTRUMENTATION FOR VEHICLE CONTROL IN NEAR SPACE. Presented at: SAE National Aeronautic Meeting, New York, N.Y., April 5-8, 1960, Rep. 173C, 8pp. Society of Automotive Engineers, Inc., New York, N.Y. (Sperry Gyroscope Company, Great Neck, N.Y.).

18,661
A typical profile of a near space flight is examined in its various aspects and considered in terms of the tasks the pilot must perform and the instrumentation needed for vehicle control.
G. I.

18,662
MacDonald, J.A. HUMAN ENGINEERING PAYOFF. Presented at: SAE National Aeronautic Meeting, New York, N.Y., April 5-8, 1960, Rep. 173B, 7pp. Society of Automotive Engineers, Inc., New York, N.Y. (USAF Aircraft Lab., Wright-Patterson AFB, Ohio).

18,662
Some of the gains in aeronautics that can be attributed to Human Engineering efforts in the past few years are discussed informally. The areas dealt with specifically are escape systems and components, restraint, sealants, vision, and crew station design and arrangement. Some expectations for future developments are mentioned.
I.

18,663
Lowrey, R.O. & Ray, J.T. HUMAN FACTORS OF THE LUNAR LOGISTICS MISSION. Presented at: SAE International Congress and Exposition of Automotive Engineering, Detroit, Mich., Jan. 9-13, 1961, Rep. 302C, 36pp. Society of Automotive Engineers, Inc., New York, N.Y. (Lockheed Aircraft Corp., Marietta, Ga.).

18,663
This paper is one in a series based on "Project Moonbeam—A 10,000-lb. Payload Lunar Vehicle." The area of human factors is considered from the standpoint of the requirements for providing man an acceptable environment within the vehicle and whether these requirements can be met by 1970. The major headings and contents of this paper are as follows: 1) physiological factors—conditions necessary to support man and maintain his well-being; 2) psychological factors—probable trouble areas; and 3) unusual hazards—radiation, meteoroids, and emergency escape system.
T. G. I. R 25

18,664
Wilson, R.B. MAINTAINING THE CONFIDENCE OF THE SPACE CREW IN THEIR LIFE SUPPORT SYSTEM. Presented at: SAE National Aeronautic Meeting, Los Angeles, Calif., Oct. 10-14, 1960, Rep. 244B, 16pp. Society of Automotive Engineers, Inc., New York, N.Y. (Convair (Astronautics) Div., General Dynamics Corporation, San Diego, Calif.).

18,664
Detailed data on environmental parameters that must be controlled to maintain healthful conditions in a satellite cabin are presented. A display design that will indicate the condition of these parameters is proposed and suggestions are made for instrumentation design. Ways and means of verifying the validity of the displays are discussed. Emergency backup for the environmental parameters is also provided.
T. I. R 28

18,665
Morris, D.B. HUMAN FACTORS CRITERIA IN MANNED ANTISUBMARINE WEAPON SYSTEMS. Presented at: SAE National Aeronautic Meeting, Los Angeles, Calif., Oct. 10-14, 1960, Rep. 244D, 9pp. Society of Automotive Engineers, Inc., New York, N.Y. (Norair Div., Northrop Corporation, Hawthorne, Calif.).

18,665
The human engineering aspects of Anti-Submarine Weapon combat systems are discussed with specific attention to manned airborne systems and projected future designs. Requirements of the aircrew team such as design of tactical display data, vision adequacy, and aircrew workstation design are presented. Basic human engineering criteria that should be evident in the system are discussed.
I. R 6

18,666
Wade, E.A., Janke, Leota L., Stern, R.M. & Lipsitt, P.D. VIGILANCE, FATIGUE AND STRESS IN AIR SURVEILLANCE (SAGE). Contract AF 19(604) 5503, ESD TR 61 26, June 1961, 187pp. Institute for Psychological Research, Tufts University, Medford, Mass.

18,666
Literature bearing upon the performance of human monitors in air-surveillance systems is surveyed. Studies of vigilance, visual search, monitoring, fatigue, and stress are reviewed for implications relating to long-term monitoring behavior. Display, signal, procedural, and operator variables are treated separately. Both visual and systemic fatigue and task-induced environmental and personal stresses encountered by the operator are studied. The data are related to operator duties in the SAGE system. Recommendations are made for improving and assuring the continued efficiency of human watchkeepers.
R 250 (approx.)

18,667
Hornick, R.J., Boettcher, C.A. & Simons, A.K. THE EFFECT OF LOW FREQUENCY, HIGH AMPLITUDE, WHOLE BODY, LONGITUDINAL AND TRANSVERSE VIBRATION UPON HUMAN PERFORMANCE. FINAL REPORT. Contract DA 11 022 509 ORD 3300, Proj. TE1 1000, July 1961, 54pp. Bostrom Research Laboratories, Bostrom Corporation, Milwaukee, Wisc.

18,667
Two experiments were conducted to determine the effects of horizontal (transverse and longitudinal) vibration upon the seated human being. Such vibration is typically found in ground vehicles. For transverse vibration frequencies from 1.5 to 5.5 cps with intensities of 0.15, 0.25, and 0.35 g were used; for longitudinal vibration the same frequencies with intensities of 0.15, 0.25, and 0.30 g were used. Measures of compensatory tracking ability, choice reaction time, foot pressure constancy, peripheral vision, visual acuity, body equilibrium, bodily transmissibility, oxygen consumption, breathing rate, and total ventilation were taken before, during, and after vibration for two different groups of 20 Ss each.
T. G. I. R 18

18,668
Kidd, J.S. & Briggs, G.E. DEVELOPMENT OF SYSTEMS RESEARCH AND DESIGN METHODOLOGY. FINAL REPORT. Contract AF 33(616) 6166, Proj. 60(8 7184), RF Proj. 894, May 1961, 28pp. Ohio State University Research Foundation, Columbus, Ohio.

18,668
This final report, stemming from a research study of systems research and design methodology, consists of brief summaries of 18 experiments and papers produced during 1959 to 1961. Work not yet completed is described in summary form. A brief history of the research, which was initiated in 1952, is included.
T. R 18

18,669
Hanson, H.F. PHYSIOLOGICAL RESPONSE CHANGES OF MEN ATTRIBUTED TO BODY ARMOR, SUN, AND WORK IN A NATURAL DESERT ENVIRONMENT (INCLUDING NEGRO-WHITE DIFFERENCES). Proj. 7X83 01 009, Tech. Rep. EP 148, June 1961, 20pp. USA Environmental Protection Research Div., QM Research & Engineering Center, Natick, Mass.

18,669
Sweat production, rectal temperature, and pulse rate were measured over a 24-consecutive-day period on 16 men (both white and Negro) in both a natural and a modified (shaded) desert environment. These indices were used to determine the effect of wearing body armor in both sun and shade and while exercising. The physiological responses of paired Negro-white Ss were compared for differences in heat tolerance.
T. R 7

18,670
Woodcock, A.H. MOISTURE PERMEABILITY INDEX - A NEW INDEX FOR DESCRIBING EVAPORATIVE HEAT TRANSFER THROUGH FABRIC SYSTEMS. Proj. Ref. 7X83 01 009, Tech. Rep. EP 149, June 1961, 12pp. USA Environmental Protection Research Div., QM Research & Engineering Center, Natick, Mass.

18,670
From theoretical considerations a new clothing parameter, moisture permeability index, has been developed. The existing "clo" formula relating dry clothing insulation and ambient temperature to man's heat loss has been extended to include evaporative heat transfer. This extension indicates a range over which the clothed man may maintain thermal equilibrium. This concept of range applies in all types of environments and thus one theory is applicable to hot, temperate, and cold environments. The theory also indicates the limitations of sweat evaporation as a cooling mechanism. The method for measuring the index is described.
T. G. I. R 9

18,671
Friede, R.L. THE PATHOLOGY AND MECHANICS OF EXPERIMENTAL CEREBRAL CONCUSSION. Proj. 7231, Task 71786, WADD TR 61 256, March 1961, 19pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio.

18,671
Two experimental series were conducted on cats. The first related the histopathology of concussion to the symptoms and mechanical forces involved; the second analyzed the mechanics of concussion. Cats, with heads suitably geared, were rendered unconscious by a pneumatic hammer blow. Eight days later they were killed; paraffin and frozen sections were cut from relevant brain sites and analyzed for cell change, fiber damage, and other complications resulting from the blow. In the second series, experimental concussion was obtained without cortical damage by cervical stretch. Mechanical factors were analyzed individually: subluxation of the odontoid process, herniation of the medulla into the foramen occipitale, rotation, and flexion or extension. T. G. I. R 43

18,672
Fried, C. & Gibson, R.S. HANDBOOK OF COLOR NOTATION SYSTEMS. Proj. TB 1 1000, Tech. Memo. 10 61, Sept. 1961, 177pp. USA Ordnance Human Engineering Labs., Aberdeen Proving Ground, Md.

18,672
The CIE Chromaticity Coordinates are given for five systems of color designations: Munsell, Ostwald, Textile Color Card Association, and USA Color Card, Federal Specification TT-C-595, and Commercial Standard CS 1947-47. Munsell renotations for a sixth system, the Inter-Society Color Council-National Bureau of Standard (ISCC-NBS) Color Name Blocks, also are presented. For the five systems with CIE values a cross-reference table is included.
T. R 5

18,673
Melching, W.H., Reid, J.B. & Kaplan, S.J. AN INVESTIGATION OF CONCEPT FORMATION IN TRANSFER OF TRAINING. Proj. 21 3501 0003, Rep. 13, Dec. 1954, 11pp. USAF School of Aviation Medicine, Brooks AFB, Tex. (Radiobiological Lab., University of Texas, Austin, Tex.).

18,673
The method of solution used by monkeys in a series of visual discriminations was evaluated. The 32 Macaca rhesus monkeys were presented with pairs of stimuli which they were required to discriminate on the basis of one member of the pair being more "whole" or "complete" (positive stimulus). Learning was established for each pair singly and combined. In the second part of the study 18 of the monkeys were given pairs with: one positive, one negative; two positives; or two negative stimuli. The rate of learning of succeeding pairs in part one and the subsequent performance in part two were given several interpretations (e.g., learning, set, transfer).
T. G. I. R 28

18,674
Lewis, D. DEVICES FOR STUDYING INTERFERENCE IN PSYCHOMOTOR PERFORMANCE: III. THE DOUBLE-DISK PURSUIT APPARATUS. Contract N5ORI 57, SDC Proj. 20 M 1, SDC TR 57 2 13, ca. 1950, 18pp. USN Special Devices Center, Port Washington, N.Y. (State University of Iowa, Iowa City, Iowa).

18,674
The aim was to induce a decrement in rotary pursuit performance following interpolated practice. Three increasingly complex pursuit devices: Koerth-type rotor and two models of the Double-Disk Pursuit Apparatus (the second provided a variable pursuit pattern) were employed to this end. In general the interpolated tasks required performance in reverse of the original. Time-on-target was the measure of performance. Means for all Ss on each trial in the three blocks of trials (original, interpolated, and relearning) were presented for each device.
G. I. R 6

18,676
Travis, R.C. MEASUREMENT OF ACCOMMODATION AND CONVERGENCE TIME AS PART OF A COMPLEX VISUAL ADJUSTMENT. Contract W33 038 AC 14559, Rep. 2, May 1947, 20pp. Tufts University, Medford, Mass.

18,676
Accommodation and convergence time of 50 college students were measured in five experimental situations (two trials of ten fixations for each): left eye, right eye, both eyes, near stimuli only, and far stimuli only. S focused the stimulus, reported the number beside the break in the circle, operated the lever to expose the next stimulus--all as quickly as possible. The data were obtained from the successive refixations of near and far, all near, or all far stimuli. Means, standard deviations, ranges, and reliability coefficients were computed. Two additional studies were carried out: 1) on the effects of practice; and 2) on the separate roles of acuity, perceptual speed, and motor speed in the above experimental task.
T. G. R 16

18,677
Kappauf, W.E., Smith, W.M. & Bray, C.W. A METHODOLOGICAL STUDY OF DIAL READING. APPENDIX I. Contract W 33 038 AC 14480, Rep. 3, Aug. 1947, 42pp. Dept. of Psychology, Princeton University, Princeton, N.J. (University of Illinois, Urbana, Ill.).

18,677
A procedure for testing dial reading accuracy was developed. It consisted of simultaneous presentation of 12 dials and scoring of the dial reading performance in terms of errors and average time. Six Ss were used to test the procedure in a preliminary study of dial size, design, reading attitude, S differences, and practice effects. Sizes were 2.8, 1.4, and 0.7 in. diameter; graduation was by tens, fives, and units; all scales were 0 to 100. Analysis of the time and error data was aimed at improvements in procedure.
T. G. I. R 8

18,678
Williams, S.J., Moyer, R.A. & Forbes, T.W. (Chm.). HIGHWAY SAFETY RESEARCH CORRELATION CONFERENCE. WASHINGTON, D.C., JUNE 5-6, 1952. 6pp. National Academy of Sciences-National Research Council, Washington, D.C.

18,678
The results of a conference aimed at formulating an interdisciplinary outline of a broad research program on human factors in relation to physical factors of the vehicle and the highway as causes of traffic accidents were reported. The topics discussed included: driver attitudes, motivation, and competence; visual requirements; vehicle and highway design.

18,679
USN Special Devices Center. BIBLIOGRAPHY OF HUMAN ENGINEERING REPORTS. NAVEXOS P 530 B, Rev. Nov. 1950, 13pp. USN Special Devices Center, Port Washington, N.Y.

18,679
This bibliography categorizes the entries broadly into the following topics and subtopics: learning--training methods, mass training, criterion studies; motor skills--general, positioning reactions, transfer; perception--general, vision, auditions; voice communications--general, speech intelligibility, measurement, training; extreme environmental factors; systems analysis--surface, subsurface, aircraft, airships, radar equipment; controls and displays--general, displays, controls; training devices--general, gunnery, flight; research tools; human engineering in general.
R 275 (approx.)

18,680
Lewis, D., Smith, P.N. & McAllister, Dorothy E. RETROACTIVE FACILITATION AND INTERFERENCE IN PERFORMANCE ON THE MODIFIED TWO-HAND COORDINATOR. Contract NONR 166(00), Proj. NR 783 002, SDC Proj. 20 M LE, SDC TR 166 00 2, Dec. 1951, 19pp. USN Special Devices Center, Port Washington, N.Y. (State University of Iowa, Iowa City, Iowa).

18,680
This study was concerned with the retroactive effects of different levels of interpolated learning in the performance on the Modified Two-Hand Coordinator. Six groups of ten Ss (female) were trained in the standard coordinator task to a given performance level; five then received practice on the reversed task until each had attained a different proficiency level; the sixth served as control. Relearning was the same for all groups. Three measures of performance were obtained: time on target (sec.), number of errors, and persistence of errors (sec.). These were examined by simple analyses of variance.
T. G. I. R 6

18,681
Hamilton, C.E. & Blackwell, H.R. THE EFFECT OF AN HORIZON-LINE LUMINANCE GRADIENT UPON TARGET DETECTABILITY IN ITS VICINITY. FINAL REPORT. Contract NOBS 72038, Rep. 2455 8 F, April 1957, 41pp. Vision Research Labs., Engineering Research Institute, University of Michigan, Ann Arbor, Mich. (Institute for Research in Vision, Ohio State University, Columbus, Ohio).

18,681
This report summarized three series of experiments concerned with the effects of an horizon-line luminance gradient upon the detectability of targets in its vicinity. Targets were viewed foveally against nonuniform background fields of photopic luminances, peripherally against nonuniform fields of scotopic luminances, and against uniform fields which ranged from photopic to scotopic. Trained Ss of 20/20 acuity observed. Viewing was binocular and unrestricted. Targets were one-sec. duration. The temporal forced-choice procedure was used. A "considerable range" of target sizes and shapes and background luminances were tested. The discussion included a detailed analysis based on the veiling luminance concept.
T. G. I. R 3

18,682
McKiernan-Terry Corporation, Dover, N.J. FEASIBILITY AND DESIGN STUDY FOR AN ADVANCED HUMAN ENVIRONMENTAL RESEARCH ACCELERATOR. Contract AF 33(616) 6538, Proj. 7222, Task 71746, WADD TR 60 225, March 1960, 494pp. USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio.

18,682
Engineering problems inherent in the design of a high performance acceleration research device capable of producing controlled high levels of centripetal acceleration and linear and rotary motion of a payload about various axes were analyzed. Combinations of acceleration parameters, e.g., acceleration level, rate of change of acceleration, radius of rotation, payload mass, were examined for engineering feasibility. All important aspects of the accelerator concept, e.g., arm strength, gimbal mechanisms, capsule layout, were considered. Finally, specifications for accelerators having optimum performance were set forth.
T. G. I. R 47 (approx.)

18,683
Harris, Katherine S., Liberman, A.M. & Eimas, P. AUDITORY SIGNALING: ABSOLUTE IDENTIFICATION AND DISCRIMINATION OF SPEECH AND NON-SPEECH SOUNDS. FINAL REPORT. Contract AF 19(604) 2285, ESD TR 61 30, July 1961, 41pp. USAF Electronic Systems Div., Bedford, Mass. (Haskins Laboratories, New York, N.Y.).

18,683
This report was a general summary of four studies concerned with the relation between phoneme labelling and discrimination. In the first, the relationship for the consonant distinction /d, t/ was studied in both a speech and nonspeech (inverted pattern) context. In the second, the distinction between /b/ and /p/ in intervocalic position (in rabid and rapid) was studied using noise bursts as the control. Next the discrimination-identification relationship of synthetic vowels was compared to that of consonants. Lastly, the consonant distinction between slit and split was examined. The results were discussed in terms of phoneme classes and boundaries.
G. R 25

18,684
Wapner, S., Werner, H. & Comalli, P.E., Jr. PERCEPTION OF PART-WHOLE RELATIONSHIPS IN MIDDLE AND OLD AGE. J. Geront., Oct. 1960, 15(4), 412-416. (Department of Psychology & Institute of Human Development, Clark University, Worcester, Mass.).

18,684
Changes in the perception of part-whole relations for the age group 20 to 80 were examined using the Müller-Lyer and Titchener Circles illusions; also, these changes were compared to those obtained for the age group 6 to 20 in an earlier study. Ss were 100 males, ten in each of seven age groups: 20 to 24, 25 to 29, etc. For the Müller-Lyer, Ss adjusted one part of the pattern to apparent equality; for the Titchener Circles, Ss judged one center circle as larger, equal, or smaller than a second. The differences among age groups were evaluated by analyses of variance. These and the earlier findings were discussed in terms of the developmental concepts, differentiation, and hierarchic integration.
T. G. I. R 13

18,685
Losee, J.E., Payfer, G.E., Frahm, W.F. & Eisenberg, B. METHODS FOR COMPUTING MANPOWER REQUIREMENTS FOR WEAPON SYSTEMS UNDER DEVELOPMENT. Contract AF 33(616) 6978, Proj. 7190 71623, ASD TR 61 361, Aug. 1961, 163pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio. (Republic Aviation Corporation, Farmingdale, N.Y.).

18,685
A systematized method for accurate and comprehensive prediction of manpower requirements for new weapons systems has been developed. It includes an integration of such requirements for maintenance, operational readiness, training, and personnel, and is adaptable to data-processing techniques. The first part of the report is a procedures and training manual for the Air Force and industry; the second describes and presents solutions to problems and variables associated with frequency of operations, sharing of tasks, etc.; the appendices include computational problems and explanations.
T. G. R 70 (approx.)

18,686
Garfinkle, D.R. SOME FIELD EXPERIENCES OF THREE TRACKING OPERATORS. Contract N123(60530) 23558A, Rep. 61 34, Biotechnology Lab. Tech. Note 23, June 1961, 8pp. Department of Engineering, University of California, Los Angeles, Calif.

18,686
The objective here was to determine the degree of transfer in tracking proficiency under actual range tracking conditions when training had been on a tracking simulator. Three male Ss participated; they were given the same training as any new tracker. They were then assigned to a variety of tracking situations at different field stations; they also performed related duties. A number of specific problems associated with range tracking were identified and discussed together with the effects of the simulator training.

18,687
Galler, S.R. RELEVANCE OF BIOLOGICAL ORIENTATION RESEARCH TO THE FIELD OF BIO-ASTRONAUTICS. Aerospace Medicine, June 1961, 32, 535-540.

18,687
The paper presented a report from the Panel on Biological Orientation and Navigation of the Armed Forces-National Research Council Committee on Bio-Astronautics. A concerted effort was made during the Panel's deliberations to seek out and evaluate biological orientation systems research in terms of its relevance to bio-astronautics. The discussion was presented within the framework of three categories: 1) the performance of integrated systems resulting in migration and homing behavior, 2) biological clocks and animal rhythms--examples of supporting systems, and 3) a description of essential components required in the functioning of systems of orientation. Recommendations for future research were included.

18,688
Garren, J.F., Jr. EFFECTS OF GYROSCOPIC CROSS COUPLING BETWEEN PITCH AND YAW ON THE HANDLING QUALITIES OF VTOL AIRCRAFT. NASA TN D 973, Nov. 1961, 21pp. National Aeronautics and Space Administration, Washington, D.C. (USAF Langley Research Center, Langley AFB, Va.).

18,688
The effects of gyroscopic cross coupling between pitch and yaw on the handling of VTOL were investigated. Pilots, using a variable-stability helicopter--were required to yaw the craft through a heading change of 90 degrees onto a preselected target while hovering at an altitude of approximately 50 ft. for various combinations of longitudinal control power, angular velocity about the yaw axis and simulated engine angular momentum. Their ratings of controllability then were obtained. The effect of longitudinal damping on coupling controllability was determined theoretically using simulator data. Satisfactory conditions of cross coupling were indicated.
T. G. R 4

18,689
Gaylord, R.H. & Knetz, W.J. OPERATIONAL ANALYSES OF THE NAVAL PERSONNEL SYSTEM: PART II. DEVELOPMENT AND TESTING OF A MACHINE SIMULATION OF PERSONNEL OPERATIONS. Contract NONR 2872(00), Rep. AIR C3 60 FR 232, July 1961, 137pp. American Institute for Research, Washington, D.C.

18,689
The present phase of the research was concerned with adapting the mathematical model developed earlier to a machine simulation of personnel operations. The model thus evolved had the following characteristics: it provided for distinction between directly controllable variables and actuarial factors, and it insured the complex interaction of variables and the manipulation of many types of policy. The model then was applied to a sample of empirical data to test its fidelity. Also, the usefulness of the model in evaluating potential changes in policy was illustrated. Some research recommendations were set down.
T. G. I.

18,690
Gibbs, C.B. FUNCTION OF LIMB TREMOR. Nature, May 1961, 190(4775), p.540. (Defence Research Medical Labs., Toronto, Ontario, Canada).

18,690
An hypothesis concerning the biological function of limb tremor in the frequency range of 6 to 15 cps was examined. Six Ss controlled a "follower" spot of light on a crt by moving a joystick until it was coincident with the target. The records of limb movement were analyzed for relationships between this function and three states of the controlling limbs at rest, while making rapid gross movements, and while making fine secondary movements. The results were interpreted in terms of mechanical servo-systems.
R 2

18,691
Gogel, W.C. CONVERGENCE AS A DETERMINER OF PERCEIVED ABSOLUTE SIZE. Proj. 6X95 25 001, Task 01, Rep. 489, Aug. 1961, 16pp. USA Medical Research Lab., Fort Knox, Ky.

18,691
The possible relation between absolute convergence and perceived absolute size was studied. Twelve Ss made four kinesthetic judgments of the size of a stereoscopically generated object (by adjusting the lateral distance between two rods to duplicate the apparent size of the object) presented at each of five convergence values: 24, 78, 132, 186, and 240 min. of arc (accommodation was held constant). Size judgments were also made under conditions of increased visual cues; and, finally, visual and kinesthetic size judgments were compared. The kinesthetic data were examined by analysis of variance. Other comparisons of the data were made graphically.
T. G. I. R 13

18,692
Gogel, W.C. THE EFFECT OF CONVERGENCE ON PERCEIVED SIZE AND DISTANCE. Proj. 6X95 25 001, Task 01, Rep. 499, Aug. 1961, 14pp. USA Medical Research Lab., Fort Knox, Ky.

18,692
The possible relation between absolute convergence and perceived absolute size and distance for a convergence range of 0 to 12 degrees was studied. Twelve Ss made four kinesthetic judgments of the size of a binocular object for each of five convergence values: 0, 3, 6, 9, and 12 degrees; also Ss made four distance judgments for the same convergence values of this object by estimating its apparent position in a monocular alley. The size and distance data were examined by analysis of variance technique. The findings were discussed in terms of the size-distance invariance hypothesis.
T. G. I. R 13

18,693
Gold, J. A UNIFIED SYSTEM FOR EVALUATION AND SELECTION OF HEAT STRESS CANDIDATES. Proj. 7163, Task 71820, ASD TR 61 272, July 1961, 9pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio. (Reprinted from: J. appl. Physiol., Jan. 1961, 16(1), 144-152).

18,693
A system for evaluation and selection of heat stress candidates was developed. Dissipation and the physiological price of heat were the two processes considered. Healthy adult males (61) were maintained at rest in thermistor underwear plus light flying suits in an all-weather room. Several temperature-humidity-time conditions were tested: 37 degrees C, 20 percent relative humidity, 3 hours; 54.4 degrees, 8 percent, 2 hours; 71.1 degrees, 4 percent (also 8.1 percent and 7 percent), 1 hour. Body heat storage was calculated by Burton's method of partitional calorimetry over successive short intervals of time. A new index of physiological strain using heart rate as the only parameter was constructed. Evaluation of heat stress candidates by these two measures was discussed briefly. T. G. R 17

18,694
Ernsting, J. INSPIRATORY FLOW PATTERNS IN SUBJECTS AT REST AND DURING SPEECH. FPRC 1144, Oct. 1960, 11pp. Flying Personnel Research Committee, London, England. (RAF Institute of Aviation Medicine, Farnborough, Hants, England).

18,694
The present study determined the effects of conversational levels of speech upon pulmonary ventilation and inspiratory flow patterns in Ss at rest. Eight males, 21 to 38 years, experienced in wearing breathing equipment, served as Ss. Pulmonary ventilation was recorded for two min. after the seated S had five min. rest and again for three min. following two min. of conversational level reading. The inspiratory flow pattern was measured similarly via a Fleisch flowmeter. Tidal volumes were calculated before, during, and after speech; inspiratory flow patterns were analyzed for peak and duration (mean and standard deviation were tabulated). The results were discussed in terms of oxygen equipment design.
T. G. I.

18,695
Ernsting, J. A PHYSIOLOGICAL ASSESSMENT OF THE PRINCIPLE OF PHASED DILUTION IN OXYGEN BREATHING SYSTEMS. FPRC 1145, Jan. 1961, 19pp. Flying Personnel Research Committee, London, England. (RAF Institute of Aviation Medicine, Farnborough, Hants, England).

18,695
A series of five experiments was conducted to compare the efficiency of two oxygen-breathing systems: a phased dilution system in which 100 percent oxygen is delivered at the beginning of each inspiration followed by air and a system in which equal amounts of oxygen and air are mixed before delivery. Four experienced males served as Ss. Oxyhemoglobin saturation and the pH of arterial blood were measured, and respiratory minute volume and frequency were recorded--all under a simulated altitude of 20,000 ft. Ten such measurements were obtained for each system. The comparison between systems was based on the mean arterial oxygen tension determinations plus several other respiratory calculations.
T. G. I. R 10

18,696
Evans, W.O. A COMPARISON OF THE ANALGETIC POTENCY OF SOME OPIATES AS MEASURED BY THE "FLINCH-JUMP" PROCEDURE. Proj. 6X95 25 001, Task 03, Rep. 494, Aug. 1961, 5pp. USA Medical Research Lab., Fort Knox, Ky.

18,696
The relative potency relationships of some opiates were measured by the "flinch-jump" procedure and compared to those reported by researches using relief of pain in man as the criterion measure. Ss were 36 hooded rats, each tested in a grid box. One-sec. electric shocks (0.1 to 3.4 Ma intensity) were administered in 14 series of ten each, one hour after injection of a drug (morphine, codeine, methadone, nalorphine, meperidine, and isotonic saline). Several doses of each were tested. The three categories of response were no response, flinch, and jump. The shock levels for flinch and for jump were determined, and the means and standard deviations of these thresholds were computed. Trend tests were performed on the dose-response curves and the ordinal relationships were tabulated. T. G. R 8

18,697
Fletcher, J.L. & Loeb, M. CONTRALATERAL THRESHOLD SHIFT AND REDUCTION IN TEMPORARY THRESHOLD SHIFT AS INDICES OF ACOUSTIC REFLEX ACTION. Proj. 6X95 25 001, Task 02, Rep. 490, Aug. 1961, 9pp. USA Medical Research Lab., Fort Knox, Ky.

18,697
"To relate threshold shift (TS) and temporary threshold shift (TTS) estimates of acoustic reflex activity and to determine the relative efficiency of narrow band noise and clicks as acoustic reflex eliciting stimuli using both the TS and TTS methods" were the aims of this investigation. The TS method involved measurement of threshold to a 500 cps tone before, during, and after contralateral stimulation by click (100, 110 db) and by noise (100 db); the TTS method measured thresholds for sweep frequencies from 250 to 8,000 cps before and after a series of gunshots. Sixteen Ss were used. TS results were examined by Wilcoxin T, TTS data by variance analysis, and relation between these by Pearson product-moment correlations.
T. G. R 10

18,698
Fletcher, J.L. PROLONGATION OF THE ACTION OF THE ACOUSTIC REFLEX. Proj. 6X95 25 001, Task 02, Rep. 496, July 1961, 4pp. USA Medical Research Lab., Fort Knox, Ky.

18,698
Clicks and narrow band noise acoustic reflex (AR) stimuli were compared in terms of their effectiveness in reducing temporary threshold shifts (TTS) of persons exposed to continuous noise. Of the seven experimental conditions investigated, four were to determine the TTS with or without stimulation of the opposite ear, two were to determine whether TTS reduction occurred when AR was elicited and prolonged together with continuous noise, and one was a control. Fourteen Ss served. The TTS data were examined by analysis of variance technique.
T. I. R 5

18,699
Flory, L.D. COMMUNICATION BETWEEN THE SCIENTIST AND THE MILITARY. ORO SP 75, Nov. 1958, 26pp. Operations Research Office, Johns Hopkins University, Baltimore, Md.

18,699
The present article is aimed at promoting better understanding and cooperation between the scientist and the military. This problem of perfecting communications between men of widely different environment, training, motivation, etc. is first discussed historically, as it developed out of the rapidly changing technology in the military sciences. Next the numerous administrative and organizational problems attending research are presented and exemplified. Finally, the conditions surrounding the civilian scientist in the military and the civilian scientist in research contracts with the military are examined and compared. Areas of misunderstanding are pointed up and some suggestions for improved relations are given.
R 18

18,700
Foley, P.J. INTERRELATIONSHIPS OF BACKGROUND AREA, TARGET AREA, AND TARGET LUMINANCE IN THEIR EFFECT ON THE CRITICAL FLICKER FREQUENCY OF THE HUMAN FOVEA. J. opt. Soc. Amer., July 1961, 51(7), 737-740. (Defence Research Medical Labs., Toronto, Ontario, Canada). (DRML Rep. 246 1).

18,700
The effects of background area, target area, and target luminance on the cff of the human fovea were investigated. Four experienced female Ss made three flicker judgments for each of 36 experimental conditions using a descending method of limits: three target sizes of 5, 10, and 20 min.; four background sizes of .5, 1, 2, and 4 degrees; and three target luminances of .32, 1.0, and 3.22 mL; background luminance was equal to the Talbot value of target luminance for that condition. An analysis of variance was carried out on the results. An index of spatial summation was derived and compared with other such indices for the fovea.
T. G. I. R 5

18,701
Foley, P.J. & Dewis, E.V.T. TACTUAL VERNIER-ACUITY. Amer. J. Psychol., March 1961, LXXIV, 61-66. (Defence Research Medical Labs., Toronto, Ontario, Canada). (DRML Rep. 212 10).

18,701
This study investigated tactual vernier-acuity (minimal perceptible displacement of one edge with respect to another continuous edge). Ss made determinations of "no displacement" between rods by adjusting their relative position after the experimenter's initial displacement setting. Three rod diameters (3.162, 6.337, 12.675 mm) and five separations between rods (0, 1, 3, 5, 7 mm) provided 15 experimental conditions. Six Ss made 12 determinations on each condition over three test sessions. The two performance indices were accuracy (difference between mean setting and physical equality) and precision (standard deviation about the point of subjective equality). These data were examined by analysis of variance techniques; the findings were compared to those of visual vernier-acuity. T. G. R 1

18,702
Frankenhaeuser, Marianne & Beckman, M. THE SUSCEPTIBILITY OF INTELLECTUAL FUNCTIONS TO A DEPRESSANT DRUG. Scand. J. Psychol., 1961, 2, 93-99. (University of Stockholm, Stockholm, Sweden & Laboratory of Aviation and Naval Medicine, Karolinska Institutet, Stockholm, Sweden).

18,702
This research investigated the effects of nitrous oxide on the performance of tests which measured verbal, numerical, inductive, and spatial factors. Specifically studied were relative susceptibility of these factors, relative susceptibility of male vs. female performance, and changes in speed and accuracy. Thirty-two Ss (16 male, 16 female) were tested under each of two conditions during inhalation of a nitrous oxide and a control mixture. Experimental vs. control and male vs. female performances were compared statistically by t-tests; means and standard deviations were included. Relative differences in susceptibility were tested by analysis of variance. Time and accuracy scores also were examined.
T. R 10

18,703
Wand, Barbara. FLEXIBILITY IN INTELLECTUAL PERFORMANCE. Contract NONR 694(00), Proj. NR 151 113, Ph.D. Thesis, April 1958, 142pp. Educational Testing Service, Princeton, N.J.

18,703
Individual differences in flexibility in problem-solving were investigated. The primary hypothesis was that such flexibility was different from ability. Tests of problem-solving flexibility were developed that paralleled the traditional mental abilities tests in content. These flexibility and ability tests plus personality and interest tests were administered to a group of high school students selected from college preparatory courses. Reliabilities were computed for most of the tests. The major relationships examined were: between the flexibility and ability tests, among the flexibility subtests, between these and other measures of flexibility, and between the flexibility and the personality and interest tests.
T. G. I. R 56

18,704
Collins, W.E. & Guedry, F.E., Jr. AROUSAL EFFECTS AND NYSTAGMUS DURING PROLONGED CONSTANT ANGULAR ACCELERATION. Proj. 6X95 25 001, Task 04, Rep. 500, Aug. 1961, 37pp. USA Medical Research Lab., Fort Knox, Ky.

18,704
The effect of mental task upon the vestibular nystagmus associated with prolonged angular acceleration was investigated. Horizontal eye movements were recorded on six Ss during two rates of rotary acceleration and deceleration for two arousal conditions: attending to sensation of rotation and performing continuous mental arithmetic. Slow-phase nystagmus velocity for five-sec. intervals was the basic datum. These and other findings were discussed to some extent and their role in evaluating vestibular function indicated.
T. G. I. R 33

18,705
Collins, W.E., Guedry, F.E., Jr. & Posner, J.B. CONTROL OF CALORIC NYSTAGMUS BY MANIPULATING AROUSAL AND VISUAL FIXATION DISTANCE. Proj. 6X95 25 001, Task 04, Rep. 485, Aug. 1961, 25pp. USA Medical Research Lab., Fort Knox, Ky.

18,705
The effects of arousal state and visual fixation distance on calorically induced vestibular nystagmus were studied. Horizontal eye movements of naive and experienced Ss were recorded during aural irrigation (30 degrees C for 40 sec.) under different conditions: arousal (alerting or relaxing instructions), fixation distance (30.5 cm, 1.63 m), and illumination (total darkness or room illumination). Duration of nystagmus and quality rating of nystagmus based on amplitude, frequency, and regularity were treated by analysis of variance technique. Also, the effect of the two arousal states were compared by t-test for the various conditions. The implications for the clinical situation were discussed.
T. G. I. R 25

18,706
Courtney, J., Davis, J.M. & Solomon, P. SENSORY DEPRIVATION: THE ROLE OF MOVEMENT. Percept. Mot. Skills, 1961, 13, 191-195. (Payne Whitney Clinic, New York, N.Y.).

18,706
The hypothesis that movement is an important variable in sensory deprivation was investigated. Experimental Ss performed a movement in which most of body musculature was exercised and control Ss a finger movement upon receipt of an air puff signal every few minutes. Each S was placed in the deprivation situation for a four-hour period. He lay on a bed with cardboard cuffs around arms and legs, white noise in earphones, and a homogeneous visual field (via translucent eye cups). After release S was given Freedman visual distortion test, Smith-Beecher Adjective Check List and Arithmetic Tests, Digit Symbol Test, and a standard interview. Differences in imagery, emotional responses, and cognitive impairment (as measured by above tests) were examined by the Mann Whitney test. T. R 13

18,707
Crane, H.L. & Sommer, R.W. EFFECTS OF CONTROL-FEEL CONFIGURATION ON AIRPLANE LONGITUDINAL CONTROL RESPONSE. NASA TN D 912, Oct. 1961, 33pp. National Aeronautics and Space Administration, Washington, D.C. (Langley Research Center, Langley Field, Va.).

18,707
This was a general study of longitudinal control-feel characteristics conducted in a transonic fighter airplane equipped with an electrohydraulic system with five sources of controllable variations: stick deflection, stick rate, airplane normal acceleration, pitching acceleration, and pitch velocity. Various combinations of the feel components from these sources were investigated in flight and analytically. Time histories and frequency response plots were presented and analyzed in terms of the military dynamic control-feel requirement. Design implications were noted.
T. G. I. R 10

18,708
Crist, B. A DEVICE FOR MEASURING THE SIZE AND SHAPE OF THE VISUAL FIELD DURING THE WEARING OF ARMY HEADGEAR. Proj. 7X95 01 001, Tech. Rep. EP 152, June 1961, 11pp. USA Environmental Protection Research Div., QM Research & Engineering Center, Natick, Mass.

18,708
The device basically is an enlarged perimeter modified so that the visual target could be controlled remotely by both S and experimenter and could be positioned anywhere within a hemisphere surrounding the head. It consists of three assemblies: the bow, the projector, and the position indicator. Details of these units, their construction, and operation are included.
I. R 1

18,709
Davis, J.M., McCourt, W.F., Courtney, J. & Solomon, P. SENSORY DEPRIVATION. THE ROLE OF SOCIAL ISOLATION. Arch. gen. Psychiat., July 1961, 5, 84-90. (Harvard Medical School, Boston, Mass.).

18,709
An experiment was conducted to assess the importance of social contact (permission of two Ss to converse) in the standard sensory deprivation situation. Two conditions were examined: when Ss were strangers (ten adult male students) and when they were married couples (11 students and their wives). Each pair was placed in adjoining tank-type respirators and told another S was present with whom they could converse. Testing time was ten and one-half hours unless release was requested. Digit Symbol Test and Beecher-Smith Adjective Checklist were administered before and after; the results were compared by Wilcoxon Sign-Rank. Interviews were conducted after; mental experiences were categorized and compared by Fisher Exact Test.
T. R 15

18,710
Davis, R., Sutherland, N.S. & Judd, B.R. INFORMATION CONTENT IN RECOGNITION AND RECALL. J. exp. Psychol., May 1961, 61(5), 422-429. (Oxford University, Oxford, England).

18,710
This experiment tested the hypothesis that the same amount of information is transmitted in recognition as in recall. Ss were 24 females, 18 to 25 years. Lists of 15 two-digit numbers or 15 two-letter syllables were presented on a memory drum which exposed each symbol for 1.5 sec. Four conditions were tested: recognition with 30, 60, and 90 symbol lists, and recall. Performance scores were converted to information scores for each S under each condition. These were evaluated by Wilcoxon's paired replicates method. Rank order correlations were also performed on the scores. The discussion of results included some information theory background relevant to the converted scores.
T. R 5

18,711
Ekman, G. & Herbert, A. A NOTE ON THE SUBJECTIVE SPEED OF MANUAL WORK. Contract AF 61(052) 300, Tech. Note 5, Rep. 87, Nov. 1960, 4pp. University of Stockholm, Stockholm, Sweden.

18,711
This preliminary investigation examined the subjective speed of work in three manual activities—dealing cards, shoveling gravel, packing—as a means of studying methodology for such complex judgments. Eighteen Ss estimated speeds of the filmed activities by the method of magnitude estimation. The 16 mm films were run at speeds from 15.3 to 20.7 frames/sec. Mean estimates were presented. Three interpretations were offered for the results.
T. G. R 3

18,712
Ekman, G. & Junge, K. PSYCHOPHYSICAL RELATIONS IN THE PERCEPTION OF VISUAL LENGTH, AREA AND VOLUME. Contract AF 61(052) 300, Tech. Note 3, Rep. 83, Oct. 1960, 13pp. University of Stockholm, Stockholm, Sweden.

18,712
Three experiments were conducted: 1) to investigate the stimulus-response relations for visually perceived length, area, and volume under standardized conditions; 2) to check the possible effect of stimulus range on these relations; 3) to investigate the stimulus-response relations for certain two-dimensional map symbols. Ss made estimates of the stimulus dimensions by the method of ratio estimation. Lines, squares, and cubes were among the stimulus figures. Scales values were computed from the ratio matrices; these were plotted against the objective values on log coordinates and fitted with power functions. Some comparisons with other data were made.
T. G. I. R 9

18,713
Ekman, G., Lindman, R. & William-Olsson, W. A PSYCHOPHYSICAL STUDY OF CARTOGRAPHIC SYMBOLS. Contract AF 61(052) 300, Tech. Note 6, Rep. 91, Feb. 1961, 13pp. University of Stockholm, Stockholm, Sweden.

18,713
In two experiments the subjective volume of certain cartographic symbols was studied by the method of magnitude estimation. The stimulus material consisted of several sets of cubes and spheres, drawn with perspective and shadow. The total range of stimulus "volume" was 1:3,500. Scale values were obtained by computing medians of estimates and power functions were fitted. A third experiment investigated perception of the volume and of area under stimulus conditions as nearly identical as possible using both the method of magnitude estimation and a method similar to category scaling. The data were analyzed for differences between volume and area perceptions.
T. G. I. R 12

18,714
Ely, J.H., Bowen, H.M. & Orlansky, J. MAN-MACHINE DYNAMICS. CHAPTER VII OF THE JOINT SERVICES HUMAN ENGINEERING GUIDE TO EQUIPMENT DESIGN. Contract AF 33(616) 419, Proj. 7180, Task 71501, WADC TR 57 582, Nov. 1957, 113pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio. (Dunlap and Associates, Inc., Stamford, Conn.).

18,714
This report discusses the factors which affect human performance in tracking and watchkeeping tasks. In the first part closed loop systems and human transfer functions are described. Part II is devoted to the important design factors in such systems: pursuit and compensatory displays, intermittency, machine dynamics, aided tracking, and quickening. The third part provides detailed information about human time lags and the factors affecting them. Finally, specific recommendations are set forth for minimizing performance decrement in such activities.
G. I. R 116

18,715
Chapanis, A. MEN, MACHINES, AND MODELS. Amer. Psychologist, 1961, 16(3), 113-131. (Johns Hopkins University, Baltimore, Md.).

18,715
The role of models in engineering psychology is discussed under three headings: definition, function, and limitation. In the first, definitions range from Webster's to those of operational research and the examples cited fall within and outside of these categories. The functions of models include help in seeing new and complex relationships, providing framework for experiments, and help in learning complex skills. The limitations or dangers include the invitation to overgeneralize and to commit a logical fallacy, and the assumption of incorrect constants.
T. G. I. R 40

18,716
Breckenridge, J.R. & Pratt, R.L. EFFECT OF CLOTHING COLOR ON SOLAR HEAT LOAD. Proj. 7X83 01 009, Tech. Rep. EP 155, June 1961, 11pp. USA Environmental Protection Research Div., QM Research & Engineering Center, Natick, Mass.

18,716
To determine how much heat stress caused by sunlight is affected by the shade and color of typical hot-weather uniforms, experiments were conducted in the desert in Yuma, Ariz. Acclimatized soldiers wearing black or white (first summer) and green or khaki (second summer) uniforms were exposed for three-hour periods seated either in the sun or shade. Determinations of sweat secretion and evaporation from nude and clothed weights before and after exposure and net water intake were the basis for calculation of solar heat loads. These latter figures were used for comparing the efficiency of the various uniforms.
T. I. R 9

18,717
Brown, C.R. & Rubenstein, H. TEST OF RESPONSE BIAS EXPLANATION OF WORD-FREQUENCY EFFECT. Science, Jan. 1961, 133(3448), 280-281. (USAF Operational Applications Office, Applications Research Branch, AFCCDD, Bedford, Mass.).

18,717
To determine the role of response bias in the word-frequency effect, observers identified monosyllabic words presented in noise. Two speech-to-noise ratios (0 and 10 db), and 13 word intervals (Large Magazine Count) were tested. Words were presented about every 10 sec.; a session lasted about one hour. Two mathematical equations, derived to predict word-frequency effect as a function of response interval, were used to interpret the results.
G. R 5

18,718
Byford, G.H. THE CONTACT LENS IN EYE MOVEMENTS RECORDING SYSTEM. FPRC Memo. 155, Dec. 1960, 17pp. Flying Personnel Research Committee, London, England. (RAF Institute of Aviation Medicine, Farnborough, Hants, England).

18,718
The fidelity of an eye movement recording system which utilizes a photoelectric transducer and a miniature electric lamp attached to a contact lens was investigated. Horizontal eye displacements of three Ss under conditions of steady state and optokinetic nystagmus were measured using three procedures: a traveling microscope focused on the eye or contact lens, a photoelectric recording system, and high speed cinematography. Direction and size of eye movement over a range extending to 18 degrees were examined for the fixation condition. Amplitude, overshoot, and mean velocity were analyzed for the nystagmus condition.
T. G. I. R 12

18,719
Chapanis, A. SOME CRITERION PROBLEMS IN HUMAN FACTORS RESEARCH. Contract NONR 248(55), Rep. 12, Aug. 1960, 35pp. Psychological Lab., Institute for Cooperative Research, Johns Hopkins University, Baltimore, Md.

18,719
This paper discusses the criteria by which human factors data are expressed and how this affects their use by systems engineers and operations analysts. Some examples are cited to illustrate that the conflicting criteria problem is at a minimum with these data. An equally important criterion which is seldomly met, that of realistic conditions for data-gathering, is also discussed with examples. The need for the human factors scientist to express his data in ways relevant to the systems engineer is emphasized.
G. I. R 15

18,720
Tennenbaum, S., Nerode, A., Mehlberg, Josephine & Myhill, J. FUNDAMENTAL CONCEPTS IN THE THEORY OF SYSTEMS. Contract AF 33(616) 2797, Proj. 7060, WADC TR 57 624, Nov. 1957, 137pp. USAF Aeronautical Research Lab., Wright-Patterson AFB, Ohio. (System Research, University of Chicago, Chicago, Ill.).

18,720
This report was a precise treatment of the basic aspects of theory of systems. The approaches to system problems accordingly presented constitute the different techniques which have been derived for systems analysis. The devices which were investigated and discussed included: digital processes, discrete linear mechanisms, continuous mechanisms, weighting functions and function spaces, finite automata, and the representation of events.
T. G. I. R 18

18,721
Chiles, W.D. & Adams, O.S. HUMAN PERFORMANCE AND THE WORK-REST SCHEDULE. Proj. 1710, Task 71582, ASD TR 61 270, July 1961, 6pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio. (Lockheed Aircraft Corporation, Marietta, Ga.).

18,721
This paper summarizes the results of studies concerned with the work-rest schedule for situations where personnel must be utilized maximally because they cannot be readily added or exchanged. The systems with such requirements are the advanced aerospace systems, e.g., earth orbiting satellites. The data are discussed in terms of several categories: sleep requirements--daily over-all and duration of minimum periods; work period duration--a function of type of task and attendant emotional environment, selection techniques, and preparation for such an atypical schedule.
R 16

18,722
Christal, R.E. & Madden, J.M. 'AIR FORCE RESEARCH ON JOB EVALUATION PROCEDURES. Proj. 7734, Task 17015, ASD TN 61 46, June 1961, 8pp. USAF Personnel Lab., Lackland AFB, Tex.

18,722
"This paper reviews present procedures in USAF job evaluation and outlines a program for improving methods of job evaluation. A short-term program, its results, and current applications are described in terms of 1) desirable rater characteristics, 2) desirable rating situations, and 3) desirable characteristics of rating factors and scales. The long-term program has the objective of making possible an accurate evaluation for every job-type in the USAF. A method is proposed for determining job-types. Problems of determining grade levels, of selecting factors to be rated, and of scaling and weighting judgments are considered."
R 15

18,723
Clark, L.V., Torre, J.P. & Gschwind, R.T. AN INVESTIGATION OF PORTABILITY PRINCIPLES FOR TWO-MAN LOADS AS APPLIED TO T201 MORTAR. DA Proj. 5W0101031, Tech. Memo. 16 61, Sept. 1961, 21pp. USA Ordnance Human Engineering Labs., Aberdeen Proving Ground, Md.

18,723
The factors which affect portability of potentially man-transportable loads (100 to 170 lbs.) were evaluated by applying them to a T201 Mortar System. These factors are: weight, load supported by muscle groups, position of center-of-mass in respect to center line of body, freedom of movement, and comfort. The three components of the morter were each transported by two-man teams about one-half mile over several kinds of terrain with and without the portability features--detachable stretcher and satchel-type handles. Twelve morter crew members served as Ss. Distance, rate of carry, and time and frequency of rest were measured. General recommendations were made.
T. G. I.

18,724
Cohen, A. THE EFFECT OF INSULATING THE PALM AND BACK OF HANDS ON FINGER COOLING. Proj. 7X83 01 009, Tech. Rep. EP 153, June 1961, 16pp. USA Environmental Protection Research Div., QM Research & Engineering Center, Natick, Mass.

18,724
Two studies were conducted: 1) to determine if added insulation on the dorsum and/or palm of the hand reduces the rate of finger-cooling, and 2) to systematically study the relationship between amount of dorsal insulation and finger-cooling rate. Three hand-cooling temperatures (20, 0, -20 degrees F) and four insulating conditions with and without dorsal and/or palmar pads were tested on eight male Ss for one and one-quarter hours per day for 12 days. Skin temperature was recorded for fingers, palm, and dorsum. A sign test analysis of differences between cooling rates was performed. In the second study dorsal pads of double thickness were also tested. Remaining conditions, procedures, and data analyses were similar or identical to those of the first study. T. G. I. R 5

18,725
Bell, J.H. INSTRUMENTATION FOR A STUDY OF TEMPORARY THRESHOLD SHIFTS CAUSED BY HIGH-INTENSITY ACOUSTIC TRANSIENTS. Contract DA 49 007 MD 985, Rep. 785, Jan. 1961, 47pp. Bolt Beranek and Newman Inc., Cambridge, Mass.

18,725
This report described the construction and operating characteristics of a flexible arbitrary function generator and a high-intensity earphone which were developed to facilitate the study of temporary threshold shifts caused by high-intensity acoustic transients. The generator, which could simulate the pressure-time characteristic of such stimuli, was described in terms of physical construction, performance specifications (e.g., stability, dynamic range), oscilloscope, photomultiplier tube, etc. Similarly appropriate details about the earphone also were presented.
G. I.

18,726
Baxter, J.R. & Day, R.H. AN INVESTIGATION OF DUTIES IN THE ELECTRA COCKPIT. ARL HE Note 9, March 1961, 25pp. Aeronautical Research Labs., Australian Defence Scientific Service, Melbourne, Australia. (Psychology Dept., University of Sydney, Sydney, Australia).

18,726
The data obtained from a questionnaire aimed at getting the opinions of Electra pilots on the flight procedures for ILS approach were discussed and analyzed. The questionnaire was based on inflight observations of the frequency and duration of duties performed by these crews during take-off and landing, and its items fell into three categories: pilot preference for one of the ILS systems, need for standardization and acceptance of it, and opinions about various details of the systems. The responses of 21 crews were obtained. A compromise system was suggested.
T. I.

18,727
Bevan, W. THE CONCEPT OF ADAPTATION IN MODERN PSYCHOLOGY. Contract NONR 3290(01), Proj. NR 142 155, Tech. Rep. 1, Sept. 1961, 17pp. Department of Psychology, Kansas State University, Manhattan, Kan.

18,727
This paper explores the meanings of adaptation through: an outline of the history of its use within psychology, a review of the types of phenomena with which it has been identified, and a discussion of the proposed underlying processes. The origin of the concept with the evolutionary biologist is examined and contrasted with psychologist's interpretation. The forms of psychological adaptation described include reduced responsivity, habituation, normative adaptation, and avoidance behavior. The adaptive mechanisms consider range from the peripheral process of an end-organ to central factors.
R 73

18,728
Bevan, W., Barker, H. & Pritchard, Joan F. THE NEWHALL SCALING METHOD, PSYCHOPHYSICAL BOWING, AND ADAPTATION LEVEL. Contract NONR 3290(01), Proj. NR 142 155, Tech. Rep. 2, Sept. 1961, 20pp. Kansas State University, Manhattan, Kan. (Mississippi Southern College, Hattiesburg, Miss.).

18,728
Four experiments were conducted: the first evaluated the Newhall spacing method for scaling lifted weights; the second examined the phenomena of bowing and hysteresis in the plots of these category data; the third and fourth were directed at modifications in experimental procedure to eliminate possible artifacts in the data. College students served as Ss. The series of seven weights (150 to 300 grams) were judged in pairs representing various combinations of spatial direction and intensitive change. Trend tests were performed on the data obtained under different conditions. Bowing was explained in terms of adaptation-level theory. The effects of ascending and descending orders were discussed.
G. R 8

18,729
Bevan, W., Reed, W.G. & Pritchard, Joan F. SINGLE-STIMULUS JUDGMENTS OF LOUDNESS AS A FUNCTION OF PRESENTATION INTERVAL. Contract NONR 3290(01), Proj. NR 142 155, Tech. Rep. 3, Sept. 1961, 9pp. Kansas State University, Manhattan, Kan. (Ohio State University, Columbus, Ohio).

18,729
This experiment was conducted: to determine the influence of presentation-interval upon the Indifference Point (IP) in loudness judgments with the single-stimulus method, to examine this relationship over a range of such intervals, and to explore the relationship of the interval to the effectiveness of anchors. Loud or soft intensity series of a 1,000 cps tone (55 to 75 db, 30 to 50 db) with anchors below or above and each of six intervals (2 to 64 sec.) between were judged by groups of female students using a rating scale variation of the single-stimulus method. Trend tests were performed on the IPs and the results discussed in terms of the pooling model of adaptation-level theory.
T. G. R 20

18,730
Bevan, W. & Pritchard, Joan F. THE ANCHOR EFFECT AND THE PROBLEM OF RELEVANCE IN THE JUDGMENT OF SHAPE. Contract NONR 3290(01), Proj. NR 142 155, Tech. Rep. 4, Sept. 1961, 18pp. Kansas State University, Manhattan, Kan.

18,730
These experiments were conducted to demonstrate an anchor effect in the judgment of shape, and to designate those properties of the anchor stimulus which make it effective. The stimuli (solid black) were a square and three rectangles and were presented in each of several orientations (e.g., vertical, horizontal) for one-half sec. at ten-sec. intervals. The anchor was first a rectangle, then a circle, then an ellipse, and in the final experiment a smaller, larger, or grey rectangle. Ss (120) judged departure from "squareness" of a series with (experimental groups) or without (controls) the anchors on a seven or more category scale. The medians of each S's judgments served as the basic data. All data were evaluated by the Alexander trend test.
G. R 16

18,731
Bishop, H.P. & Crook, M.N. ABSOLUTE IDENTIFICATION OF COLOR FOR TARGETS PRESENTED AGAINST WHITE AND COLORED BACKGROUNDS. Contract AF 33(616) 5087, Proj. 7184, Task 71560, WADD TR 60 611, March 1961, 42pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio. (Institute for Psychological Research, Tufts University, Medford, Mass.).

18,731
The number of stimulus colors which can be absolutely identified when viewed against various colored background was investigated. These stimulus colors were varied in luminance, purity, size, and shape. In addition, the effects of training and of a distracting task were studied. Experienced and naive Ss with normal vision participated in the various phases. The optical system allowed independent control of the target and background parameters. The results were discussed in terms of operational coding.
T. G. I. R 6

18,732
Adams, J.A. & Hufford, L.E. EFFECTS OF PROGRAMMED PERCEPTUAL TRAINING ON THE LEARNING OF CONTACT LANDING SKILLS. Contract N61339 297, NAVTRADEVCEN TR 297 3, April 1961, 84pp. USN Training Device Center, Port Washington, N.Y. (University of Illinois, Savoy, Ill.).

18,732
This experiment investigated the effect of "perceptual-verbal pretraining" on learning a contact landing task. After several hours classroom simulated instrument flight training, 30 Ss were divided into an experimental and control group. The former was given open-loop training, i.e., judged presentations of correct and incorrect landing patterns and identified the cause of errors. All Ss then performed a series of landing problems in the contact analog landing research tool in which their only task was to perceptually evaluate the display. Two error scores were tabulated for each leg of the landing patterns spatial and altitude. The error scores and terminal landing success percentages were examined by Type I analyses of variance and discussed considering transfer of training. T. G. I. R 32

18,733
Aliphin, W. BCD APPRAISALS OF LUMINAIRE BRIGHTNESS IN A SIMULATED OFFICE. Illum. Engng., Jan. 1961, LVI(1), 31-44.

18,733
This study investigated the meaningfulness of the concept, borderline between comfort and discomfort (BCD), to inexperienced observers in a realistic lighting situation. Each of 109 observers sat at a desk in a simulated office lighted by three rows of enclosed luminaires and adjusted the brightness to his BCD. Six lighting situations were tested; each varied as to the number and location of fixtures which were lighted. Each lighting situation was judged several times. Performance of several typical observers was presented graphically. Results were compared with existing glare factors, and data for checking glare prediction methods were presented.
T. G. I. R 8

18,734
Alper, M.E. WEIGHT VS RELIABILITY - A DESIGN CHOICE. Contract NASW 6, Tech. Rep. 32 110, Aug. 1961, 18pp. Jet Propulsion Lab., California Institute of Technology, Pasadena, Calif.

18,734
"Several aspects of the problem of choosing a design reliability for a subsystem whose weight varies in a determinable manner with design reliability are discussed. The choice of design reliability is shown to depend on the other subsystems which make up the system and on the type of program in which the system is used. A design procedure and philosophy are proposed."
T. G. R 3

18,735
Ambler, Rosalie K., Berkshire, J.R. & O'Connor, W.F. THE IDENTIFICATION OF POTENTIAL ASTRONAUTS. Proj. MR005.13 3003, Subtask 1, Rep. 33, June 1961, 8pp. USN School of Aviation Medicine, Pensacola Air Station, Fla.

18,735
The abilities and aptitudes of aviation trainees who volunteer for astronaut careers were compared with those of the Mercury Astronauts, the 31 from whom Astronauts were drawn, and the trainees who did not volunteer. Data were obtained on 1,209 students. Volunteers and nonvolunteers were compared on aptitude as measured by the Aviation Qualification Test (AQT) and Flight Aptitude Rating, preflight school grades, and losses from flight training. The differences were examined by t-tests. Intelligence (AQT scores) and mechanical ability were compared for the volunteers and the two Astronaut groups. The findings were related to the implementation of a high level selection program for space personnel.
T. R 5

18,736
Armstrong, H.G. (Ed.). AEROSPACE MEDICINE. 1961, 633pp. The Williams & Wilkins Company, Baltimore, Md.

18,736
This volume "examines, in detail, the medical problems of both civil and military aviation and astronautics," and is directed for use by three general groups: "the student and practioner of aerospace medicine, members of the general medical and dental profession, and those concerned with the design, construction, and operation of aircraft and manned space vehicles." The 32 chapters cover: historical background; physical examinations; flight environment, accidents, and diseases; and the medical problems of space flight.
T. G. I. R 500 (approx.)

18,737
Hitt, W.D., Abma, J., House, R., Mason, L., et al. USE OF THE BATTELLE AURAL READING DEVICE BY CHILDREN. PROGRESS REPORT. Grant B 2492(C1), June 1961, 33pp. Battelle Memorial Institute, Columbus, Ohio.

18,737
The three aims of this project were: to determine how well children could learn to use the Battelle aural reading device, to investigate the relative efficacy of selected direct-translation codes, and to improve the over-all design of the reader. The training phase tested the letter versus word method and massed versus spaced learning with elementary and high school children. The second study made an information analysis of printed letter shapes, a survey and screening of available codes, a simulation of codes by digital computer, and tested experimental designs. Finally, the components of the new model which were redesigned, improved, or otherwise modified were described. Future plans for the device and reading program were outlined.
T. G. I. R 1

18,738
Hodge, M.H., Piercy, Mary L. & Crawford, M.J. THE CONSTANT-RATIO RULE AND LIFTED WEIGHTS. Contract AF 19 (604) 7299, ESD TN 61 61, Scientific Rep. 1, June 1961, 16pp. Department of Psychology, University of Georgia, Athens, Ga.

18,738
This experiment tested the constant ratio rule (CRR), a model of choice behavior, with a single dimensional stimulus ensemble of lifted weights. Ss identified each of eight stimulus objects which ranged from 150 to 206 grams in eight gram steps. Sequences of 8, 4, and 2 weights were presented. Obtained and predicted response proportions were compared to evaluate the CRR. These data also were compared to those obtained from the auditory dimension to evaluate the generality of the model.
T. G. R 7

18,739
Horst, P. MATRIX ALGEBRA FOR SOCIAL SCIENTISTS. PART III. THE STRUCTURE OF A MATRIX. Contract NONR 477(08), Grant M 743(C6), Aug. 1961, 151pp. University of Washington, Seattle, Wash.

18,739
Part III deals with matrix structure and is one in a series "on notation, terminology, concepts, and computational procedures which have been found useful in the application of matrix algebra to multivariate experimental designs in the social and biological sciences." The five chapters which compose this part cover the following areas: orthogonal and orthonormal matrices--their definitions and properties; the rank of matrices--the basic matrix, products of matrices, product moments and sums of matrices; the processes for finding these ranks; the basic structure of a matrix; and the solution for the basic structure.
T. I.

18,740
Huebner, W.J., Jr. & Ryack, B.C. LINEAR PROGRAMMING AND WORKPLACE ARRANGEMENT: SOLUTION OF ASSIGNMENT PROBLEMS BY THE PRODUCT TECHNIQUE. Proj. 7183, Task 71619, WADD TR 61 143, March 1961, 21pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio.

18,740
The applicability of linear programming to work space assignment problems is demonstrated. The "product technique" method is developed to solve such problems. It is compared to other linear programming techniques and its advantages noted. Some modifications of this method are discussed.
T. I. R 4

18,741
Hall, A.W. & Harris, J.E. A SIMULATOR STUDY OF THE EFFECTIVENESS OF A PILOT'S INDICATOR WHICH COMBINED ANGLE OF ATTACK AND RATE OF CHANGE OF TOTAL PRESSURE AS APPLIED TO THE TAKE-OFF ROTATION AND CLIMBOUT OF A SUPERSONIC TRANSPORT. NASA TN D 948, Sept. 1961, 26pp. National Aeronautics and Space Administration, Washington, D.C. (USAF Langley Research Center, Langley AFB, Va.).

18,741
The effectiveness of a single instrument presentation for controlling rotation and climbout path in takeoff was examined. The instrument essentially was an angle-of-attack indicator biased with a total-pressure-rate input for suppressing phugoid oscillation. Linearized six-degree-of-freedom equations of motion were used to simulate the hypothetical supersonic transport. Several experienced pilots performed a number of simulated take-offs using conventional instruments and either an angle-of-attack indicator or the experimental instrument. Flight profiles for these two instrument conditions were compared, and comments of pilots were summarized.
T. G. I. R 4

18,742
Glascock, H.W., Jr. (Ed.). JOINT U.S. - CANADIAN CONFERENCE ON ENVIRONMENTAL PHYSIOLOGY. 9-10 NOVEMBER, 1960. Proj. 6X64 12 001, Rep. 474, Sept. 1961, 135pp. USA Medical Research Lab., Fort Knox, Ky.

18,742
This conference was for representatives of the National Defense Research Board of Canada and the USA Research Office to exchange information and ideas arising from their work in the area of military operations in cold environments. The research topics included: the ground soldier in a cold climate; the cooling effects of wind in a cold climate; comparison of responses to cold in Eskimos with Caucasians, Alacalufe Indians and Australian Aborigines; heat flow from the hands of Eskimos; laboratory versus field cold acclimitization; cold weather clothing; adrenalin and noradrenalin in cold adaptation; cold injury treatment.
T. G. I. R 4

18,743
Harbold, G.J. & O'Connor, W.F. EFFECTS OF VARYING MODE OF SIGNAL PRESENTATION ON HEARING THRESHOLDS OBTAINED WITH BEKESY-TYPE AUDIOMETER. Proj. MR005.13 2005, Subtask 1, Rep. 9, ca. 1959, 18pp. USN School of Aviation Medicine, Pensacola Air Station, Fla.

18,743
This was a systematic study of some of the characteristics of the Bekesy audiometer. All built-in stimulus variables were responded to in all combinations by 17 naval aviation cadets. The variables were speed (slow and fast); tone (steady and pulsed); and frequencies (ascending and descending). Mean hearing levels and their standard deviations were obtained. A six-dimensional (subjects, tones, ears, speed, pulse-steady, ascending-descending) analysis of variance was performed on these hearing levels as an aid in evaluating the instrument.
T. G. R 14

18,744
Harbold, G.J. & Greene, J.W. A FIELD STUDY OF THE EFFECTS OF EXPOSURE TO IMPULSE NOISE ON HEARING ACUITY. Proj. MR005.13 2005, Subtask 1, Rep. 11, May 1961, 24pp. USN School of Aviation Medicine, Pensacola Air Station, Fla.

18,744
Audiometric data on about 3,600 Navy and Marine Corps personnel were evaluated to determine the effects on hearing acuity of varying amounts and types of impulse noises from gunfire. In addition, the equipment and test procedures were evaluated. The data were obtained with the Automatic Audiometric Data System, a Bekesy-type audiometer, and a questionnaire. All possible comparisons were made among the pooled data from the various categories of subjects.
G. R 14

18,745
Harbold, G.J. & Greene, J.W. A STUDY OF THE EFFECTS OF GUNFIRE AND OTHER INFANTRY COMBAT TRAINING NOISES ON THE HEARING ACUITY OF U.S. MARINE CORPS RECRUITS. Proj. MR005.13 2005, Subtask 1, Rep. 10, May 1961, 20pp. USN School of Aviation Medicine, Pensacola Air Station, Fla.

18,745
Base line audiometric data were obtained with the Automatic Audiometric Data System (a group test with discrete frequencies using the Method of Single Descent) from about 1,000 Marine recruits at the beginning of their training and compared to retest data obtained at several stages of training following exposure to gunfire and other infantry noises. One group of Ss also was tested individually with a Bekesy-type audiometer; another group wore V51-R earplugs during the noise periods; in another TTS was measured; and one group served as control. Mean hearing levels and standard deviations were compared. Group testing limitations were indicated.
G. R 4

18,746
Hawkes, G.R. EFFECT OF SKIN TEMPERATURE ON THE ABSOLUTE THRESHOLD FOR ELECTRICAL CURRENT. Proj. 6X95 25 001, Task 05, Rep. 497, Aug. 1961, 6pp. USA Medical Research Lab., Fort Knox, Ky.

18,746
The effect of raising skin temperature on the vibratory threshold for alternating current stimulation was determined. These thresholds, taken on the forearm and index finger with a current of 100 and 10,000 cps, were measured by a modified method of limits. They were obtained every two min. before and during application of heat and for seven min. thereafter; a test session lasted one hour. Electrode temperature ranged from 25 to 45 degrees C in five-degree steps. Two trained Ss participated throughout; four others provided checks at the highest temperature. The findings were discussed in terms of underlying receptor and neural processes.
G. R 17

18,747
Hawkes, G.R., Joy, R.J.T., & Evans, W.O. AUTONOMIC EFFECTS ON ESTIMATES OF TIME: EVIDENCE FOR A PHYSIOLOGICAL CORRELATE OF TEMPORAL EXPERIENCE. Proj. 6X95 25 001, Task 05, Rep. 506, Sept. 1961, 9pp. USA Medical Research Lab., Fort Knox, Ky.

18,747
The aims of this study were to determine the effect of usual therapeutic doses of autonomically active drugs upon judgments of time and to ascertain physiological correlates of this activity for each of two methods of time estimation. Ss made judgments of duration by the production and reproduction methods for intervals of white noise, white light, and random-frequency electrical cutaneous stimuli under each of seven drug conditions, e.g., chloropromazine HCL, mecamylamine HCL, placebo. Heart rate, skin temperature, respiration rate, and blood pressure were recorded. Analyses of variance of drug effects on the physiological indices and on the time estimations were performed. Correlations between these indices and time judgments also were obtained for the analysis. T. R 12

18,748
Hillix, W.A. & Coburn, R. HUMAN FACTORS IN KEYSET DESIGN. PO 06401, S R006 09 02, Task 5742 (NEL N5 5), Rep. 1023, March 1961, 58pp. USN Electronics Lab., San Diego, Calif.

18,748
The keyset entry process as it occurs in real-time computer-aided systems was analyzed. A general model of the human keyset operator and the two basic modes of keyset operation were first discussed. Next, relevant experiments and observations were examined as they relate to the model. Research was reported which evaluated several potential computer keysets in terms of type of stimulus input, e.g., binary, coded and information transmission rate. A particular computer keyset also was examined within the framework of man-machine communications. Recommendations in the form of principles and concepts for guiding keyset designs were included.
T. G. I. R 29

18,749
Wokoun, W. DETECTION OF RANDOM LOW-ALTITUDE JET AIRCRAFT BY GROUND OBSERVERS. From: "Sixth Annual Army Human Factors Engineering Conference. USA Engineer Research and Development Labs., Ft. Belvoir, Va. 3-6 October, 1960," 30-34. USA Office of the Chief of Research and Development, Washington, D.C. (USA Ordnance Human Engineering Labs., Aberdeen Proving Ground, Md.).

18,749
This conference paper presented the highlights of an aerial detection study conducted at an Air Force landing field where the surrounding terrain (eight to ten miles radius) was flat and the atmosphere clear. The two major variables examined were size of search sectors: 360, 180, 90, and 45 degrees; and altitude of aircraft: 500 and 1,500 ft. Approach courses (six) and intervals between aircraft (greater than five min. to two hours) were randomized. Three types of jets--T-33, F-86, and F-100--were used. Ss (30) had normal or better vision, normal hearing, and GCT scores between 90 and 120. Some specific findings were discussed.

18,750
Brown, G.L. A PRELIMINARY INVESTIGATION OF CLOSED CIRCUIT TELEVISION VEHICLE DRIVING. From: "Sixth Annual Army Human Factors Engineering Conference. USA Engineer Research and Development Labs., Ft. Belvoir, Va. 3-6 October, 1960," 34-35. USA Office of the Chief of Research and Development, Washington, D.C. (USA Ordnance Human Engineering Labs., Aberdeen Proving Ground, Md.).

18,750
This conference paper summarized a study on the feasibility of driving a vehicle when visual contact is via television. Ss drove an Army Mechanical Mule, modified to accommodate the necessary television components, over three courses: relatively easy one for familiarization of S with the controls, one requiring precision driving, and a cross-country one requiring greater skill than the others. Problems in vehicle control and equipment functioning were brought out and suggestions for future research made.

18,751
Karr, A.C. EXPERIMENTAL INVESTIGATION OF A WEAPON SYSTEM CONTROL MECHANISM. (ABSTRACT OF A CLASSIFIED PRESENTATION). From: "Sixth Annual Army Human Factors Engineering Conference. USA Engineer Research and Development Labs., Ft. Belvoir, Va. 3-6 October, 1960," 39-40. USA Office of the Chief of Research and Development, Washington, D.C. (USA Research and Development Group, Frankford Arsenal, Philadelphia, Penn.).

18,751
Because this conference paper was in the category "classified," only an unclassified abstract was presented. "Investigations were made of two aspects of the control mechanism of a Heavy Anti-tank Weapon System. One study investigated the influence of different amounts of friction in the controlling mechanism. The second study concerned the influence of different control ratios within the mechanism."

18,752
Cohen, A. THE ABILITY OF HELMETS TO ATTENUATE SOUND. From: "Sixth Annual Army Human Factors Engineering Conference. USA Engineer Research and Development Labs., Ft. Belvoir, Va. 3-6 October, 1960," 57-65. USA Office of the Chief of Research and Development, Washington, D.C. (USA Quartermaster Research & Engineering Command, Natick, Mass.).

18,752
The purpose of this paper is "to review some basic noise suppression problems which are common to both combat vehicle and aircraft crewmen helmets, and to indicate possibilities for resolving them." These problem areas are: attenuation of low frequency noise, helmet resonance, attenuation with accessory headgear, and need for ambient sounds. Solutions include noise suppressors, noise cancellation technique, and additions to and modifications of helmet.
G. I. R 18

18,753
Kryter, K.D. THE MEASUREMENT OF NOISE OF U.S. ARMY WEAPONS. From: "Sixth Annual Army Human Factors Engineering Conference. USA Engineer Research and Development Labs., Ft. Belvoir, Va. 3-6 October, 1960," 69-82. USA Office of the Chief of Research and Development, Washington, D.C. (Bolt Beranek and Newman, Inc., Cambridge, Mass.).

18,753
Three tasks were performed under the contract; this paper briefly described them. First, the physical characteristics of the noise of USA weapons were recorded and analyzed. The potential damage of the noise was evaluated by comparison of an octave band spectrum analysis and the auditory threshold curve. Next, an impulse sound generator which would simulate weapons noise was developed. Finally, the effects of the various characteristics of noise, e.g., sound pressure level, rise and decay time, on hearing loss were examined in the laboratory. (This phase of the work was in progress at the time of writing.)
T. G. I. R 4

18,755
Lathrop, P.A. (Chm.). PROCEEDINGS OF THE NATIONAL SYMPOSIUM ON HUMAN FACTORS IN SYSTEMS ENGINEERING. PHILADELPHIA, PENNSYLVANIA, DECEMBER 3-4, 1957. 117pp. Human Factors Society of America, Arlington, Va. & Institute of Radio Engineers, Philadelphia, Penn.

18,755
This document contained all papers and addresses presented at the jointly sponsored Human Factors-IRE national symposium. The four sessions were: engineering approaches to systems synthesis, human factors approaches to systems synthesis, a panel discussion on synthesis of a control system for a manned space ship, and human factors data (source, form, and use). The individual papers have been abstracted separately.
T. G. I. R 30

18,756
Flickinger, D.D. MAN--THE ESSENTIAL FACTOR IN SYSTEMS. From: "Proceedings of the National Symposium on Human Factors in Systems Engineering, Philadelphia, Pennsylvania, December 3-4, 1957," 2-4. Human Factors Society of America, Arlington, Va. & Institute of Radio Engineers, Philadelphia, Penn. (USAF Air Research and Development Command Headquarters, Andrews AFB, Washington, D.C.).

18,756
This address is aimed at defining the present state of human factors concepts and setting forth some objectives for the human factors researcher. The concepts include man's roles in systems, man's versatility of performance, factory designing, and testing environment versus operational environment. Some changes in human factors agencies and their programs are outlined.

18,757
Linvill, W.K. SENSITIVITY OF SYSTEM DESIGN TO SYSTEM OBJECTIVES. From: "Proceedings of the National Symposium on Human Factors in Systems Engineering, Philadelphia, Pennsylvania, December 3-4, 1957," 5-8. Human Factors Society of America, Arlington, Va. & Institute of Radio Engineers, Philadelphia, Penn. (Institute for Defense Analyses, Washington, D.C.).

18,757
This paper discusses the role of human factors in system engineering when the objectives of a system are examined to determine what its function is and to evaluate its performance of that function. Considering a system as being composed of various levels or layers, the objectives derive from the exterior system which, in turn, involves human factors assessments. The problem of design of a computer system is used to illustrate this type of analysis.

18,758
Drenick, R.F. AN APPROACH TO THE SYNTHESIS OF INFORMATION PROCESSING SYSTEMS. From: "Proceedings of the National Symposium on Human Factors in Systems Engineering, Philadelphia, Pennsylvania, December 3-4, 1957," 9-11. Human Factors Society of America, Arlington, Va. & Institute of Radio Engineers, Philadelphia, Penn. (Bell Telephone Laboratories, Inc., Murray Hill, N.J.).

18,758
A mathematical model is proposed and briefly sketched which may aid in answering these questions in regard to information processing systems: what decision-making agencies should be created, what decisions should be turned over to them, what information should be channeled to them, and what aids should be supplied them to support their activities. The task of the system here considered is a strategic game which differs from the conventional game problem in that the aim is to determine game deterioration and manner of recouping same as a result of certain limitations placed on one or both players. The problem is formulated; solutions, however, are not yet ready to report.

18,759
Truxal, J.G. SYSTEMS ENGINEERING AS THE MATURATION OF CONTROL ENGINEERING. From: "Proceedings of the National Symposium on Human Factors in Systems Engineering, Philadelphia, Pennsylvania, December 3-4, 1957," 12-19. Human Factors Society of America, Arlington, Va. & Institute of Radio Engineers, Philadelphia, Penn. (Polytechnic Institute of Brooklyn, Brooklyn, N.Y.).

18,759
This discussion has three parts: "the first section describes briefly the basic characteristics of control engineering--the techniques for determination and manipulation of a mathematical model for a physical situation--, and indicates the types of models which have been most highly developed by control engineers. The following section describes briefly the extension of these model concepts in systems engineering as necessitated by the modified requirements when the systems engineer must view the overall, and, often complex, system. The final section describes one specific area of recent work in control systems engineering as an illustration of current trends in this field."
I. R 3

18,760
Beaumariage, D.C. AN APPROACH TO SYSTEMS INTEGRATION FOR MANNED SYSTEMS. From: "Proceedings of the National Symposium on Human Factors in Systems Engineering, Philadelphia, Pennsylvania, December 3-4, 1957," 22-24. Human Factors Society of America, Arlington, Va. & Institute of Radio Engineers, Philadelphia, Penn. (Radio Corporation of America, Waltham, Mass.).

18,760
This paper presents a method for organizing and executing a typical systems development program which insures equal treatment for the man in accomplishing systems integration. The main components of the program are: preliminary studies, system analysis, subsystem development, system evaluation, product design, and manufacturing. The essential item emphasized throughout is the effective working together of the control systems engineers group and the human engineering factors group. Other important items include early specification of human performance requirements and feedback of task and equipment analyses to the proper groups.
I. R 1

18,761
Abrahams, I.C. THE ENGINEER-PSYCHOLOGIST TEAM IN SYSTEMS PLANNING. From: "Proceedings of the National Symposium on Human Factors in Systems Engineering, Philadelphia, Pennsylvania, December 3-4, 1957," 34-40. Human Factors Society of America, Arlington, Va. & Institute of Radio Engineers, Philadelphia, Penn. (General Electric Company, Syracuse, N.Y.).

18,761
The organizational structure of a company is outlined with particular emphasis on the Systems Utilization group which is responsible for planning the use of the system in its operational environment. This responsibility is divided into several functional areas which include personnel studies, training requirements, operation studies, maintenance studies, and human engineering. The significant point is the over-all functional integration of the psychologist and engineer in the organization, and thus the effective communication between the two professions.
I.

18,762
Taylor, F.V. EQUALIZING THE SYSTEM FOR COMPONENT "H". From: "Proceedings of the National Symposium on Human Factors in Systems Engineering, Philadelphia, Pennsylvania, December 3-4, 1957," 42-47. Human Factors Society of America, Arlington, Va. & Institute of Radio Engineers, Philadelphia, Penn. (USN Research Lab., Washington, D.C.).

18,762
This paper describes "certain means of equalizing systems which contain one or more human operators as essential elements in the control loop." Four such means are discussed: appropriate transduction of information-bearing signals and the respective controls, informational coding of displays and controls, minimization of operational transformations required (task complexity), and desensitization of the performance of the system to human noise and to stochastic variations in the human transfer function (display quickening).
R 6

18,763
Krendel, E.S. & McRuer, D.T. HUMAN DYNAMICS AND SYSTEM SYNTHESIS. From: "Proceedings of the National Symposium on Human Factors in Systems Engineering, Philadelphia, Pennsylvania, December 3-4, 1957," 48-54. Human Factors Society of America, Arlington, Va. & Institute of Radio Engineers, Philadelphia, Penn. (The Franklin Institute, Philadelphia, Penn. & Kelsey-Hayes Company, Los Angeles, Calif.).

18,763
The problem of facilitating the pilot's decisions on nonroutine problems is approached in terms of enabling the pilot to function with greater efficiency in routine tasks. The methods and techniques of synthesis in a pilot-airframe system are described for the compensatory or pursuit type tracking task by expansion of A. Tustin's linear plus remnant model of the human operator. An interim design procedure for such visual tracking tasks is then hypothesized.
I. R 13

18,764
Kraft, J.A. INDUSTRIAL APPROACH TO HUMAN ENGINEERING. From: "Proceedings of the National Symposium on Human Factors in Systems Engineering, Philadelphia, Pennsylvania, December 3-4, 1957," 55-58. Human Factors Society of America, Arlington, Va. & Institute of Radio Engineers, Philadelphia, Penn. (Lockheed Aircraft Corporation, Marietta, Ga.).

18,764
Human engineering research programs in industry, with particular reference to the aircraft industry, are discussed under the following topics: how they originate, where they are located in the organizational structure, what kind of skills they use, what they do, and some of the advantages and disadvantages of selected approaches.

18,765
Sharkey, V.J. THE APPLICATION OF HUMAN FACTORS TO SYSTEM DESIGN. From: "Proceedings of the National Symposium on Human Factors in Systems Engineering, Philadelphia, Pennsylvania, December 3-4, 1957," 59-66. Human Factors Society of America, Arlington, Va. & Institute of Radio Engineers, Philadelphia, Penn. (USAF Operational Applications Lab., AFCRC, Bedford, Mass.).

18,765
Three phases of system design—conceptualization, development test, and prototype-production—are each discussed in terms of the role played by human factors personnel. Important functions in the first phase revolve around providing human operator data, either already available or conducting research to obtain same. In the second, design of consoles, testing of capabilities, and identification of training requirements are essential. In the third, assistance in system specifications is the main function.
I.

18,766
Stapp, J.P. FROM HYPOTHESIS TO REALITY IN SPACE FLIGHT. From: "Proceedings of the National Symposium on Human Factors in Systems Engineering, Philadelphia, Pennsylvania, December 3-4, 1957," 82-83. Human Factors Society of America, Arlington, Va. & Institute of Radio Engineers, Philadelphia, Penn. (USAF Aero Medical Field Lab., Holloman AFB, N.M.).

18,766
This address consisted of some introductory remarks on the unrealities, e.g., flying saucers, versus realities, e.g., Sputnik, in space flight and the showing of the motion picture film of Major D. Simon's balloon flight.

18,767
Grether, W.F. DATA ON SENSORY MECHANISMS (INPUTS). From: "Proceedings of the National Symposium on Human Factors in Systems Engineering, Philadelphia, Pennsylvania, December 3-4, 1957," 85-88. Human Factors Society of America, Arlington, Va. & Institute of Radio Engineers, Philadelphia, Penn. (USAF Aero Medical Lab., Wright-Patterson AFB, Ohio).

18,767
The problem of defining the maximum capabilities of the human sense organs is discussed in terms of the two levels of sensory data: threshold data which "answer the question of whether or not a signal or stimulus can be seen, heard, felt, etc." and perceptual performance data which "answer the questions of how easily a signal or stimulus can be understood and translated into appropriate action." The difficulties in utilizing these data in the operational situation are indicated and a few recommendations given.

18,768
Edwards, W.D. HUMAN FACTORS DATA ON THE HIGHER MENTAL PROCESSES. From: "Proceedings of the National Symposium on Human Factors in Systems Engineering, Philadelphia, Pennsylvania, December 3-4, 1957," 89-93. Human Factors Society of America, Arlington, Va. & Institute of Radio Engineers, Philadelphia, Penn. (USAF Personnel and Training Research Center, Lackland AFB, Tex.).

18,768
The problem of applying data on the higher mental processes to systems design is considered. Some experimental findings of a research program devoted to examining the nature of the decision-making process are discussed. Specifically, these findings are from experimentation on four classes of decision determiners: boundary conditions, values, probabilities, and strategies. Their implications for systems design are indicated.

18,769
Senders, J.W. SOME COMMENTS ON MOTOR SKILLS DATA. From: "Proceedings of the National Symposium on Human Factors in Systems Engineering, Philadelphia, Pennsylvania, December 3-4, 1957," 94-96. Human Factors Society of America, Arlington, Va. & Institute of Radio Engineers, Philadelphia, Penn. (Minneapolis-Honeywell Regulator Company, Minneapolis, Minn.).

18,769
Those factors which limit the usefulness of the psychological data on motor skills and motor acts to the systems designer are discussed and illustrative studies are cited. The factors includes 1) inadequate engineering-type descriptions of experimental conditions; 2) lack of experimentation on multiple-channel-type tasks; 3) differences in performance criteria from laboratory to operational situations; and 4) lack of experimentation on coordination among components of a large task, i.e., interaction effects and loading factors.

18,770
Miller, R.B. PERSONNEL REQUIREMENTS AND OPTIONS IN SYSTEMS PLANNING. From: "Proceedings of the National Symposium on Human Factors in Systems Engineering, Philadelphia, Pennsylvania, December 3-4, 1957," 97-100. Human Factors Society of America, Arlington, Va. & Institute of Radio Engineers, Philadelphia, Penn. (International Business Machines Corporation, Poughkeepsie, N.Y.).

18,770
This paper discusses the optimum allocation of functions to man versus machine, given that the system requirements have been completely identified and that human functions can be provisionally identified. The major options other than function allocation and job structure include training and training aids, human engineering, procedure design, and personnel selection. A format for specifying human as distinguished from system requirements is discussed.

18,771
Saul, E.V. HUMAN FACTORS DATA: THEIR ORIGIN, FORM, CLASSIFICATION AND AVAILABILITY. From: "Proceedings of the National Symposium on Human Factors in Systems Engineering, Philadelphia, Pennsylvania, December 3-4, 1957," 101-110. Human Factors Society of America, Arlington, Va. & Institute of Radio Engineers, Philadelphia, Penn. (Institute for Psychological Research, Tufts University, Medford, Mass.).

18,771
This paper points out some significant problems encountered in providing documentation services to human factors specialists and presents some information intended to aid them in their literature searches. The topics thus discussed include: origins of human factors data, e.g., military and commercial, classified and unclassified; subject matter classification and attendant terminology problems; form and availability of these data.
R 64

18,772
Licklider, J.C.R. SOME HUMAN FACTORS IN THE DESIGN OF A CONTROL SYSTEM FOR A SPACE SHIP. From: "Proceedings of the National Symposium on Human Factors in Systems Engineering, Philadelphia, Pennsylvania, December 3-4, 1957," 111-117. Human Factors Society of America, Arlington, Va. & Institute of Radio Engineers, Philadelphia, Penn. (Bolt Beranek and Newman, Inc., Cambridge, Mass.).

18,772
An approach to the design of the control system for a manned space ship is outlined and relevant human factors are discussed. First, the mission is analyzed into 12 phases, e.g., departure, orbit acquisition, landing approach; the control requirements of each phase are considered. Next, alternative ways of handling the phase requirements are indicated. The man-machine control arrangements which are discussed include: attitude control, horizontal position control, braking control, and coordination of control actions. Also considered are capabilities and costs of alternative subsystems, subsystem simulation, and synthesis and evaluation of the over-all control system.
R 7

18,773
Irving, A. THE OPTICAL BLINK REACTION TIME. FPRC Memo. 101, Nov. 1960, 4pp. Flying Personnel Research Committee, London, England. (RAF Institute of Aviation Medicine, Farnborough, Hants, England).

18,773
The voluntary blink reaction time was measured for five luminances: 1, 2, 3, 4, and 5 log ft.-L, and five locations of the stimulus in the visual field: 0-, 15-, 30-, 45-, and 60-degree subtense between stimulus and visual axis. Five Ss were used. Both sets of data were examined by analyses of variance.
T. G. I. R 2

18,774
Iampietro, P.F. PREDICTION OF SKIN TEMPERATURE OF MEN IN THE COLD. Tech. Rep. EP 154, June 1961, 8pp. USA Environmental Protection Research Div., QM Research & Engineering Center, Natick, Mass.

18,774
"Skin temperatures of seminude men were measured during two-hour exposures to various combinations of air temperature (90 to 25 degrees F) and wind velocities (less than 1, 5, 10 mph). The data were used to derive an expression for the estimation of mean weighted skin temperature as a function of duration of exposure (up to 180 min.), air temperature (90 to -20 degrees F), and windspeed (0 to 40 mph). A chart was also constructed for more rapid estimation of skin temperature."
G. R 6

18,775
Iampietro, P.F., Mager, M., Goldman, R.F. & Bass, D.E. COMPOSITION AND CALORIC DENSITY OF WEIGHT LOSS DURING CALORIC RESTRICTION IN THE COLD. Proj. 7X83 01 009, Tech. Rep. EP 156, June 1961, 6pp. USA Environmental Protection Research Div., QM Research & Engineering Center, Natick, Mass.

18,775
This research was an investigation of changes in body weight and composition during caloric restriction in a cold environment. Twelve young males participated; six were completely starved (zero kcal/day) and six were semistarved (600 kcal/day) for 14 days in a 60 degree F chamber. All Ss wore only athletic shorts and socks and engaged in only sedentary activity. Body weight was measured each morning and body specific gravity was determined before and after the test period. Also body fat content, nitrogen balance, and fat-free tissue loss were determined. From these the caloric equivalent of the weight loss was calculated. The results were related to specific findings from similar studies.
T. G. R 8

18,776
Javitz, A.E. HUMAN ENGINEERING IN EQUIPMENT DESIGN. Electrical Manufacturing, Oct. 1956, 108-126.

18,776
This review of the human engineering literature is realistically written for the comprehension and use of the design engineer. The material is organized to answer two basic questions: what are the design functions of human engineering and what are the associated techniques. The research, development, and applied categories of work are described and the general design stages indicated. The areas where human engineering techniques have been used are discussed and illustrated. They include data processing and systems analysis, discriminability of controls and displays, reliability and maintainability, automation, and civilian design. Finally, the function of the human engineer on the design team is considered.
T. G. I. R 40

18,777
Jones, M.B. MOLAR CORRELATIONAL ANALYSIS. Mono. 4, Rep. SAM P 17, July 1960, 93pp. USN School of Aviation Medicine, Pensacola Air Station, Fla.

18,777
This work describes a methodology for solving problems by a process of correlational deductive logic. The method essentially involves four main steps: calculating the correlation matrix, looking for a correlation pattern, hypothesizing a factor structure to explain it, and comparing the theoretical and empirical results. The major portion of the work is devoted to the different structures and the correlation patterns they generate.
T. G. I. R 34

18,778
Jones, F.P. F.M. ALEXANDER AND THE REEDUCATION OF FEELING. Gen. semantics Bull., 1951, (6 & 7), 78-81. (Tufts University, Medford, Mass.).

18,778
In this presentation to the Boston Society for General Semantics, the author points out the empirical nature of the F. M. Alexander technique, a method by which one is able to establish conscious control of the head-neck relationship, and attempts to describe this experience as a first step toward establishing the control through a systematic and complete awareness of the physical self. The kinaesthetic impressions and discriminations are dealt with in some detail.
R 11

18,779
Jones, F.P. & Hanson, J.A. TIME-SPACE PATTERN IN A GROSS BODY MOVEMENT. Percept. Mot. Skills, 1961, 12, 35–41. (Tufts University, Medford, Mass.).

18,779
To study individual differences in pattern of movement from sitting to standing, a method of multiple-image photography was used. Twenty-five Ss, divided into a well coordinated and a poorly coordinated group on the basis of tests of motor performance, were required to rise from a chair as rapidly as possible; eight responses were measured with the second, fifth, and eighth being recorded photographically. Measures recorded or derived from the photographs were reaction time (time between signal and weight leaving chair), rise time, head speed and velocity, and acceleration of arm. The data were analyzed for differences between the two groups.
T. G. I. R 3

18,780
Johnson, W.H. & Taylor, N.B.G. SOME EXPERIMENTS ON THE RELATIVE EFFECTIVENESS OF VARIOUS TYPES OF ACCELERATIONS ON MOTION SICKNESS. Aerospace Medicine, March 1961, 32, 205–208. (Defence Research Medical Labs., Toronto, Ontario, Canada).

18,780
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.
T. I. R 11

18,781
Klein, S.J., Mendelson, E.S. & Gallagher, T.J. THE EFFECTS OF REDUCED OXYGEN INTAKE ON AUDITORY THRESHOLD SHIFTS IN A QUIET ENVIRONMENT. J. comp. physiol. Psychol., 1961, 54(4), 401–404. (USN Air Material Center, Philadelphia, Penn.).

18,781
The effects of reduced oxygen intake on auditory sensitivity for bone- and air-conducted signals in a quiet environment was studied. Seven adult males with normal hearing served as Ss. Threshold shifts from the prehypoxic level were recorded during reduced oxygen intake and at four succeeding ten-min. intervals after resumption of normal breathing. Bone and air thresholds were taken for tones which ranged in one octave steps from 256 to 4,096 cps. Analyses of variance were performed on the shift and recovery data.
G. R 11

18,782
Klein, S.J. EFFECTS OF REDUCED OXYGEN INTAKE ON BONE CONDUCTED HEARING THRESHOLDS IN A NOISY ENVIRONMENT. Percept. Mot. Skills, 1961, 13, 43–47. (USN Air Material Center, Philadelphia, Penn.).

18,782
The effect of hypoxia on auditory sensitivity for bone conducted pure tone signal was studied. Seven naval aviators with normal hearing served as Ss; all had experienced the effects of reduced oxygen intake. Bone thresholds for pure tones which ranged from 256 to 4,096 cps in one octave increments were determined before and during induced hypoxia. These were made in a noisy laboratory, about 80 db ambient level. Analysis of variance was used to examine the threshold shift data.
T. G. R 8

18,783
Karr, A.C. A TANK TRACKING SIMULATOR FOR HUMAN ENGINEERING STUDIES. DA Proj. N/A, Rep. R 1594, June 1961, 17pp. USA Research and Development Group, Frankford Arsenal, Philadelphia, Penn.

18,783
The design, construction, and operation of a tank tracking simulator was described and an experiment conducted on this device was reported. The specific problem was to determine whether or not gunner performance would be improved if the gunner were placed on the preferred side of the weapon to operate the joy stick with his preferred hand. Right- and left-handed Ss served in three sessions of 24 trials, 12 with the target on the right and 12 on the left. Accumulated times to first hit were compared statistically.
T. I.

18,784
Krebs, A.T. RADIOACTIVITY IN MAN, BEAST, AND FOOD. Proj. 6X64 14 001, Task 03, Rep. 501, Sept. 1961, 8pp. USA Medical Research Lab., Fort Knox, Ky.

18,784
Recent research findings on radium content of soft human tissues; alpha activity of men, animals, and foodstuffs; and still living radium-poisoned and radium-treated victims from the early 20s and 30s are discussed in terms of their consequences for current ideas on radiation protection guides and dangers from low level radiation sources, e.g., fallout, radioactive waste disposals.
T. R 18

18,785
Kraus, R.N., Elliott, Lois L. & Moore, E.W. STAPES MOBILIZATION: EXPERIENCE IN THE UNITED STATES AIR FORCE. Rep. 61 88, July 1961, 11pp. USAF School of Aerospace Medicine, Brooks AFB, Tex.

18,785
This paper described and discussed two techniques for performing stapes mobilization surgery: the Kos "Pick" and the Chisel technique, and presented and analyzed the results of 151 such operations performed in a USAF hospital. The criterion of successful surgery was a hearing gain of at least plus ten db and a postoperative hearing loss no greater than 30 db. Follow-up data for 1-, 3-, and 6-month periods were considered.
T. G. I. R 13

18,786
Kama, W.N. SPEED AND ACCURACY OF POSITIONING WEIGHTLESS OBJECTS AS A FUNCTION OF MASS, DISTANCE, AND DIRECTION. Proj. 7184, Task 71586, WADD TR 61 182, March 1961, 19pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio.

18,786
The effect on human performance of the loss of weight and friction cues was studied. The task required Ss to move each of four masses (1,000, 3,000, 5,000, and 7,000 grams made "weightless" and "frictionless" via a compressed air platform) three distances (10, 20, and 40 cm) in each of two horizontal directions. Each of 24 Ss was given 15 trials per mass. The three performance measures—constant error, absolute error, and response time—were analyzed by t-tests.
T. G. I. R 4

18,787
Karsh, R. RELATIONSHIP BETWEEN GALVANIC SKIN RESISTANCE AND REACTION TIME ON A VISUAL MONITORING TASK. Proj. TB1 1000, Tech. Memo. 8 61, May 1961, 11pp. USA Ordnance Human Engineering Labs., Aberdeen Proving Ground, Md.

18,787
The aim of this preliminary study was to determine whether there is a reliable correlation between some index of skin resistance and some index of monitoring performance. Ss were 39 enlisted men with 20/20 acuity. A continuous record of skin resistance was obtained while each S monitored a crt by depressing a key at the appearance of a critical signal. The monitoring period was one hour; 25 signals were presented during this time. Three indices of RT (e.g., mean, range) and five indices of GSR (e.g., mean, amplitude, range) were obtained. Correlations between and within Ss were calculated for the skin resistance and RT indices. The findings were considered in terms of an automatic vigilance indicator.
T. G. R 8

18,788
Melton, A.W. MILITARY PSYCHOLOGY IN THE UNITED STATES OF AMERICA. Amer. Psychologist, Dec. 1957, 12(12), 740-746. (University of Michigan, Ann Arbor, Mich.).

18,788
Military psychology is defined here as being coextensive with all psychology with its unique unifying characteristic merely the specific contexts of application. The requirements for a military psychologist are examined briefly. The principal trends and emphases of contemporary military psychology in the United States are then discussed.

18,789
Michanek, E. OPENING ADDRESS AT INTERNATIONAL CONGRESS ON ERGONOMICS. No date, 6pp. Ministry of Social Affairs, Labour, and Housing, Stockholm, Sweden.

18,789
In his opening address to the International Congress on Ergonomics, Mr. Ernest Michanek of Sweden, reviewed briefly the development of working hours during and since the so-called industrial revolution. He pointed out that we are now at the threshold of a new industrial revolution—that of automation—and that this is accompanied by a new concern for full employment and for more leisure time. These ideas were then related to the thesis of ergonomics—that of adapting the work to the individual worker. The extension of this idea to that of making life easier and fuller was then put forward as a possible goal of ergonomics.

18,790
Stuart, H.C. (Chm.). PROCEEDINGS OF FIRST NATIONAL CONFERENCE ON THE PEACEFUL USES OF SPACE. TULSA, OKLAHOMA, MAY 26-27, 1961. 184pp. National Aeronautics and Space Administration, Washington, D.C.

18,790
The papers and panel discussions given at the conference on the peaceful uses of space are presented. The general subjects are 1) National Aeronautics and Space Administration flight programs; 2) opportunities for industry and education in the space age; 3) present and future of manned space flight; 4) science in space; and 5) applying in-space science to communications, weather, and navigation. A transcript of conference proceedings is included.
G. I.

18,791
Malhotra, M.S. & Wright, H.C. AIR EMBOLISM DURING DECOMPRESSION AND ITS PREVENTION. RNP 60/996, UPS 188, RNPL 9/59, Dec. 1959, 16pp. Royal Naval Personnel Research Committee, MRC, London, England. (Royal Naval Physiological Lab., MRC, Alverstoke, Hants, England).

18,791
Investigations were made into the causes of air embolism and methods of its prevention during simulated ascents at the constant rate of five ft./sec. in a compression chamber, on animals--mainly rabbits. In three series of experiments the animals were tracheotomized and the outlet from the trachea closed at a pressure equivalent to 60 ft. of water. In the first series, no control method was used; in the second, a firm binder was applied to the abdomen prior to ascent; and in the third, the chest was squeezed manually just before the trachea was closed. Various physiological measures were taken, including autopsies, to assess the results.
R 6

18,792
Miles, S. & Mackay, D.E. THE NITROGEN NARCOSIS HAZARD AND THE SELF CONTAINED DIVER. RNP 60/995, UPS 184, RNPL 4/59, May 1959, 5pp. Royal Naval Personnel Research Committee, MRC, London, England. (Royal Naval Physiological Lab., MRC, Alverstoke, Hants, England).

18,792
To investigate whether nitrogen narcosis may be affective in relatively shallow dives, simple tests involving memory and mental skill were carried out by 16 helmeted divers. The tests were performed in and out of the water, at the surface, and on the bottom during the latter part of a series of dives varying from 60 min. at 100 ft. to 25 min. at 180 ft. Performance was compared for these conditions and discussed in relation to the problem of expected narcotic effects upon divers wearing self-contained air breathing sets and thus not under the control of a surface unit.
T. R 4

18,793
Cornell University. HUMAN FACTORS BULLETINS. A COLLECTION OF HUMAN FACTORS BULLETINS SHOWING HUMAN ENGINEERING PRINCIPLES FOR IMPROVED SAFETY. 1959, 28pp. Daniel and Florence Guggenheim Aviation Safety Center, Cornell University, New York, N.Y.

18,793
A collection of Human Factors Bulletins is presented in order to acquaint engineers with the importance of using physiological, psychological, and related data in the design of aircraft. No claim is made that the field of human engineering is covered, but rather the importance of using information already available to improve safety is stressed. Illustrative bulletin topics are optimum allocation of tasks among man and machines, MT, some applications of body weight to design, hand operated control forces, instrument panels, and human requirements and performance limitations at various altitudes.
T. G. I. R 31

18,794
Scharf, B. LOUDNESS SUMMATION UNDER MASKING. J. acoust. Soc. Amer., April 1961, 33(4), 503-511. (Northeastern University, Boston, Mass.).

18,794
The notion that the loudness of a complex sound is the sum of the loudnesses of its component critical bands and that therefore the amount of loudness summation depends upon the slope of the loudness functions for these components was investigated. The loudness of four-tone complexes centered at 250, 2,000, and 4,000 cps was measured as a function of the over-all spacing of the components both in quiet and against various levels of a uniform masking noise.
G. I. R 11

18,795
Scharf, B. COMPLEX SOUNDS AND CRITICAL BANDS. Psychol. Bull., May 1961, 58(3), 205-217. (Northeastern University, Boston, Mass.).

18,795
Studies of the responses of human observers to bands of noise and other complex sounds have led to the measure of what appears to be a basic unit of hearing, the critical band. This unit is defined by reference to four types of experiment in which it has been measured: absolute threshold of complex sounds, masking of a band of noise by two tones, sensitivity to phase differences, and loudness. The role of the critical band in the masking of pure tones by white noise is next considered in the light of both indirect and direct measures of the masking band. Other correlates of the critical band and future prospects for its use, both experimental and clinical, are discussed.
G. I. R 32

18,796
Senay, L.C., Jr., Christensen, Margaret L. & Hertzman, A.B. CUTANEOUS BLOOD FLOWS IN CALF, FOREARM, CHEEK AND EAR DURING CHANGING AMBIENT TEMPERATURE. Contract AF 33(616) 7077, Proj. 7164, Task 71830, WADD TR 61 190, March 1961, 16pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio. (St. Louis University, St. Louis, Mo.).

18,796
To determine whether local skin temperature determines the local vascular tone, observations were made on cutaneous vasodilations elicited in the calf, forearm, cheek, and ear of resting nude Se by exposing them to a slowly rising ambient temperature. Two patterns of heat stress were used: 1) increase from 25 to 45 degrees C over a period of three hours, and 2) temperature were cycled between 25 and 45 degrees C at rate of one cycle per hour. Cutaneous volume pulses, skin temperatures, and regional sweating were measured over the trial period and studied for correspondences among the various areas.
R 11

18,797
Shelanski, M.V. & Gabriel, K.L. CUTANEOUS TOXICITY EVALUATION OF AIR FORCE DEVELOPMENT MATERIALS - IV. Contract AF 33(616) 6962, Proj. 7165, Task 71836, ASD TR 61 77, April 1961, 8pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio. (Industrial Biology Research and Testing Laboratories, Inc., Philadelphia, Penn.).

18,797
Twelve Air Force development materials were studied by the prophetic patch test method on laboratory animals and volunteer human Ss to determine the primary irritant effect and the sensitization index of these materials. These cutaneous toxicity data were obtained to serve the Air Force as criteria for establishing safe handling procedures and limits for their utilization.
R 7

18,798
Space Technology Laboratories, Inc. INTEGRATED TEST PLAN FOR WS 107A 1. OPERATIONAL SYSTEM TEST FACILITY OSTF #1 AND #2. SUPPLEMENT: PERSONNEL SUBSYSTEM TEST PLAN ANNEX. GM 6300.5 1060, Dec. 1960, 99pp. Space Technology Laboratories, Inc., Los Angeles, Calif.

18,798
This annex is the technical directive for the collection, analysis, evaluation, and reporting of personnel subsystem (PSS) data during Category II testing activities on the Atlas "E" and "F" series missiles at OSTF-1 and -2, respectively. It describes an integrated approach to PSS testing.
I.

18,799
Wang, R.I.H. & Davidson, D.E., Jr. EXPERIMENTAL CONDITIONS FOR ACUTE WHOLE-BODY IRRADIATION OF DOGS WITH COBALT 60. USAMRL Proj. 6X64 14 001, Task 04, Rep. 483, Aug. 1961, 19pp. USA Medical Research Lab., Fort Knox, Ky.

18,799
To establish experimental conditions for the acute whole-body irradiation of dogs using cobalt 60 as the source, 40 mature dogs were exposed to irradiation at midline tissue doses of 250 and 500 r (27 to 32 r/min.). Clinical examinations and blood determinations of various sorts were obtained prior to and following irradiation until death or recovery. The findings were analyzed for consistency. Recommendations were made for subsequent irradiation studies in dogs at this laboratory.
T. G. I. R 4

18,800
Wang, R.I.H. & Davidson, D.E., Jr. REDUCTION OF RADIATION LETHALITY IN DOGS BY CHEMICAL MIXTURE. USAMRL Proj. 6X64 14 001, Task 04, Rep. 484, Aug. 1961, 17pp. USA Medical Research Lab., Fort Knox, Ky.

18,800
To determine whether the preradiation administration of mixtures of chemical agents to dogs, with or without postirradiation supportive therapy, can provide effective protection from supralethal total-body doses of ionizing radiation, a total of 68 dogs were individually exposed to doses of 600 r of acute whole-body radiation from a cobalt 60 source. Chemical agents used included para-aminopropriophenone, B-aminoethylisothiuronium, and serotonin. Supportive therapy consisted of antibiotics, vitamins, parenteral fluids, and whole-blood transfusions. The criterion was survival time.

18,801
Sander, E.G. & George, Marilyn. THE RADIOPROTECTIVE EFFECT OF MIXTURES OF AET AND SEROTONIN. Proj. 7163, Task 71826, ASD TR 61 221, June 1961, 8pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio.

18,801
Experiments were conducted to determine the protection provided the erythropoietic system of rats against whole-body, gamma radiation by mixtures of 2-aminoethylisothiouronium bromide and serotonin (5-hydroxytryptamine). The incorporation of iron-59 into newly formed red blood cells was used as the criterion of the radioprotection afforded.
T. G. R 9

18,802
Sleight, R.B. DESIGNING FOR HIGHER PROFITS. July-Aug. 1961, 4pp. Small Business Administration, Washington, D.C. (Applied Psychology Corporation, Arlington, Va.).

18,802
The relations between design of a piece of equipment, a procedure, or a workplace layout and efficiency of production are discussed. Two examples of actual business situations involving improved design after study by human engineering experts are presented. These cases suggest approaches that can be adapted by others to their own needs. A list of publications and organizations helpful to those wishing to explore further possibilities of designing for profit is included.
T. I. R 7

18,803
Swets, J.A., Tanner, W.P., Jr. & Birdsall, T.G. DECISION PROCESSES IN PERCEPTION. Psychol. Rev., Sept. 1961, 68(5), 301-340. (Massachusetts Institute of Technology, Cambridge, Mass.).

18,803
A brief review is given of the theory of statistical decision followed by a description of the elements of the theory of signal detection appropriate to human observers. The results of some experimental tests of the applicability of the theory to the detection of visual signals are presented. The relationship of this work to psychophysics and the threshold concept is explored. The concept is then developed that the detection process is itself a perceptual process of a relatively simple sort and that statistical decision theory could be used for a rigorous study of perception.
G. R 33

18,804
Siegel, A.I. & Wolf, J.J. A TECHNIQUE FOR EVALUATING MAN-MACHINE SYSTEM DESIGNS. Hum. Factors, March 1961, 3(1), 18-28. (Applied Psychological Services, Wayne, Penn.).

18,804
A digital computer-based method for simulating the performance, in one-operator systems, of operators who possess various characteristics was described. The method was developed for use in evaluating various system designs while the system is in the early design stage. Two operational tasks, landing an F4D aircraft on a carrier and firing an air-to-air missile, were simulated using the method. Predictions from the model were compared with outside criterion data for the same tasks. The usefulness of the model in its present form was discussed.
T. G. I. R 2

18,805
Ward, J.H., Jr. HIERARCHICAL GROUPING TO MAXIMIZE PAYOFF. Proj. 7734, Task 17016, WADD TN 61 29, March 1961, 18pp. USAF Personnel Lab., Lackland AFB, Tex.

18,805
A mathematical description is given of a general procedure for forming hierarchical groups of mutually exclusive sets in a manner which yields an optimum value for the functional relation or objective function that reflects the criterion chosen by the investigator. The number of groups to be formed need not be specified in advance. The technique permits reduction of any given number of sets to one by repeated operations. This permits decisions on number of groups to be used to be based on knowledge of costs of grouping at each stage in the hierarchical structure. A computer flow chart and a numerical example of the procedure are given.
I. R 5

18,806
Wallach, H.C. PERFORMANCE OF A PURSUIT TRACKING TASK WITH DIFFERENT DELAY TIMES INSERTED BETWEEN THE CONTROL MECHANISM AND THE DISPLAY CURSOR. Tech. Memo. 12 61, Aug. 1961, 23pp. USA Ordnance Human Engineering Labs., Aberdeen Proving Ground, Md.

18,806
To estimate the extent of deterioration of performance on a pursuit tracking task when various time delays were inserted between the control corrections and the corresponding display movements, an experiment was conducted. Sixty Ss arranged in six groups with ten Ss per group were used. Each group was assigned to a separate condition of delay time (0, 1, 3, 3.5, 4, and 5 sec.). Error scores were used to evaluate performance.
I.

18,807
Sells, S.B. & Barratt, E.S. (Eds.). BIOELECTRONICS DIRECTORY. SURVEY OF BIOELECTRONIC APPROACHES TO THE STUDY OF BEHAVIOR. Rep. 1, 1961, 177pp. Texas Christian University, Fort Worth, Tex.

18,807
This directory is an up-to-date, geographically organized, multidisciplinary guide to the location, affiliation, and current research interests and activities of scientists who are engaged in various types of research involving the recording and interpretation of electrical potentials from living organisms. The data were compiled from questionnaires sent to 1,365 scientists.

18,808
Siegel, A.I. & Wolf, J.J. TECHNIQUES FOR EVALUATING OPERATOR LOADING IN MAN-MACHINE SYSTEMS. A FURTHER APPLICATION OF A "MODEL" FOR DIGITAL SIMULATION OF ONE OR TWO-OPERATOR MAN-MACHINE SYSTEMS. Contract NONR 2492(00), June 1961, 63pp. Applied Psychological Services, Wayne, Penn.

18,808
A previously derived and described model for simulating the activity of a team composed of two operators while performing as a loop in a man-machine system was applied to an air intercept task. The model was based on the use of a digital computer that sequentially simulates operator performance of each subtask in a total task. As a result of various calculations, output records were obtained of subtask success or failure, task success or failure, peak stress, terminal stress, idle time, waiting time, team cohesiveness, and, in the event of successful task completion, time available but unspent. Predictions from the model and real life for the air intercept task were reported. The usefulness of the simulation technique was discussed.
T. G. I. R 4

18,809
Scodel, A. VALUE ORIENTATIONS AND PREFERENCE FOR A MINIMAX STRATEGY. Contract AF 49(638) 317, Proj. 9778, Task 37708, AFOSR TN 379 & RF Proj. 808, Tech. Note 3, Jan. 1961, 11pp. Ohio State University Research Foundation, Columbus, Ohio.

18,809
This study was an attempt to elicit differences in value orientations between those who play a minimax strategy in a two-person, zero-sum-game and those who play a riskier strategy. Each of 35 pairs of Ss were given an Allport-Vernon-Lindzey Study of Values (third edition) prior to their play of a two-person, zero-sum-game with a saddle point. The game ran for 50 trials and the positions were reversed after the first 25 trials. Mean value scores (theoretical, economic, aesthetic, social, political, and religious) of the upper and lower quartile players in number of minimax plays were analyzed for differences in risk-taking personalities.
T. R 9

18,810
Licklider, J.C.R. MAN-COMPUTER SYMBIOSIS--A PROBLEM IN COOPERATIVE INTERACTION. 1960, 1p. Bolt, Beranek and Newman, Inc., Cambridge, Mass.

18,810
Man-computer symbiosis, an expected development in cooperative interaction between men and computers, is defined as a subclass of the man-machine system in which men will set the goals, formulate the hypotheses, determine the criteria, and perform the evaluations while computing machines will do the routinizable work that must be done. Two aspects of the concept are discussed in this note: 1) the distinction between the concept of the man-machine system and that of man-computer symbiosis; and 2) existing limitations in input and output equipment (displays and controls) that are needed to implement the symbiotic concept.

18,811
Miller, J.G. INFORMATION INPUT OVERLOAD AND PSYCHOPATHOLOGY. Amer. J. Psychiat., Feb. 1960, 116(8), 695-704. (University of Michigan, Ann Arbor, Mich.).

18,811
A review of a research program in progress which is concerned with efforts to determine rigorously the effects of information input overload on the system is presented. A primary concern is whether such overload can produce psychopathology as does the reverse condition—information input underload (sensory deprivation). Current experiments on five levels of systems (the cell, organ, individual, group, and social institution) are discussed and related to relevant studies in the literature.
G. R 15

18,812
Madden, J.M. A FURTHER NOTE ON THE FAMILIARITY EFFECT IN JOB EVALUATION. Proj. 7734, Task 17015, ASD TN 61 47, June 1961, 4pp. USAF Personnel Lab., Lackland AFB, Tex.

18,812
Previous papers on the application of rating judgment to job evaluation have found that familiarity of the rater with the object being judged appears to be important. An analysis was made in this paper which expressed the interaction between familiarity level and specialty (airman) rated in statistical terms. Each of 50 airman specialties at the five skill level was rated on 14 job evaluation factors by officers attending the Command and Staff School. Each rater indicated his familiarity with the work activities of each specialty he rated on a four-point scale. The results were studied by analysis of variance technique.
T. R 12

18,813
Marko, A.R., McLennan, M.A. & Correll, E.G. A MULTICHANNEL PERSONAL TELEMETRY SYSTEM USING PULSE POSITION MODULATION. Proj. 7222, Task 71751, ASD TR 61 290, July 1961, 10pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio.

18,813
A personal telemetry system using the pulse position modulation technique is described. The laboratory model transmits heart rate, respiration rate, and body temperature within a range of 100 ft. Compared with FM-FM Systems this system has the advantage of very low power consumption (20 milliwatts), light weight (six ounces with batteries for 80 hours continuous operation), small sizes (4 3/4 by 3 1/2 by 1 inches), and sufficient accuracy and stability for physiological measurements. The recording and display systems are also described. Certain limitations of the system are pointed out.
T. I.

18,814
Meek, J.C., Graybiel, A., Beischer, D.E. & Riopelle, A.J. OBSERVATIONS OF CANAL SICKNESS AND ADAPTATION IN CHIMPANZEES AND SQUIRREL MONKEYS IN A SLOW ROTATION ROOM. Proj. MR005.13 6001, Subtask 1, Rep. 59, May 1961, 15pp. USN School of Aviation Medicine, Pensacola Air Station, Fla.

18,814
To help clarify the etiology of canal sickness experienced in a slow rotation room, chimpanzees and squirrel monkeys with both normal and disturbed vestibular function were subjected to varying degrees of rotation in the Pensacola Slow Rotation Room. The animals were observed first for symptoms of canal sickness, then critical speeds (from 1.9 to 10.0 rpm) at which retching and vomiting occurred were determined for each susceptible animal. An attempt was made to adapt four animals to tolerate stronger stimulation by initial prolonged exposure to low angular velocities. Results with normal animals were compared with findings from human Ss and with those having impaired vestibular function.
T. G. R 4

18,815
McGrath, J.J. & Hatcher, J.F. THE ACCURACY OF JUDGMENTS OF EYE FIXATIONS: A METHODOLOGICAL NOTE ON VIGILANCE. Contract NONR 2649(00), Proj. NR 153 199, Tech. Memo. 206 13, Sept. 1961, 13pp. Human Factors Research, Incorporated, Los Angeles, Calif.

18,815
To describe the accuracy with which eye fixations can be judged from photographs so that the value of this potentially useful method of studying vigilance performance can be assessed, a sample of photographs were obtained of the head of an S looking at different known points in space. The photographs were then used to construct an "Eye Fixation Judgment" test. The test was administered to four groups of 25 Ss, and the accuracy of their judgments was analyzed.
G. I. R 3

18,816
Lewis, R.E.F. PILOT PERFORMANCE DURING LOW SPEED, LOW LEVEL NAVIGATION. DRML Proj. 248, DRML Rep. 248 1 & PCC Proj. D77 94 45 07, HR 214, June 1961, 22pp. Defence Research Medical Labs., Toronto, Ontario, Canada.

18,816
The problem faced by pilots required to navigate accurately while flying very low was investigated in an experiment designed to reveal difficulties encountered in typical sorties navigated with no aids other than map, compass, and gyrocompass. Each of four Army pilots flew two-hour low level sorties in quick succession, three times a day for four days. Pilots' task was to reach a given target, stay on track, and fly at approximately 25 ft. An L19 100-mph aircraft was instrumented as the test vehicle. Measurements were taken of absolute height and track flown; pilot's head and eye movements were sampled and recorded cinephotographically. Recommendations for simplifying the task were made in light of the findings.
T. G. R 3

18,817
Lucier, O., Fischl, M.A. & Courtney, D. APPLICATION OF A SYSTEMS CONCEPT TO PERSONNEL RESEARCH. FINAL REPORT. Contract NONR 2212(00), Proj. J, Rep. 22, Aug. 1958, 129pp. Courtney and Company, Philadelphia, Penn.

18,817
This is a first report in a project devoted to the development of information gathering and information analysis techniques to support and implement the general objectives of providing command with techniques and procedures for effective personnel decisions. The development of the techniques is based on considering the personnel organization as a system and applying the systems concept to it. Only the first stage is detailed here: determination of the feasibility of introducing the feedback concept into the Navy's personnel research system. This is done by sending men to the fleet to see kinds of data available there, to explore the possibility of additional data, and to obtain the general idea for a skeleton system for the flow of information to and from command. T. I. R 65

18,818
White, R.M. ANTHROPOMETRY OF ARMY AVIATORS. Proj. 7X96 01 001, Tech. Rep. EP 150, June 1961, 109pp. USA Environmental Protection Research Div., QM Research & Engineering Center, Natick, Mass.

18,818
An anthropometric survey of Army aviators was carried out in order to provide body size information formerly unavailable on this segment of the military population. The series of 500 flyers, including both warrant and commissioned officers, represented a sampling of about ten percent of the population. The anthropometric data, consisting of some 40 body measurements, were analyzed and were presented in the form of a table of percentile distributions and 82 bivariate charts. These data may now be applied in problems of design, sizing, and tariffing of flight clothing and specialized equipment as well as in other areas requiring the use of body size information in aviator-equipment-aircraft systems.
T. R 4

18,819
Woodson, W. HUMAN ENGINEERING SUGGESTIONS FOR DESIGNERS OF ELECTRONIC EQUIPMENT. Jan. 1955, 7pp. USN Electronics Lab., San Diego, Calif.

18,819
The importance of considering the human component in a system was discussed and the relationship between man and machines clarified by listing some functions in which each (man or machine) excels the other. Checklists of common faults and design suggestions were presented r background for good human engineering design. A selec... list of "100 Human Engineering Considerations for Improving Man-Machine Effectiveness" was drawn from experience in actual application of human engineering principles to electronic equipment design. Topics dealt with were visual displays, panel layouts, console design, multiple layout, environment, and maintenance.
R 3

18,820
Zubek, J.P., Pushkar, Dolores, Sansom, Wilma & Gowing, J. PERCEPTUAL CHANGES AFTER PROLONGED SENSORY ISOLATION (DARKNESS AND SILENCE). Canad. J. Psychol., June 1961, 15(2), 83-100. (University of Manitoba, Winnipeg, Manitoba, Canada).

18,820
Sixteen Ss were placed in a dark and soundproofed chamber for a week or longer. A battery of perceptual-motor tests was administered before and immediately after isolation. Ss were also asked to estimate the passage of 1, 3, 5, 15, 30, 60, and 120 min. at daily intervals during isolation and to report hallucinatory phenomena. A carefully chosen matched group of controls was tested on the same tests and at the same time intervals. Data on depth perception, size constancy, auditory discrimination, reversible figures, and vigilance performance were analyzed. Two case reports were made on the individuals who stayed in isolation over seven days.
R 26

18,821
Westheimer, G. ABERRATIONS OF CONTACT LENSES. Amer. J. Optom. & Arch. Amer. Acad. Optom., Aug. 1961, 445-448. (School of Optometry, University of California, Berkeley, Calif.). (Tech. Rep. 2).

18,821
The spherical abberration of contact lenses in air were computed for four representative lenses by tracing procedures for parallel incident beams at various heights of incidence. The computations gave the expected values of aberrations of ideally constructed spherical contact lenses as measured on the vertex refractionometer. It was pointed out that a detailed knowledge of the corneal configuration is necessary before applying them to a contact lens correction on the eye.
T.

18,822
Weston, H.C. THE EFFECT OF AGE AND ILLUMINATION UPON VISUAL PERFORMANCE WITH CLOSE SIGHTS. Trans. Amer. Acad. Ophthal. Otolaryng., March-April 1949, 394-400. (Reprinted from: Brit. J. Ophthal., Sept. 1948, 32, 645-653).

18,822
The results of an experimental investigation in which 12 Ss performed a series of visual tasks, graded in difficulty, involving the perception of fairly small detail, were summarized. Each task in the series was performed at each of six values of illumination (from 0.5 to 500 ft.-c) so chosen as to form a geometric series in a range likely to be used in practical situations. Ratio of brightness of task to surrounding brightness was maintained. The 12 Ss ranged in age from 19 to 47 years and were distributed by age into five groups. The performance data were presented as functions of age and illumination for each task in the series.
T. G. I. R 3

18,823
Wolf, E. EFFECTS ON VISUAL THRESHOLDS OF EXPOSURE TO THE RADIATION BELOW 4000 ANGSTROMS. Trans. Amer. Acad. Ophthal. Otolaryng., March-April 1949, 400-413. (Harvard University, Cambridge, Mass.).

18,823
A study of the effect on visual sensitivity of ultraviolet emission of various fluorescent light sources was reported. The course of dark adaptation following exposure to the light source was the criterion measure. In one series, the Ss were exposed for ten min. to the radiation of a fluorescent "daylight" lamp with a crown glass screen permitting ultraviolet above 2,800 Angstroms to reach the eye or with Noviol-A passing only wavelengths above 4,100 Angstroms. Other series of tests used fluorescent "white," "softwhite," and "gold" lights. Finally, Ss were exposed to either one hour or ten min. of reading under these lights. The resulting dark adaptation data were discussed in relation to room lighting problems.
G. R 9

18,824
Kuhn, H.S. CONTINUING BIBLIOGRAPHY ON INDUSTRIAL EYE PROBLEMS. Trans. Amer. Acad. Ophthal. Otolaryng., March-April 1949, p. 414.

18,824
A short list of titles dealing with industrial eye problems was presented. All appeared in various journals in 1946, 1947, or 1948.
R 12

18,825
Webb, W. & Wherry, R.J., Jr. VIGILANCE IN PROLONGED AND REPEATED SESSIONS. Proj. MR005.13 5001, Subtask 12, Rep. 1, Feb. 1961, 5pp. USN School of Aviation Medicine, Pensacola Air Station, Fla.

18,825
To investigate inter- and intrasubject response characteristics in prolonged and repeated sessions of monitoring a simple signal, three Ss were studied over five sessions of nine hours per session. An auditory, aperiodic signal was delivered to the S through earphones; the response was to press an appropriate key. The signal was varied in size (small or large); was of constant duration (three sec.); and was varied in time intervals (short and long). Data collected were errors (wrong key pressed), missed signals, and latency of responses to each signal. These data were analyzed for changes due to time, magnitude of stimulus, and direction of stimulus change.
T. R 2

18,826
Smith, D.D. (Chm.) TRI-SERVICE CONFERENCE ON SELECTION RESEARCH. PENSACOLA, FLA., MAY 25, 26, 27, 1960. ONR Symposium Rep. ACR 60, 273pp. USN Office of Naval Research, Washington, D.C.

18,826
This was a collection of 26 papers presented at a conference concerned with research on the cognitive and noncognitive factors affecting the selection standards employed by the military services. The subject matter of the conference was divided into the following categories: 1) models, 2) aspects of classifications, 3) leadership, 4) statistical methodology, and 5) noncognitive measures. In addition, an evening session was held, the subject being a paper on "The computer as a research instrument in the behavioral sciences."
T. G. I. R 180 (approx.)

18,827
Zeidner, J. HUMAN FACTORS CONSIDERATIONS IN THE PERFORMANCE OF IMAGE INTERPRETERS. Report from: "Tri-Service Conference on Selection Research. Pensacola, Fla., May 25, 26, 27, 1960." ONR Symposium Rep. ACR 60, 20-33. USN Office of Naval Research, Washington, D.C. (USA Personnel Research Branch, Adjutant General's Office, Washington, D.C.).

18,827
A research program on psychological factors in image interpretation and its objectives are outined. Two broad and general problem areas are discussed: 1) the nature of the information extraction process with the specific skills, abilities, and techniques necessary to extract intelligence information from conventional and newer types of imagery; and 2) photo interpretation performance within the special context of USA operations. Objective indices of photo interpreter performance, including the accuracy and completeness of information extracted are presented. The extent of improvement in photo interpreter output as a function of such human factors considerations as assignment of personnel and change in work procedures is indicated.
T. I.

18,828
Jones, M.B. MOLAR CORRELATIONAL ANALYSIS AND TRAINING RESEARCH. Report from: "Tri-Service Conference on Selection Research. Pensacola, Fla., May 25, 26, 27, 1960." ONR Symposium Rep. ACR 60, 35-40. USN Office of Naval Research, Washington, D.C. (USN School of Aviation Medicine, Pensacola Air Station. Fla.).

18,828
Molar analysis is defined as a deductive process of studying correlations to bring out the relationships between structural hypotheses and their correlational consequences so that a worker whose ideas express themselves in a definite structure will know what pattern to look for, or, if he has a correlation pattern, so that he will know what structures might have given rise to it. The open contiguum and the simplex structures are described and illustrated with data from the literature. The uses of simplex theory in training are discussed and illustrated by a string model of stages in flight training.
T. I.

18,829
Wever, E.G., Lawrence, Merle & von Bekesy, G. A NOTE ON RECENT DEVELOPMENTS IN AUDITORY THEORY. Proc. nat. Acad. Sci., Wash., June 1954, 40(6), 508-512. (Princeton University, Princeton, N.J.).

18,829
This note considered recent auditory research. Two approaches for study of the pattern of cochlear action were discussed: direct observation in fresh human temporal bones in which suitable exposures were made and the use of electrical potentials on anesthetized cats. The results were interpreted in terms of auditory theory. Further studies on the relation of the pattern of cochlear action and locus of stimulation were mentioned. The crucial problem now under consideration was how any given segment of the basilar membrane gets the energy that makes it vibrate--whether from neighboring parts of the membrane or from the cochlear fluid.
G. I. R 7

18,830
Wilson, S.G., Jr. RADIATION-INDUCED CENTRAL NERVOUS SYSTEM DEATH. A STUDY OF THE PATHOLOGIC FINDINGS IN MONKEYS IRRADIATED WITH MASSIVE DOSES OF COBALT-60 (GAMMA) RADIATION. Rep. 59 58, April 1959, 18pp. USAF School of Aviation Medicine, Brooks AFB, Tex.

18,830
A study of the pathologic findings in monkeys irradiated with acute doses of whole-body gamma radiation, ranging from 400 to 40,000 r, was made. Twenty of the 99 animals receiving from 400 to 40,000 r exhibited severe signs of central nervous system damage which persisted until death. Autopsies were made to study pathologic alterations of the central nervous system and on lesions occurring simultaneously in the remaining viscera, particularly in the gastrointestinal tract. The observed changes were compared to those described by other authors. The concept of "leukocyte devitalization" was introduced.
T. G. I. R 11

18,831
Langdon, D.E. AIR EVACUATION OF PATIENTS WITH HEAD INJURIES. Rep. 61 91, Aug. 1961, 8pp. USAF School of Aerospace Medicine, Brooks AFB, Tex.

18,831
Physicians from the School of Aerospace Medicine observed results of air evacuation by modern pressurized aircraft of 47 patients with varied head injuries. The data collected were 1) state of consciousness of patient; 2) reason for evacuation; 3) causes of head injury; 4) diagnoses; 5) flying time; 6) time of evacuation, in days after injury; and 7) disposition of patients. In-flight problems, such as those connected with acutal flight as well as nursing care, were observed and discussed in relation to selection of patients and their preparation for air evacuation.
T. R 18

18,832
Langendorf, Patricia M. THE PHILOSOPHY OF THE GENERAL PROBLEM OF SEARCH AND DETECTION. Proj. 4505, RADC TN 59 130, May 1959, 7pp. USAF Rome Air Development Center, Griffiss AFB, N.Y.

18,832
A study was conducted to discover the way a detection system should operate to maximize detection in the absence of information regarding the signal to be detected. The problem of search in detection was defined. The simplest possible distribution in frequency azimuth and transmitter time cycle and the pattern of search in successive blocks of $\Delta\theta, \Delta f$ for Δt were assumed and interaction was emphasized.
I.

18,833
LaRochelle, P.J. & Brescia, R.E. SOME PROBABILITY ASPECTS OF THE AIRCRAFT COLLISION PROBLEM. NRL Rep. 5289, April 1959, 45pp. USN Research Lab., Washington, D.C.

18,833
The general problem under consideration here is the aircraft collision problem. As one in a series of reports, this paper emphasizes that before an adequate approach to control can be chosen, a knowledge of both the random and ordered aspects of the air space environment must be known. Some conclusions are reached as to techniques for improving reliability of position data, suitable methods for accomplishing the necessary communications with desired reliability, and means to reduce disturbances in flight program due to collision avoidance maneuvers. Problems for further investigation are indicated.
T. G. I. R 10

18,834
Pollack, I. HEARING. Annu. Rev. Psychol., 1961, 12, 335-362. (USAF Operational Applications Office, Applications Research Branch, AFCCDD, Bedford, Mass.). (AFCCDD TR 60 26).

18,834
A survey of literature on hearing is presented. The period covered is primarily the years 1958 and 1959 although some references of 1956, 1957, and the spring of 1960 are included. The increase in rate of publications in this field are noted. The following major headings are used to organize the review: monographs, Bekesy's skin model of the cochlea, physiology of the auditory system, comparative study of audition, theory of signal detectability, loudness and loudness scaling, pitch, masking, binaural listening, noise-induced hearing loss, audiometry, response to low frequencies, and speech.
R 204

18,835
Otis, L.S. & Boenning, R.A. A TRANSISTORIZED CIRCUIT FOR RECORDING CONTACT RESPONSES. Contract N5ORI 166, Task I & Contract NONR 248(55), Rep. 10, 1959, 3pp. Johns Hopkins University, Baltimore, Md.

18,835
A highly sensitive and reliable transistorized contact electronic switch is described. The switch can be used to control recording equipment used in any psychological problem in which the S can be trained to touch, or in fact does touch during the normal course of his behavior, selected regions of the behavioral space. The usefulness of the touch response is discussed.
I. R 1

18,836
Paskusz, G. & Gwynne, G. BRAIDED PNEUMATIC ACTUATORS: DYNAMIC TEST RESULTS AND EXTENSION OF PREVIOUS ANALYSIS. Rep. 61 36, Tech. Note 19, July 1961, 20pp. Department of Engineering, University of California, Los Angeles, Calif.

18,836
This note presented the findings and some implications of a short series of experiments investigating the dynamic behavior of the Braided Pneumatic Actuator (BPA) or McKibben Artificial Muscle. The dynamic length characteristics of BPA investigated were 1) extension under various loads (preloading from 3 to 20 lbs.), 2) extension under varying operating pressure (25 to 60 lbs./square inch), and 3) constant load characteristics. The effect of weave angle on force pressure ratio was determined by theoretical analysis. A practical application of the principles developed was made in a design study of an electropneumatic prosthesis.
T. G. I. R 3

18,837
Pope, L.T. A SURVEY OF CHECKOUT EQUIPMENT USED IN AIR FORCE WEAPON SYSTEMS, WITH EMPHASIS ON THE MAN-MACHINE RELATIONSHIP. Proj. 7184, Task 71586, ASD TN 61 38, May 1961, 12pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio.

18,837
The engineering files of 13 Air Force weapon systems were searched for information on the various types of checkout equipment in use by the Air Force today. In this search, emphasis was placed on the man-machine relationships involved in the operation of the equipment. The information was used in developing a tentative Level-of-Automation scale; 37 items of checkout equipment were rated on the scale. Checkout problems which should be investigated were identified.
T. R 7

18,838
Plutchik, R. EFFECT OF HIGH INTENSITY INTERMITTENT SOUND ON COMPENSATORY TRACKING AND MIRROR TRACING. Percept. Mot. Skills, 1961, 12, 187-194. (Hofstra College, Hempstead, N.Y.).

18,838
To study certain types of noise effects on tracking performance, six Ss were required to work at two tasks--mirror-tracing a star pattern and compensatory tracking of an "horizon-line" moving up and down on the screen of an oscilloscope. The line was driven by a sinusoidal input at 24 cycles per min. At certain times a high intensity intermittent tone was introduced at three pulses per sec.; tone frequency was 2,500 or 1,000 cps at intensities of 105 to 122 db depending on a previously determined "just noticeably painful" level for each S. Performance time and error time for star-tracing and summated error indices for tracking were analyzed and interpreted in terms of task complexity and requirements.
T. I. R 11

18,839
Roy, S.N. & Roy, J. A NOTE ON A CLASS OF PROBLEMS IN 'NORMAL' MULTIVARIATE ANALYSIS OF VARIANCE. Contract AF 18(600) 83, AFOSR TN 57 749, Nov. 1957, 6pp. University of North Carolina, Chapel Hill, N.C.

18,839
This note considers some problems in "normal" multivariate analysis of variance. The model is as follows: let the columns of X (pxn) be independent, nonsingular, p-dimensional, normal variates with a common variance-covariance matrix and expectations given by $\xi X' = A\xi$ where A (mxn) is a matrix of known constants and ξ (mxp) is a matrix of unknown parameters. Under this model the hypothesis $\mathcal{H}: \xi = B\eta$ where B (mxk) is a given matrix of constants and η (kxp) is a matrix of unknown parameters is considered. It is shown that the hypothesis is completely testable only under certain conditions.

18,840
Rubenstein, H. & Pollack, I. DESCENT OF THE MEDIAN: REPLY TO GERSTMAN AND BRICKER. J. acoust. Soc. Amer., May 1961, 33(5), 697-699. (USAF Operational Applications Office, Applications Research Branch, AFCCDD, Bedford, Mass.).

18,840
In an earlier experiment on identification of unknown sets of words presented in noise, it was found that the median word frequency of incorrect responses decreased as the signal-to-noise (S/N) ratio became more favorable. Since the same listeners heard the same set of noise at successively more favorable S/N ratios, learning could have been a factor in the descent of the median. Results from a similar study using different sets of listeners for each S/N ratio were presented in this note to clarify this confusion.
G. R 6

18,841
Richards, O.W., Woolner, R.W. & Panjian, J. WHAT THE WELL-DRESSED DEER HUNTER WILL WEAR. Nat. Safety News, ca. 1960, 8pp. (American Optical Co., Southbridge, Mass.).

18,841
To determine the color that would give the best protection in Massachusetts when worn by hunters of white-tailed deer, a series of field tests was conducted in typical deer hunting terrain during three different months of the hunting season (October, November, and January). More than 500 observers participated in the tests; of these men, 6.7 percent were color deficients as identified by laboratory testing. Colors tested were: 1) fluorescent red yellow, blaze orange, fire orange, and neon red; and 2) nonfluorescent white, yellow, and red. The test program included: 1) identifying color of targets placed at random along the course; 2) selecting comfort, handier to use, most artificial, and most protective; and 3) [illegible] shooting at moving targets. Recommendations were included. T. G. I. R 8

18,843
Tupes, E.C. & Kaplan, Margorie N. RELATIONSHIPS BETWEEN PERSONALITY TRAITS, PHYSICAL PROFICIENCY, AND CADET EFFECTIVENESS REPORTS OF AIR FORCE ACADEMY CADETS. Proj. 7717, Task 17110, ASD TN 61 53, Sept. 1961, 40pp. USAF Personnel Lab., Lackland AFB, Tex.

18,843
Cadets in three USAF Academy classes rated each other on 20 personality traits as well as on physical ability and officer potential. For two of the classes objective measures of physical proficiency were available. Intercorrelation matrices within each class were analyzed to determine relationships between personality trait ratings and Cadet Effectiveness Ratings (ratings made on each cadet by his peers, his upperclassmen, and his tactical officers to measure leadership ability and officer potential), and to determine the factor structure underlying the ratings. The results were compared with OCS candidates and majors attending Command and Staff School.
T. G. R 8

18,844
Tinker, M.A. BRIGHTNESS CONTRAST, ILLUMINATION INTENSITY AND VISUAL EFFICIENCY. Amer. J. Optom. & Amer. Acad. Optom., May 1959, 36, 221-236. (Department of Psychology, University of Minnesota, Minneapolis, Minn.).

18,844
To evaluate speed of perception in reading versus visibility as techniques for determining the illumination requirements for adequate vision in reading under varying degrees of brightness contrast between print and paper, 367 Ss were tested on either a standard speed of reading test or on five-letter words from these tests, individually displayed. The test materials were printed on paper of different reflectances so that the brightness contrasts were 0.756, 0.581, 0.348, and 0.217. Illumination intensities used were 5, 25, 50, 100, 200, and 400 ft.-c. Visibility of print and speed of reading were measured under each condition of light intensity and brightness constrast. The findings were related to the problem of specifying illumination.
T. R 6

18,845
Taylor, M.M. EFFECT OF ANCHORING AND DISTANCE PERCEPTION ON THE REPRODUCTION OF FORMS. Percept. Mot. Skills, 1961, 12, 203-230. (Johns Hopkins University, Baltimore, Md.).

18,845
The consistent errors in serial reproduction of visual forms were investigated for the position of 1) the dot on a blank index card, 2) the line, and 3) the quadrilateral. An analysis of error tendencies led to an hypothesis that the edge of the card had an anchoring effect. In some following experiments, anchoring marks were used on the response card. A very simple model was formulated which accounts for the observed errors in terms of the relation of perceived distance to the proximity of anchoring points. Improvements in the model were suggested.
G. I. R 22

18,846
Vomaske, R.F., Sadoff, M. & Drinkwater, F.J., III. THE EFFECT OF LATERAL-DIRECTIONAL CONTROL COUPLING ON PILOT CONTROL OF AN AIRPLANE AS DETERMINED IN FLIGHT AND IN A FIXED-BASE FLIGHT SIMULATOR. NASA TN D 1141, Nov. 1961, 44pp. National Aeronautics and Space Administration, Washington, D.C. (Ames Research Center, Moffett Field, Calif.).

18,846
As part of a general program investigating the basic vehicle flying or handling qualities of advanced vehicle design, a flight and fixed-base simulator study was made at several conditions of Dutch roll damping to determine the effect on pilot opinion of a wide range of favorable and adverse yawing moments due to aileron deflection. Objectives were 1) to define the maximum acceptable levels of aileron-induced yawing moments, 2) to assess the effect of lack of motion cues in a fixed-base flight simulator, and 3) to evaluate several lateral-directional handling qualities parameters.
T. G. I. R 11

18,847
Taylor, L.W., Jr. ANALYSIS OF A PILOT-AIRPLANE LATERAL INSTABILITY EXPERIENCED WITH THE X-15 AIRPLANE. NASA TN D 1059, Nov. 1961, 29pp. National Aeronautics and Space Administration, Washington, D.C. (USAF Flight Research Center, Edwards AFB, Calif.).

18,847
By using an experimentally developed human transfer function for the pilot and system-analysis methods, the pilot-airplane lateral instability observed with the X-15 airplane was analyzed. The methods used adequately explained the lateral-control problem and can be used to predict the problem. The calculated area of lateral-control difficulty was compared with that determined on the X-15 piloted flight simulator and with flight data.
T. G. I. R 4

18,848
Shapley, L.S. COMPLEMENTS AND SUBSTITUTES IN THE OPTIMAL ASSIGNMENT PROBLEM. Res. Memo. 2240, Aug. 1958, 8pp. Rand Corporation, Santa Monica, Calif.

18,848
When studying a process that depends intricately on several input activities it is sometimes of interest to know whether two given activities are complements or substitutes--that is, whether they reinforce or interfere with each other's influence on the process as a whole. The optimal assignment problem is considered here to be such a process and the complementarity-substitutability relationships between its elements are established. It is shown that man-machine pairs are complementary while man-man and machine-machine pairs are substitutes.
I. R 1

18,849
Starkey, D.G. & Carter, D.L. MEN SURPASS PRESENT DAY MACHINES IN THE ABILITY TO:, MACHINES SURPASS MAN IN THE ABILITY TO:. Human Factors Bull. 58 5M, ca. 1960, 1p. Flight Safety Foundation Inc., New York, N.Y. (Chance Vought Aircraft, Inc., Dallas, Tex.).

18,849
This bulletin presents a list of functions in which men surpass present day machines and of those in which machines surpass men. Each function is illustrated graphically.

18,850
Hall, W.J. MOST ECONOMICAL MULTIPLE-DECISION RULES. Contract AF 18(600) 458, OSR TN 54 268, CIT Rep. 10, Aug. 1954, 160pp. University of North Carolina, Chapel Hill, N.C.

18,850
Nonsequential decision procedures for choosing among a number of alternatives are derived which are most economical in the sense that the cost of experimentation is minimized, subject to bounds on the probabilities of making correct or incorrect decisions. Characteristic properties and existence theorems are given as well as a number of applications to common statistical problems. Also, a theory of most economical decision functions is briefly discussed. An appendix treats some particular examples of two- and three-decision rules; a nomograph is presented for obtaining such rules explicitly; some brief tables of most economical sample sizes are computed from it.
T. G. R 26

18,851
Tagiuri, R. MOVEMENT AS A CUE IN PERSON PERCEPTION. From: David, H.P. & Brengelman, J.C. (Eds.), "Perspectives in Personality Research," 1960, 175-195. Springer Publishing Company, New York, N.Y.

18,851
An analysis of the role of movement in the process of understanding other persons is presented. Two major methods of inquiry are described: 1) the frozen path wherein a line between two points is shown and the S asked to consider this line as a path described by a person moving from one point to another and then to describe the kind of person, and 2) moving dot on a film to describe the path. In some cases the goal is described as undesirable, desirable, or indifferent. An analysis of the free response data is made in terms of preferred responses under three conditions of goal valence, the meaning of angle of movement, signal features of the path, and field conditions.
T. I. R 20

18,852
Vallance, T.R. DEVELOPING GUIDANCE FOR ESTABLISHING REQUIREMENTS AND CHARACTERISTICS OF TRAINING DEVICES--TRADER. Task NR 01 04, ca. 1961, 75-78. USA Air Defense Human Research Unit, Fort Bliss, Tex.

18,852
This task statement on a research project for developing guidance for establishing requirements and characteristics of training devices presents its principal investigator and sponsor, its scope (objectives, background, and method of attack), estimated time, and professional requirements.
T.

18,853
Devoe, D.B. PRELIMINARY INVESTIGATION OF ABRIDGED COLOR TELEVISION. OAL TM 61 1, Dec. 1961, 10pp. USAF Operational Applications Lab., Bedford, Mass. (Sperry Rand Research Center, Sudbury, Mass.).

18,853
Recent literature on abridged color systems (methods of producing colored pictures with anything less than three primary colors) was reviewed and the implications of such systems for television, especially for military applications, were discussed. Some exploratory research was accomplished, the results described, and recommendations for further research were made.
I. R 16

18,854
Engstrom, H. & Ades, H.W. EFFECT OF HIGH-INTENSITY NOISE ON INNER EAR SENSORY EPITHELIA. Acta Oto-Laryng., ca. 1960, Suppl. 158, 219-229. (University of Goteborg, Goteborg, Sweden & USN School of Aviation Medicine, Pensacola Air Station, Fla.).

18,854
This was a preliminary report of the effect of high-intensity noise on cochlear hair cells. Guinea pigs were exposed to various kinds of noise from two different tone generators, jet engines, helicopters, gun shots, and white noise. The structural changes appearing inside the organ of Corti were described.
T. G. I. R 16

18,855
Cram, D. EXPLAINING "TEACHING MACHINES" AND PROGRAMMING. 1961, 86pp. Fearon Publishers, Inc., San Francisco, Calif. (Division of Audio-Visual Services, San Jose State College, San Jose, Calif.).

18,855
The term "teaching machine" is defined and various programming methods--linear, branching, self-organizing--are described. Practice is provided, in the make-up of the book, in the first two of these methods. Advantages, both actual and potential, of teaching machines are discussed. Pictures of presently available commercially produced machines are appended.
I. R 9

18,856
Harris, J.G., Jr., Beischer, D.E. & Everson, D. THE EFFECTS OF INHALATION OF 100 PER CENT OXYGEN ON PERFORMANCE OF A TASK INVOLVING VISUAL AUDITORY CONFLICT. Proj. MR005.13 1002, Subtask 11, Rep. 3, Oct. 1960, 20pp. USN School of Aviation Medicine, Pensacola Air Station, Fla.

18,856
To explore the effects of breathing pure oxygen at one atmosphere pressure on performance, a task involving visual-auditory conflict was performed by nine Ss breathing oxygen and by a control group of 40 Ss breathing air. Recognition of stimulus form or color, simultaneous comprehension of printed and spoken words, and resolution of conflict among these stimulus elements by pressing appropriate response key was the task. A set of 30 stimulus patterns was presented before breathing oxygen and again at 30-min. intervals throughout a three and one-half-hour period. Response times and errors were analyzed for effect of time spent breathing oxygen and were also compared with results from the control group.
T. R 5

18,857
Muckler, F.A. THE DESIGN OF OPERATOR CONTROLS: A SELECTED BIBLIOGRAPHY. Contract AF 33(616) 7752, Proj. 6190, Task 71573, WADD TN 60 277, March 1961, 62pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio. (Martin Company, Baltimore, Md.).

18,857
A bibliographic survey of research on critical variables in the design of operator controls was presented. Major emphasis in selecting articles was placed on the problems of 1) types of manual operator controls, 2) selecting operator controls, 3) physical dimensions of operator controls, 4) inadvertent control operation and control coding, 5) environmental factors and personal equipment, and 6) layout of controls. Where pertinent, material has been added in the areas of skilled operator movement characteristics and display-control relationships. Of prime interest was the physical characteristics of operator controls. A subject index was included to the alphabetically (by author) arranged titles.
I. R 404

18,858
Moul, M.T., Schy, A.A. & Williams, J.L. DYNAMIC STABILITY AND CONTROL PROBLEMS OF PILOTED REENTRY FROM LUNAR MISSIONS. NASA TN D 986, Nov. 1961, 20pp. National Aeronautics and Space Administration, Washington, D.C. (Langley Research Center, Langley AFB, Va.).

18,858
A fixed-base simulator investigation was made of stability and control problems during piloted re-entry from lunar missions. Re-entries were made within constraints of acceleration and skipping, in which the pilot was given simulated navigation tasks of altitude and heading angle commands. Vehicles considered included a blunt-face, high-drag capsule, and low-drag lifting cone, each of which had a trim lift-drag ratio of 0.5. Three-axis automatic damping was included and results were presented for various damper-failure conditions.
T. G. I. R 2

18,859
Dorfman, D.D. & Zajonc, R.B. SOME EFFECTS OF SOUND AND BACKGROUND BRIGHTNESS ON THE PERCEIVED SIZE OF COINS AND DISCS. STUDIES ON DRIVE AND INCENTIVE IN PERCEPTION IV. AFOSR Grant AF 49(638) 367 & NSF Grant G 4951, Tech. Rep. 12, Nov. 1961, 14pp. Research Center for Group Dynamics, University of Michigan, Ann Arbor, Mich.

18,859
To test the point of view that perceptual accentuation may occur in the presence of extraneous stimuli whether or not they bear any relationship to the object perceived, 120 children (half were from low-income and half from high-income homes) estimated the size of coins (penny, nickel, dime, quarter, and half-dollar) and medium gray discs matched with the coin for size. Judgments were made against a black and also a white background, with and without sound. Judgments of apparent size were analyzed for effects of background brightness, sound, and economic background. Interaction effects were examined.
T. G. R 17

18,860
Clausen, J. & Karrer, R. ELECTRICAL SENSITIVITY OF THE EYE IN THE MENTALLY RETARDED. Train. Sch. Bull., May 1961, 58(1), 3-13. (Training School, Vineland, N.J.).

18,860
An initial exploration of the potentialities of using the phosphene threshold as a means of studying cases with central nervous system involvement, 55 young mentally retarded Ss were studied. The phosphene threshold was recorded for 20 cps sine wave stimulation and studied in relation to age, sex, EEG, neurological examination results, to the latter two combined, and to etiology.
T. R 7

18,861
Munis, T.E., Jr. EFFECTS OF A MASTER CAUTION INDICATOR ON DETECTION OF PERIPHERAL SIGNALS. Human Factors Data Bull. 57, Dec. 1960, 2pp. Human Factors Group, Westinghouse Electric Corporation, Baltimore, Md.

18,861
A brief summary of the results of an experiment investigating the feasibility of using a centrally located caution indicator to aid in detecting peripherally located signals was presented. The S was given a primary tracking task with a secondary task of "extinguishing," by pressing an appropriate button, any of the peripherally located lights that came on. On some trials a central or master indicator lighted up as the peripheral lights came on; on others the peripheral lights came on alone. Number of missed peripheral signals for each condition was presented.
T. R 1

18,862
Newman, K.M. & Davis, A.K. MULTIDIMENSIONAL NONREDUNDANT ENCODING OF A VISUAL SYMBOLIC DISPLAY. Proj. PO 06401, S R006 09 02, Task 5742 (NEL N5 5), Rep. 1048, July 1961, 49pp. USN Electronics Lab., San Diego, Calif.

18,862
Experiments were conducted to determine whether a multidimensional nonredundant means of encoding information for visual displays could be derived from several encoding dimensions. The effectiveness of geometric-only encoding was compared with geometric-plus-brightness level, flashing rate, and color encoding with respect to speed and accuracy in the performance of two different tasks.
T. G. I. R 35

18,863
Chase, W.P. PERSONNEL SUBSYSTEM DEVELOPMENT AND TEST PROGRAM. Contract AF 04(694) 1, July 1961, 39pp. Space Technology Laboratories, Inc., Los Angeles, Calif.

18,863
Included in a complete system are the hardware, facilities, materiel support, and the qualified personnel required for the operation, control, and maintenance of the system in its intended operational environment. This presentation, although concerned primarily with the development of the personnel subsystem, emphasizes the interdependence of all the subsystems in the development process. By means of charts and diagrams, a systems engineering approach for personnel subsystem development is presented and discussed.
I.

18,864
Moore, H.G. THE EFFECTS OF LOAD AND ACCESSIBILITY OF INFORMATION UPON PERFORMANCE OF SMALL TEAMS. Contract AF 49(638) 449, ORA Proj. 02814 8 T, AFOSR TR 1636, Oct. 1961, 125pp. Office of Research Administration, University of Michigan, Ann Arbor, Mich.

18,864
To determine some of the effects of input load density and of information accessibility on the effectiveness of two-man teams in performing a complex, dynamic, time-stressed task, 96 male Ss were divided into two-man teams. The task was a simulated taxi dispatching station with the problem of pickup and delivery of 15 persons. Two load conditions (low—three persons every two min.; high—three persons each min.) were combined with two levels of information accessibility (unrestricted with face-to-face communication; restricted with radio intercommunication) to make four conditions. Performance was scored on a schedule of earnings, bookkeeping errors, waiting times, cab miles, and paid miles. The results were discussed in relation to hypotheses derived from study of literature. T. G. I. R 35

18,865
Davis, T.R.A. & Matzger, A.D. THE COOLING EFFECT OF WIND ON THE LITTLE FINGER. USAMRL Proj. 6X64 12 001, Task 01, Rep. 440, Dec. 1960, 13pp. USA Medical Research Lab., Fort Knox, Ky.

18,865
A study was made of the cooling effect of combinations of wind velocity and temperature upon the little finger of man. Eight Ss were tested in a wind tunnel using four temperatures (-5, -15, -20, and -25 degrees C) with wind velocities of 0, 2.5, 10, and 25 mph. During exposure the little finger was held in the resting position in the air stream until the temperature of the exposed finger reached zero degrees C or the S experienced unbearable pain. Rate of cooling was analyzed in terms of wind velocity and temperatures.
T. G. R 4

18,866
Botsch, F.W., Powers, J.J. & Sacco, M.J. ENVIRONMENTAL PROTECTION RESEARCH BY MEANS OF RADIO TELEMETRY. II. MEASUREMENT OF PULSE RATE FROM ACTIVE TEST SUBJECTS. Proj. 7X83 01 009, Tech. Rep. EP 158, July 1961, 19pp. USA Environmental Protection Research Div., QM Research & Engineering Center, Natick, Mass.

18,866
New instruments for measuring pulse rates under various testing conditions are described. They are 1) a wire telemeter used in climatic chamber studies, 2) a portable unit that delivers an audio signal suitable for either earphone monitoring or recording on magnetic tape, and 3) a radiocardiotachometer used in field studies. A noise-free, nonambiguous record of pulse beats during strenuous exercise can be obtained from these instruments. Photographs, circuit diagrams, and drawings of the component parts are given. Sample data are presented which show the pulse wave shape and typical transient response curves of pulse rate for various activities.
G. I. R 15

18,867
Breckenridge, J.R. EFFECTIVE AREA OF CLOTHED MAN FOR SOLAR RADIATION. Proj. 7X83 01 009, Tech. Rep. EP 157, July 1961, 11pp. USA Environmental Protection Research Div., QM Research & Engineering Center, Natick, Mass.

18,867
To obtain effective area data on Arctic, wet-cold, and hot-weather uniforms that would supplement work on nude men done previously, measurements were made on two average-sized men. The effective, or normal cross-sectional, area in the path of direct sunlight was determined for the two men dressed in each of the three uniforms and in each of four positions (sitting, standing, walking, and prone). Values were obtained by measuring the outlined areas of the men on photographs taken from front, rear, side, and overhead, and from various angles with the horizontal, assuming that a camera located between the sun and man would photograph the same cross-section as that in the path of direct radiation.
T. G. I. R 6

18,868
Doll, R.E. & Berkshire, J.R. BIBLIOGRAPHY: PSYCHOLOGICAL RESEARCH IN THE U.S. NAVAL SCHOOL OF AVIATION MEDICINE--JULY 1950-JUNE 1960. Feb. 1961, 41pp. USN School of Aviation Medicine, Pensacola Air Station, Fla.

18,868
This bibliography covers those inservice research publications of the USN School of Aviation Medicine which might be of interest to psychologists. The period of publication covered is from July, 1950, through June, 1960. The report titles are grouped by subject matter as follows: acoustics, anxiety, attitudes, grades and standards, morale, peer ratings, perception, selection, methodology, safety, tests, training, vision, and miscellaneous. An author index is included.
R 493

18,869
Evans, W.O. & Jewett, A. THE EFFECT OF SOME CENTRALLY ACTING DRUGS ON DISJUNCTIVE REACTION TIME. Proj. 6X95 25 001, Task 03, Rep. 510, Oct. 1961, 4pp. USA Medical Research Lab., Fort Knox, Ky.

18,869
A test was made of the hypothesis that drugs which arouse or depress the EEG response should differentially affect the reaction to stimuli occurring with different frequencies. Disjunctive RTs to stimuli with different probabilities of occurrence were obtained from Ss while under the effects of chlorpromazine, d-amphetamine, atropine, and sucrose. RTs were analyzed by techniques of analysis of variance.
T. R 5

18,870
Kennedy, R.S. & Graybiel, A. SYMPTOMATOLOGY DURING PROLONGED EXPOSURE IN A CONSTANTLY ROTATING ENVIRONMENT AT A VELOCITY OF ONE REVOLUTION PER MINUTE. Proj. MR005.13 6004, Subtask 1, Rep. 62, Sept. 1961, 19pp. USN School of Aviation Medicine, Pensacola Air Station, Fla.

18,870
To define the angular velocity of a continuously rotating environment which would not cause disturbing symptoms in men subjected to this environment, systematic observations were made on eight Ss on certain tasks aboard the slow rotation room at a velocity of one rpm. Previous findings of symptoms at velocities from 1.7 to 10.0 rpm were used to select the rate for this experiment. Four Ss were selected whose susceptibility to canal sickness and motion sickness was far above average. The application of the findings to orbiting vehicles was discussed.
T. R 5

18,871
Briggs, P. ON HUMAN ADAPTIVE STRATEGY IN AN UNPREDICTABLE ENVIRONMENT. Contract AF 19(604) 4548, DSR 8055 3, ESD TR 61 41, Aug. 1961, 65pp. Dynamic Analysis and Control Lab., Massachusetts Institute of Technology, Cambridge, Mass.

18,871
The interaction between human Ss and a simple, experimentally reproducible environment is studied in detail. The task may be visualized as a hill-climbing problem in which the hill is simply a randomly pivoting ramp function. The person varies two quantities, x_1 and x_2, while observing changes in a third quantity, z. Constraints are imposed upon the manipulation of x_1 and x_2 and upon the slope and orientation of the ramp; transition probabilities are introduced which govern rotation of the ramp from one orientation to the other. Assumptions concerning the mechanism of human choice behavior in this situation lead to the development of a single-parameter stochastic behavior model. Predicted performance is compared with experimentally determined performance; discrepancies are discussed. T. G. I. R 10

18,872
Guedry, F.E., Jr. & Graybiel, A. THE APPEARANCE OF COMPENSATORY NYSTAGMUS IN HUMAN SUBJECTS AS A CONDITIONED RESPONSE DURING ADAPTATION TO A CONTINUOUSLY ROTATING ENVIRONMENT. Proj. MR005.13 6001, Subtask 1, Rep. 61, Aug. 1961, 23pp. USN School of Aviation Medicine, Pensacola Air Station, Fla.

18,872
To determine the course of adaptation to a slowly rotating environment, seven men were rotated at 5.4 rpm in a room for 64 hours. Vestibular nystagmus produced by a series of controlled head and body movements was used as an indicator of the state of adaptation. Tests were administered before, during, and after rotation. Observations on such symptoms as nausea and disorientation were made throughout the run. Changes in nystagmus throughout the run and appearance of a compensatory nystagmus in the test following the run were studied. Practical problems of transfer of habituation from one acceleration environment to another were discussed.
T. G. I. R 35

18,873
Graybiel, A. & Clark, B. PERCEPTION OF THE HORIZONTAL OR VERTICAL WITH HEAD UPRIGHT, ON THE SIDE, AND INVERTED UNDER STATIC CONDITIONS AND DURING EXPOSURE TO CENTRIPETAL FORCE. Proj. MR005.13 6001, Subtask 1, Rep. 60, Aug. 1961, 13pp. USN School of Aviation Medicine, Pensacola Air Station, Fla. (San Jose State College, San Jose, Calif.).

18,873
To measure the accuracy of visual egocentric localization in widely different body (head) positions and the changes in localization induced by a change in direction of the gravitational-inertial force environment, tests were conducted on five Ss. The task was to set a luminous line to the horizontal while in the dark. The head positions were upright, on the side, and inverted with measurements taken under static conditions and during exposure to centripetal force. Comparisons of mean settings for both conditions were made. The significance of the findings was discussed with reference to the function of the otolith apparatus and other factors.
T. I. R 13

18,874
Harbold, G.J. & Greene, J.W. AN OPERATIONAL EVALUATION OF AN AUDIOMETRIC TEST ROOM AND THREE AUDIOMETERS ABOARD THE USS SARATOGA. Proj. MR005.13 2005, Subtask 1, Rep. 12, June 1961, 19pp. USN School of Aviation Medicine, Pensacola Air Station, Fla.

18,874
This study assessed the adequacy of an audiometric test room and the relative effectiveness of three audiometers aboard the USS SARATOGA. Ambient noise measures in the test room and audiometric data were obtained during three operational conditions of the carrier. The findings were discussed in relation to the feasibility of implementing a hearing conservation program aboard ship.
G. I. R 2

18,875
Hawkes, G.R. & Loeb, M. VIGILANCE FOR CUTANEOUS AND AUDITORY STIMULI AS A FUNCTION OF INTERSIGNAL INTERVAL AND SIGNAL STRENGTH. Proj. 6X95 25 001, Task 02, Rep. 511, Oct. 1961, 8pp. USA Medical Research Lab., Fort Knox, Ky.

18,875
To investigate vigilance for infrequent auditory or electrical cutaneous stimuli at both weak and moderate intensities, 24 Ss were tested in two sessions for each type of stimuli. The task was to press a key in response to the perceived presence of the stimulus. Cutaneous signal intensities were 1.2 db sensation level (SL) and 5.1 db SL (absolute threshold); auditory signal strength was subjectively equal to the cutaneous. Interstimulus intervals of 150, 225, 300, 375, 450, 525, or 600 sec. were used. Response latencies for each session (100 min.) were analyzed for effect of signal, signal strength, interstimulus interval, and time on task.

18,876
Hicks, S.A. THE EFFECTS OF TWENTY-FOUR HOURS CONFINEMENT IN MOBILE ARMORED PERSONNEL CARRIERS ON SELECTED COMBAT RELEVANT SKILLS: STUDY V. Tech. Memo. 23 61, Nov. 1961, 10pp. USA Ordnance Human Engineering Labs., Aberdeen Proving Ground, Md.

18,876
This investigation was the fifth in a series designed to determine changes in general combat relevant performance as a result of sustained confinement in Armored Personnel Carriers. In this study, 44 men were tested before and after 24 hours of confinement in mobile carriers. The tests were designed to measure stamina, eye-arm coordination, locomotor coordination, equilibrium, and hand-arm steadiness. Changes in performance due to confinement were analyzed. Recommendations were included for future research.
T. R 7

18,877
Glucksberg, S. & Karsh, R. EFFECTS OF THREAT OF PUNISHMENT ON MONITORING PERFORMANCE. Tech. Note 5 61, Oct. 1961, 11pp. USA Ordnance Human Engineering Labs., Aberdeen Proving Ground, Md.

18,877
To determine whether punishment (electric shock) facilitates monitoring performance, the Ss (eight men, eight women) performed a visual monitoring task for a two-hour period. The specific task was to press a key whenever a blinking neutral signal was replaced by a critical signal (sine wave). One group of Ss was given a mild electric shock if they responded late (RT over .75 sec.), if they missed a signal, or if they responded in the absence of a critical signal. The other group merely monitored for the two-hour period. RTs were analyzed as a function of time and compared for the two groups. Differences due to sex were noted.
T. G. R 10

18,878
Carson, T.R., Rosenholtz, M.J. & Wilinski, F.T. THE RESPONSES OF ANIMALS INHALING NITROGEN DIOXIDE FOR SINGLE, SHORT-TERM EXPOSURES. MIPR (33 616) 60 32, Proj. 7165, Task 71836, ASD TR 61 525, Oct. 1961, 11pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio. (USA Chemical Research & Development Labs., Army Chemical Center, Md.).

18,878
To provide toxicological information that would aid in estimating a safe concentration of nitrogen dioxide (NO_2) in man for single, short exposures, rats and rabbits were exposed to various concentrations for 5 to 60 min. and the Lethal Concentration 50's (LC50) were calculated. In addition, rats and dogs were exposed for single 5- to 60-min. periods to various concentrations of NO_2 below the rats' LC50's. Toxic signs, pathologic changes in the lung and lung-to-body weight ratios, were correlated with length and severity of exposure. Concentrations of NO_2, at which minimal effects were found, were calculated for various time exposures.
T. G. R 18

18,879
Drone, K.C. DESIGN STUDY FOR AN ACCELERATION RESEARCH DEVICE. Contract AF 33(616) 7536, Proj. 7222, Task 71746, ASD TR 61 425, Aug. 1961, 256pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio. (Tucker Company, Oakland, Calif.).

18,879
An advanced centrifuge design, utilizing modern engineering and manufacturing techniques, for research in biophysics of acceleration, is described. A tentative configuration and performance of a centrifuge and facility that meets present and anticipated weapons systems requirements is presented along with an evaluation of the centrifuge with respect to the research value of a specific performance capability and its attendant costs, and with respect to manufacturing techniques to meet performance requirements with emphasis placed on vibration control and stored energy powering means. The areas of study (kinematics, kinetics, vibrations, dynamics of simulation and rotation, etc.) which were major factors in the design are included.
G. I. R 42

18,880
Demaree, R.G. DEVELOPMENT OF TRAINING EQUIPMENT PLANNING INFORMATION. Contract AF 33(616) 7464, Proj. 7190, Task 71608, ASD TR 61 533, Oct. 1961, 101pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio. (Psychological Research Associates, Arlington, Va.).

18,880
This report attempts to take proper account of both engineering and human factors considerations in the timely procurement and delivery of training equipment in the development of USAF systems. The report consists of the following sections: introduction, an overview of training equipment planning, training functions for various types of training equipment, training equipment utilization, training equipment effectiveness characteristics, training equipment costs, and training equipment planning information development. Appended are term definitions, the personnel subsystem and its elements, and a selected bibliography.
T. G. I. R 65

18,881
Kubiak, E.J., Rest, J. & Bambenek, R.A. A CLOSED RESPIRATORY SYSTEM EVALUATOR. Contract AF 33(616) 7392, Proj. 6373, Task 63120, ASD TR 61 512, Sept. 1961, 48pp. USAF Life Support Systems Lab., Wright-Patterson AFB, Ohio. (American Machine & Foundry Company, Niles, Ill.).

18,881
A program for developing a device capable of simulating human respiration and recording the operating characteristics of closed respiratory systems is described. The closed respiratory system evaluator described is capable of performing all tests necessary to evaluate the performance of any type of closed respiratory system. The automatic components of the evaluator and of the automatic control system are given in detail. An operating manual is appended.
G. I.

18,882
Naylor, J.C. & Briggs, G.E. LONG-TERM RETENTION OF LEARNED SKILLS: A REVIEW OF THE LITERATURE. Contract AF 33(616) 7269, Proj. 1710, Task 71605, ASD TR 61 390, Aug. 1961, 35pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio. (Ohio State University, Columbus, Ohio).

18,882
An attempt is made to provide an organization of previous research findings in the area of motor skill retention and a framework which will provide some structure to present knowledge and also serve as a guide for future research. In a review of articles that relate, either directly or indirectly, to the subject, four general classes of variables are identified: 1) those dealing with type of task, 2) those concerned with learning parameters, 3) those concerned with retention interval parameters, and 4) those concerned with recall parameters. Research under each category is reviewed and commented upon and suggestions are made for further investigation.
R 123

18,883
Altman, J.W., Marchese, Angeline C. & Marchiando, Barbara W. GUIDE TO DESIGN OF MECHANICAL EQUIPMENT FOR MAINTAINABILITY. Contract AF 33(616) 6124, Proj. 7184, Task 71586, ASD TR 61 381, Aug. 1961, 226pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio. (American Institute for Research, Pittsburgh, Penn.).

18,883
This guide contains human engineering recommendations and suggestions for designing mechanical equipment to increase over-all ease, speed, and accuracy of maintenance job performance. It is written for engineers responsible for designing mechanical subsystems and components and is intended to serve as a convenient reference to help insure the integration of maintainability design into mechanical subsystems and components. It treats design features common to all mechanical equipment as well as those features unique to certain classes of equipment.
T. I. R 103

18,884
Coermann, R.R. THE MECHANICAL IMPEDANCE OF THE HUMAN BODY IN SITTING AND STANDING POSITION AT LOW FREQUENCIES. Proj. 7231, Task 71786, ASD TR 61 492, Sept. 1961, 39pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio.

18,884
The theory of the mechanical impedance of systems with one or more degrees of freedom is applied to the human body. A method of measuring mechanical impedance and determining the parameters of the vibrating systems is developed and impedance curves for longitudinal vibrations of a sitting and standing S are established for the frequency range of 1 to 20 cps. The influence of varied posture and restraining systems is investigated. Dynamic movements of body parts are measured and compared with impedance curves. Correlations between impedance functions of the body and subjective tolerance curve to vibration are found. The variability of subjective tolerance and such factors as posture, restraining systems, etc. are discussed. Effects of impact are discussed. T. G. I. R 13

18,885
Borsky, P.N. COMMUNITY REACTIONS TO AIR FORCE NOISE. PART I. BASIC CONCEPTS AND PRELIMINARY METHODOLOGY. Contract AF 33(616) 2624, Proj. 7210, Task 71701, WADD TR 60 689 (I), March 1961, 91pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio. (National Opinion Research Center, University of Chicago, Chicago, Ill.).

18,885
A comprehensive conceptual scheme to describe the annoyance and complaint processes involved in community reactions to jet aircraft noise and related operations was presented. The basis for the scheme was a previous study of propellor-driven aircraft, a series of interviews with New York City and Hanscom AFB residents, and discussions with technical personnel concerned with different phases of the problem. 1) Objective physical characteristics of jet stimuli and related residential disturbances, 2) socio-psychological factors in perception and feelings of annoyance, and 3) community considerations determining scope of action are dealt with. A standard personal interview questionnaire for use in gathering data was developed and pretested.
T. G.

18,886
Borsky, P.N. COMMUNITY REACTIONS TO AIR FORCE NOISE. PART II. DATA ON COMMUNITY STUDIES AND THEIR INTERPRETATION. Contract AF 41(657) 79, Proj. 7210, Task 77444, WADD TR 60 689 (II), March 1961, 171pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio. (National Opinion Research Center, University of Chicago, Chicago, Ill.).

18,886
To determine relationships between variations in acoustic situations and disturbances, annoyance, and complaint potentials, personal interviews were held with almost 2,500 residents at different air bases. The acoustic conditions at three of these bases were measured. From these studies the instruments and procedures for assessing neighborhood reactions have been developed, pretested, and validated. Prototype statistical models were developed for estimating neighborhood disturbance, annoyance, and complaint readiness.
T. I.

18,887
Poe, R.H. & Davis, T.R.A. COLD EXPOSURE AND ACCLIMATIZATION IN ALLOXAN DIABETES. Proj. 6X64 12 001, Task 08, Rep. 515, Oct. 1961, 11pp. USA Medical Research Lab., Fort Knox, Ky.

18,887
To study the role of insulin in the process of cold acclimatization and in resistance to cold injury, the survival rate, incidence of cold injury, and physiological responses of a group of alloxan diabetic rats were studied at five degrees C before and during cold acclimatization. Oxygen consumption, shivering rate, tail skin and rectal temperatures were measured prior to cold acclimatization after 20 days and after 45 days of exposure.
G. I. R 37

18,888
Poe, R.H., Davidson, E.T. & Brieger, G. THE PHYSIOLOGICAL RESPONSES OF MEN WEARING CHEMICALLY IMPREGNATED PROTECTIVE CLOTHING IN A HOT DRY CLIMATE. USAMRL Proj. 6X64 12 001, Task 17, Rep. 507, Sept. 1961, 8pp. USA Medical Research Lab., Fort Knox, Ky.

18,888
To determine whether or not and to what extent a group of combat equipped soldiers wearing Hycar Absorbent Protective Underwear and XXCC 3 Impregnated Fatigues can tolerate a hot dry climate under field conditions, 40 Ss were studied. Half of the Ss wore the chemically impregnated protective clothing and half wore standard long underwear and fatigue uniform. Both groups were subjected to several types of physical exertion, selected to approximate activities of a soldier in the field during the month of July in Dugway, Utah. Physiological measurements were used to evaluate the degree of heat stress for both groups.
G. R 10

18,889
Marks, M.R. A DATA ORGANIZATION MODEL FOR THE PERSONNEL SUBSYSTEM. Contract AF 33(616) 5738, Proj. 1710, Task 71608, ASD TR 61 447, Sept. 1961, 74pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio. (Psychological Research Associates, Arlington, Va.).

18,889
The need for organizing Personnel-Equipment Data (PED) for any system is discussed; development considerations and constraints for such a model are described. It is concluded that a model which organizes all system basic data will serve for PED as well. The rationale, description, and implementation techniques for a data organization model to be used in connection with data from any USAF weapon or support system are presented. Examples of such application are given and problems in implementing the model in any system are discussed. Appendices representing categories applicable to the basic data of any system are presented. Mechanization of data storage and retrieval are discussed.
T. I. R 21

18,890
Leiderman, P.H. & Stern, R. SELECTED BIBLIOGRAPHY OF SENSORY DEPRIVATION AND RELATED SUBJECTS. Contract AF 33(616), 6110, Proj. 7220, ASD TR 61 259, July 1961, 28pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio. (Harvard Medical School, Boston, Mass.).

18,890
This bibliography compiles and classifies the available articles and books relevant to the field of sensory deprivation. Included are review articles; theoretical publications; anecdotal reports; experimental, clinical, developmental, and social accounts; sleep deprivation; vigilance; level of activation and arousal; animal and physiological studies. American and British publications are reasonably well covered. No references specific to sensory deprivation are found in the litsrature of other countries.
R 314

18,891
Jacobson, J.H. & Krohn, D.L. A STUDY TO DETERMINE THE RELATIVE BIOLOGICAL EFFECTIVENESS OF NEUTRONS BY CORRELATING THE PHYSIOLOGICAL CHANGES OF THE EYE TO X-RADIATION. Contract AF 33(616) 7127, Proj. 7165, Task 71839, ASD TR 61 415, Aug. 1961, 100pp. USAF Life Support Systems Lab., Wright-Patterson AFB, Ohio. (New York Eye and Ear Infirmary, New York, N.Y.).

18,891
To determine the Relative Biological Effectiveness (RBE) of neutrons relative to X-radiation, the heads of white albino rabbits were exposed to two X-ray units with differing parameters and to pile radiation from a critical reactor. Four moderator thicknesses were used. Estimations were made of the extent of tissue damage in the eyes by observations of the effects on the ERG, biochemical determinations, histopathological and clinical observations. An RBE for acute retinal changes was derived from the data for both types of exposure.
T. G. I. R 56

18,892
Kaehler, R.C. THE EFFECTS OF TRANSVERSE ACCELERATIONS AND EXPONENTIAL TIME-LAG CONSTANTS ON COMPENSATORY TRACKING PERFORMANCE. Contract AF 33(616) 5407, Proj. 7222, Task 71746, ASD TR 61 457, Sept. 1961, 34pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio. (School of Medicine, University of Southern California, Los Angeles, Calif.).

18,892
To evaluate human control capabilities while exposed to relatively high-magnitude, long-duration accelerations during boost and re-entry phases of manned space vehicles, a study of the effects and interactions of increased front-to-back transverse accelerations (static or zero, 3.0, and 6.0 g) and various exponential time-lag constants (0.1, 1.0, and 2.0 sec.) on tracking ability was conducted. A two-dimensional compensatory tracking task, requiring the S to hold the display at zero degrees in pitch and roll angle, was performed by 35 Ss at all acceleration and at one of the lag conditions. The results were discussed in relation to Helson's U-hypothesis and Principle of Generality. Learning effects were also treated.
T. G. I. R 29

18,893
Goldberger, L. & Holt, R.R. STUDIES ON THE EFFECTS OF PERCEPTUAL ALTERATION. Contract AF 33(616) 6103, Proj. 7222, Task 71745, ASD TR 61 416, Aug. 1961, 20pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio. (Research Center for Mental Health, New York University, New York, N.Y.).

18,893
This was a report of three separate studies which explored facets of sensory alteration (sensory deprivation). One study focused on the role of a diffuse, homogeneous visual field (Ganzfeld) in promoting visual images; the second compared performance on a cognitive test battery immediately following eight hours of perceptual isolation with performances under a drug (100 gamma of LSD-25) and a placebo condition; the third study dealt with the effects upon cognitive functioning of an eight-hour isolation experience, during which constant auditory vigilance was required of the Ss.
T. R 13

18,894
Goldberger, L. & Holt, R.R. A COMPARISON OF ISOLATION EFFECTS AND THEIR PERSONALITY CORRELATES IN TWO DIVERGENT SAMPLES. Contract AF 33(616) 6103, Proj. 7222, Task 71745, ASD TR 61 417, Aug. 1961, 46pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio. (Research Center for Mental Health, New York University, New York, N.Y.).

18,894
Findings were reported from a pair of replicated studies using male Ss and conditions of perceptual isolation (sensory deprivation) similar to those used in the McGill studies. The first group consisted of 14 undergraduates; the second consisted of 16 unemployed actors. Isolation was an eight-hour period of confinement in a semisoundproof room with no visual stimulation and a constant masking "white" noise. All Ss were put through an intensive multiform assessment of personality. Reactions to the altered sensory environment were judged from typed protocols of their verbalizations during confinement. Variables derived from the protocols were intercorrelated and related to variables from the personality assessment. Implications for space flight were discussed. T. R 22

18,895
Nunis, T.E., Jr. A COMPARISON OF VISUAL AND AUDITORY WARNING INDICATORS. Human Factors Data Bull. 55, Oct. 1960, 1p. Human Factors Group, Westinghouse Electric Corporation, Baltimore, Md.

18,895
A brief summary was given of an experimental study in which visual, auditory, and the two in combination were compared to find the best attention attracting combination when an operator is busy with another task. Ss were instructed to perform a tracking task, and secondarily, to extinguish any peripheral light signals that occurred. Four conditions were used with separate groups of Ss: peripheral lights alone, peripheral lights with a centrally located master warning light, peripheral lights with an auditory signal, and finally all signals together. Signals (total number) missed under each condition were tabulated and compared.
T. R 1

18,896
Nunis, T.E., Jr. DISPLAY OF INFORMATION AND ACCURACY OF RECALL. Human Factors Data Bull. 56, Nov. 1960, 4pp. Human Factors Group, Westinghouse Electric Corporation, Baltimore, Md.

18,896
A brief summary of an experimental study of design factors in a visual display affecting perceptual span was presented. The parameters investigated were 1) position of relevant information on the display, and 2) length of time between stimulus exposure and response. The task required the S, after viewing a two by eight array of letters for 50 msec., to name the letter designated by a black bar marker that subsequently appeared either above one of the positions in the upper row or below one of the positions in the bottom row. The appearance of the marker came after variable delays ranging from 50 to 200 msec. Accuracy of recall was analyzed for effects of the two variables.
G. R 1

18,897
Rosenblith, W.A. (Ed.). SENSORY COMMUNICATION. CONTRIBUTIONS TO THE SYMPOSIUM ON PRINCIPLES OF SENSORY COMMUNICATION JULY 19 - AUGUST 1, 1959, MASSACHUSETTS INSTITUTE OF TECHNOLOGY. Contract AF 49(638) 421, AFOSR 796, 1961, 844pp. Massachusetts Institute of Technology Press, Cambridge, Mass. & John Wiley & Sons, Inc., New York, N.Y.

18,897
The chapters in this book represent contributions by 42 research scientists to a multidisciplinary international symposium on principles on sensory communication. The chapters present experimental results and theoretical considerations from a variety of approaches to the general problem of the symposium. Several chapters are devoted to psychophysics and other measurement problems; others are devoted to communication problems in a specific sensory mode; another group deal with events and properties of the nervous system. A final chapter by the editor looks to problems of the future.

18,898
Kopstein, F.F. & Shillestad, Isabel J. A SURVEY OF AUTO-INSTRUCTIONAL DEVICES. Proj. 1710, Task 171007, ASD TR 61 414, Sept. 1961, 111pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio.

18,898
In the interest of suggesting possible applications to local training or educational problems, the state of the art of auto-instruction and teaching devices is reviewed and the instructional devices to April, 1961, are cataloged. The first section reviews briefly what auto-instruction is, whether it is an entirely new concept, its practical benefits, auto-instruction terminology, programs and devices, current programming formats, evaluating a program, and prospects for the future. The second section catalogs and describes all major current auto-instructional devices: Skinner machines, Pressey machines, Crowder technique, self-organizing systems, audio-visual machines, digital computers as teaching machines, and miscellaneous devices.
I. R 39

18,899
Schaefer, H.J. RADIATION TOLERANCE CRITERIA IN SPACE OPERATIONS. Proj. MR005.13 1002, Subtask 1, Rep. 20, Sept. 1961, 16pp. USN School of Aviation Medicine, Pensacola Air Station, Fla.

18,899
Effective coping with emergency conditions in space flight due to unexpected radiation surges from solar activity requires exact information on the critical dose level at which acute effects would develop in man. Animal data of the literature pertinent to the problem are reviewed; extrapolation of such data to man is considered. The implications of one model for acute exposures are considered.
T. G. R 17

18,900
Pickett, J.M. EFFECTS OF TRANSMISSION BAND AND MESSAGE CONTEXT ON SPEECH INTELLIGIBILITY. Proj. RR 006 09 41 5351, Prob. Y02 01, Rep. 5690, Oct. 1961, 14pp. USN Engineering Psychology Branch, NRL, Washington, D.C.

18,900
To measure relationships between speech intelligibility, type of message context, and the frequency band of speech transmission, two experiments were performed in both of which a band-limited speech signal was tested in a broadband noise having a spectrum approximately parallel to the average speech spectrum. The first was a test for contextually determined changes in the importance of high and low speech frequencies. Three speech contexts (nonsense syllables, a large word set, and two-word subsets) were tested over various high- and low-pass speech channels. The second test established rough trading relationships between message difficulty (size of set) and size of transmission band.
G. I. R 17

18,901
Lavender, H.J., Jr. THE RELATIONSHIP OF HUMAN ENGINEERING TO INDUSTRIAL ENGINEERING CONCEPTS. J. industr. Engng., Jan.-Feb. 1961, XII(1), 48-50. (Human Factors Engineering Group, Avco Corporation, Cincinnati, Ohio).

18,901
The fields of Human Engineering and Industrial Engineering are compared. Common origins are pointed out and areas of similarity are discussed. It is pointed out, in summary, that the Industrial Engineer may find it challenging to be a part of the research and development of man-machine systems as against the operational aspects of industry.
I. I. R 9

18,902
Runner, G.H. & Sweeney, J.S. A COMPARISON OF QUICKENED AND UNQUICKENED DISPLAYS FOR THE MONITORING OF VEHICLE PERFORMANCE UNDER FULL AUTOMATIC CONTROL. Proj. SF 0130901 4976, Prob. Y02 16, Rep. 5696, Oct. 1961, 12pp. USN Engineering Psychology Branch, NRL, Washington, D.C.

18,902
An investigation was carried out to examine the relative effect on system failure detection of two methods of processing and displaying submarine automatic-dive-control information. Submarine dynamics were simulated on analog computers. The display systems were 1) conventional (dive plane angle, boat pitch angle, and submarine depth displayed on separate indicators) and 2) quickened (depth and other derivatives summed to a single indication of command depth through appropriate feedback circuitry). The S's task was to report a malfunction in the system. The times required to recognize and report a malfunction were compared for the two displays.
G. I. R 4

18,903
Pigg, L.D. (Chm.). HUMAN FACTORS OF REMOTE HANDLING IN ADVANCED SYSTEMS SYMPOSIUM, 18-19 APRIL 1961. Proj. 7184, Task 71586, ASD TR 61 430, Sept. 1961, 192pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio.

18,903
This report compiled the papers presented at a symposium in which human factors in remote handling were viewed by the psychologist and the engineer. Problems of operator selection and training were presented; manned and unmanned ground support equipment for nuclear-powered aircraft were reviewed. Space environmental constraints on extravehicular space operations were assessed. A representative remote-handling system for space operations was described and a three-dimensional color television system was analyzed and evaluated. Human factors in the design of remote-handling equipment were discussed.
T. G. I. R 60 (approx.)

18,904
Redden, R.J. URINE COLLECTION AND DISPOSAL DEVICE FOR PRESSURE SUIT. Contract AF 33(616) 7344, Proj. 7164, Task 71831, ASD TR 61 329, Aug. 1961, 18pp. USAF Life Support Systems Lab., Wright-Patterson AFB, Ohio. (International Latex Corporation, Dover, Del.).

18,904
The design, fabrication, and testing of a urine collection and disposal system for pressure suits were discussed. The need for providing a means to remove urine from within the full pressure suit during long periods of use in a weightless environment and for sampling each individual specimen motivated the project. The prototype system was checked both with and against gravity. Weightless tests have not been conducted.
T. I.

18,905
Sandage, C. TOLERANCE CRITERIA FOR CONTINUOUS INHALATION EXPOSURE TO TOXIC MATERIAL. I. EFFECTS ON ANIMALS OF 90-DAY EXPOSURE TO PHENOL, CCl_4, AND A MIXTURE OF INDOLE, SKATOLE, H_2S, AND METHYL MERCAPTAN. Contract AF 33(616) 7055, Proj. 7165, Task 716501, ASD TR 61 519 (I), Oct. 1961, 31pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio. (Midwest Research Institute, Kansas City, Mo.).

18,905
Physiological changes in rats, mice, and monkeys were studied during continuous 90-day exposure to controlled atmospheres of toxic vapors and gases. Concentrations of test chemicals were those recognized as Industrial Threshold Limit Values and included 1) CCl_4; 2) phenol; and 3) a mixture of indole, skatole, H_2S, and methyl mercaptan. Clinical laboratory and terminal stress tests were followed by autopsy with gross and microscopic pathology. The mortality rates from toxic effects were compared with rates predicted by toxicological theory.
T. I. R 25

18,906
Schafer, T., Benson, N. & Clausen, H. DEVELOPMENT OF CRITERIA AND QUANTITATIVE PREDICTORS OF MAINTAINABILITY OF AIR FORCE EQUIPMENT. Contract AF 33(616) 6924, Proj. 7184, Task 71586, ASD TR 61 502, Sept. 1961, 92pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio. (Convair, General Dynamics Corporation, San Diego, Calif.).

18,906
The development and validation of a technique for measuring and predicting the maintainability of USAF equipment was described. The criteria used were 1) active unscheduled maintenance time (mean number of man-hours spent in actual unscheduled maintenance per maintenance action) and 2) active unscheduled maintenance load (mean number of man-hours spent in actual unscheduled maintenance per system operating hour). The technique developed was used to obtain "predictions" which were then compared with skilled mechanics' estimates of time required to perform a sample of F-106 maintenance actions. The limitations and advantages of the technique were discussed.
T. G. I. R 10

18,907
Weiswurm, K. EXPERIMENTAL MOUSE CAPSULE WITH LIFE SUPPORTING SYSTEM. Proj. 6373, Task 63124, ASD TR 61 323, Aug. 1961, 7pp. USAF Life Support Systems Lab., Wright-Patterson AFB, Ohio.

18,907
To determine the basic requirements needed to furnish a sealed atmosphere suitable for sustaining life, a 12-inch sphere housing a mouse cage, two-week food and water supply, atmosphere control units, and photographic equipment was designed and built for laboratory testing. Several methods of atmosphere control were tested using drierite, calcium chloride, gaseous oxygen, and potassium superoxide. Three tests using potassium superoxide, each lasting two weeks, were described. The advantages of this method were discussed.
G. I.

18,908
Schoettlin, C.E., Cianko, G.M., Walter, R.D. & Freedman, T. TOXICOLOGICAL RESEARCH ON CENTRAL NERVOUS SYSTEM EFFECTS OF BORANE FUELS. Contract AF 33(616) 7186, Proj. 7165, Task 71836, ASD TR 61 438, Sept. 1961, 36pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio. (North American Aviation, Inc., Los Angeles, Calif.).

18,908
This report described the research conducted on the central nervous system subsequent to accidental human exposure to boron hydrides. Serial EEG tracings were used to identify the effects. Methods, machines, and techniques were described in detail. A complete data summary of all Ss tested was included.
T. I.

18,909
Watson, J.F. & Cherniack, N.S. EFFECT OF POSITIVE PRESSURE BREATHING ON THE RESPIRATORY MECHANICS AND TOLERANCE TO FORWARD ACCELERATION. Proj. 7222, Task 71746, ASD TR 61 398, Aug. 1961, 8pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio.

18,909
The hypothesis that positive pressure breathing may reverse the abnormalities of respiratory mechanics produced by forward acceleration and thereby increase tolerance limits was studied experimentally. Vital capacity, inspiratory reserve, tidal air, and expiratory reserve were measured in four Ss at 4, 6, and 8 g with and without positive pressure; 100 percent oxygen was used in both cases. Time tolerances and vital capacity with and without pressure breathing were determined in nine Ss at ten g; each S rode until he felt he could no longer withstand further acceleration. Changes in lung volumes and time tolerances due to positive pressure breathing were analyzed.
T. G. R 11

18,910
Welbourn, J.L. & Lachance, P.A. SUITABILITY OF TUBED FOODS FOR IN-FLIGHT FEEDING. Proj. 7164, Task 71833, ASD TR 61 456, Sept. 1961, 6pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio.

18,910
Tubed foods, developed to meet restricted flight conditions (e.g., pressure suits, weightlessness), were evaluated in two experiments designed to determine their palatability and suitability for inflight conditions. Ten foods were evaluated by 25 Ss wearing oxygen helmets at ground level and at simulated altitude of 30,000 ft. Nine foods were evaluated by 50 Ss at ground level. The Ss rated each food on a nine-point hedonic (like-dislike) scale and acceptability scores were determined for each food. The ease with which the food was consumed was noted.
T. I. R 5

18,911
Watson, J.F. & Rapp, Rita M. EFFECT OF FORWARD ACCELERATION ON RENAL HEMODYNAMICS, ELECTROLYTE EXCRETION, AND WATER CLEARANCE. Proj. 7222, Task 71746, ASD TR 61 375, Aug. 1961, 10pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio.

18,911
The effect of forward acceleration on renal hemodynamics, electrolyte excretion, and water clearance was studied in six normal human Ss. Physiologic responses to forward acceleration and negative pressure breathing were compared.
T. G. I. R 32

18,912
New Devices Labs., Thompson Ramo Woolridge Inc., Cleveland, Ohio. PROPELLANT-ATMOSPHERE SYSTEM STUDY. Contract AF 33(616) 6514, Proj. 6373, Task 63124, WADD TR 60 622, Rep. ER 4257, March 1961, 222pp. USAF Life Support Systems Lab., Wright-Patterson AFB, Ohio.

18,912
Two broad aspects of using chemical energy to provide metabolic oxygen in a manned space capsule were studied: man's ecological requirements and supply of auxiliary power. The studies were restricted to chemicals used in propulsion systems with emphasis on by-products useful to man. The methods for meeting environmental requirements included 1) evaluation of passive temperature control in terms of capsule factors; and 2) evaluation of weight and energy requirements for supplying oxygen, dehumidifying, and removing carbon dioxide in the cabin. The best of 40 fuels and 35 oxidizers were screened for other factors. A prototype fuel system was developed.
T. G. I. R 53

18,913
Seeler, H.W. DEVELOPMENT OF ORAL-NASAL MASKS, OXYGEN, MC-1 AND MBU-5/P. Proj. 6352, Task 63102, ASD TR 61 395, Aug. 1961, 16pp. USAF Life Support Systems Lab., Wright-Patterson AFB, Ohio.

18,913
A small, lightweight, nonfreezing, oral-nasal, pressure-breathing oxygen mask for use at altitudes to 45,000 ft. was described. The development program covered two masks, the single-size MC-1 mask and the four-size MBU-5/P mask. Both masks were flight-tested for service use and acceptability. Recommendations were included.
I. R 5

18,914
Sosnow, M. & Ross, E. ELECTRODES FOR RECORDING PRIMARY BIOELECTRICAL SIGNALS. Contract AF 33(616) 7304, Proj. 7222, Task 71751, ASD TR 61 437, Sept. 1961, 172pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio. (Litton Industries, Woodland Hills, Calif.).

18,914
This report summarizes electroding practices in the biological sciences. The literature concerning major problems associated with physiological electroding techniques in common use is reviewed. Primary areas of interest and discussion are 1) general electrode problems; 2) methods of minimizing these problems; and 3) specific applications to b' electric measurements such as electroencephalography, electrocardiography, GSR, electromyography, and electrical optokinetics.
T. G. I. R 88

18,915
Wagner, W.G., Evans, B.H. & Nowak, M.A. SHELTER FOR PHYSICAL EDUCATION. A STUDY OF THE FEASIBILITY OF THE USE OF LIMITED SHELTERS FOR PHYSICAL EDUCATION. 1961, 57pp. Architectural Research Group, Texas Engineering Experiment Station, A. & M. College of Texas, College Station, Tex.

18,915
This study is concerned with the design of "limited shelters" for physical education at the primary and secondary school levels. Limited shelter is considered as any outdoor space that uses natural or man made devices to protect the human being from the extremes of the natural elements. Technical aspects of climate and human comfort, physical education programs, and possible directions for the design of shelters are reviewed and related to the question of feasibility. Arguments for and against the concept of limited shelters are presented.
T. G. I. R 2

18,916
USA Board for Aviation Accident Research. ACCIDENT SUMMARIES AND SEMINAR REPORTS. Dec. 1961, 23pp. USA Board for Aviation Accident Research, Fort Rucker, Ala.

18,916
This letter contains aviation accident summaries and seminar reports of interest to the flight surgeon. Included are papers on disorientation due to subclinical vestibular pathology, the graveyard spiral, vestibular stimulation and blood flow, high intensity noise and disorientation, pathology of fear, post mortem search, Navy ejection seat experience, principles of crash protective restraint, survey of helicopter accidents, and fatal aircraft accidents and disease of aircrew.
R 12

18,917
USA Board for Aviation Accident Research. ARMY FIXED WING ACCIDENTS INVOLVING FIRE. Rep. HF 1 61, Sept. 1961, 7pp. USA Board for Aviation Accident Research, Fort Rucker, Ala.

18,917
A general analysis of Army experience with fixed wing aircraft accidents involving fire was presented. The data were obtained from Army aircraft accident reports covering the period July, 1957, through June, 1960. The number of total accidents, the number involving fire, and the fatalities in both cases were presented. The major cause of the majority of fires was fixed. The seriousness of postcrash fires was considered.
T. G. I.

18,918
Smith, M.G. & Goldstone, G. A PILOT STUDY OF TEMPORARY THRESHOLD SHIFTS RESULTING FROM EXPOSURE TO HIGH-INTENSITY IMPULSE NOISE. Tech. Memo. 19 61, Sept. 1961, 37pp. USA Ordnance Human Engineering Labs., Aberdeen Proving Ground, Md.

18,918
To determine temporary threshold shifts resulting from exposure to high-intensity impulse noise, 30 enlisted men received audiometric tests both before and after exposure to such noise generated by an M-14 rifle. Two rates of impulse (single fire--1 round per sec., and rapid fire--12.7 rounds per sec.), and three levels of total impulses (20, 25, and 30 rounds) were varied separately and examined at three test frequencies (3,000, 4,000, and 6,000 cps). Because of inter-subject differences, only general implications of the results were indicated. Recommendations for future study were included.
T. G. I. R 8

18,919
Shipley, Elizabeth F. DEPENDENCE OF SUCCESSIVE JUDGMENTS IN DETECTION TASKS: CORRECTNESS OF THE RESPONSE. J. acoust. Soc. Amer., Aug. 1961, 33(8), 1142-1143. (University of Pennsylvania, Philadelphia, Penn.). (ESD TR 61 47).

18,919
This study presented sequential data on response correctness from a procedure in which response dependence and correctness dependence can be distinguished: forced-choice and yes-no auditory detection procedure in which the signal appears equally often in one of two temporal intervals. Single-trial dependencies were examined and the effects of various characteristics of the signal (intensity, type of signal tone or increment in a continuously audible background noise, and duration) on the pattern of responses were analyzed. An attempt was made to relate the findings to a criterion-correction of the sequential dependence.
T. R 7

18,920
Seeley, S.F. & Weisiger, J.R. (Eds.). PROCEEDINGS OF A CONFERENCE ON RECENT PROGRESS AND PRESENT PROBLEMS IN THE FIELD OF SHOCK HELD AT WALTER REED ARMY INSTITUTE OF RESEARCH, WASHINGTON, D.C., DECEMBER 14-17, 1960. Suppl. 9, July 1961, 268pp. Federation of American Societies for Experimental Biology, Washington, D.C.

18,920
Papers given at a symposium on shock were presented. The aims of the meeting were to define the major problems in the field of shock at this time, the delineation of currently fruitful areas of exploration by the exchange of information at the international level, and the stimulation of contribution toward the resuscitation after injury of men of all ages under any geographic location. Program topics were 1) experimental shock models, 2) circulatory changes in shock, 3) neuroendocrine and metabolic aspects of shock, 4) permeability factors and radiation injury in shock, 5) bacterial factors in shock, and 6) vascular surgery and shock.
T. G. I. R 14

18,921
Schultz, E.F., Jr. & Goggans, J.F. A SYSTEMATIC PROCEDURE FOR DETERMINING POTENT INDEPENDENT VARIABLES IN MULTIPLE REGRESSION AND DISCRIMINANT ANALYSIS. Bull. 336, Nov. 1961, 75pp. Agricultural Experiment Station, Auburn University, Auburn, Ala.

18,921
A method is presented for finding which few of a large number of independent variables are the most potent predictors of some dependent variable Y in the case of a multiple regression or are the most potent discriminators in the case of a discriminant function. The most potent variable is defined as that independent variable most closely related to the dependent variable; the second most potent variable is that variable which combined with the most potent makes the pair of independent variables most closely related to the dependent variable. A systematic procedure with computational checks and some devices for reducing duplication are described and illustrated with worked examples.
T. R 23

18,922
Moser, H.M., Fotheringham, W.C. & Gonzalez, G.A. VARIANCE IN THE RATE OF SPEAKING BY PILOTS AND CONTROLLERS IN COMMUNICATING TO U.S. AND FOREIGN LISTENERS. Contract AF 19(604) 6179, AFESD TN 61 41, RF Proj. 1080, Tech. Rep. 67, April 1961, 4pp. Ohio State University Research Foundation, Columbus, Ohio.

18,922
To determine if adjustments in rate of speaking were made by pilots and air traffic controllers in terms of perceived listener needs, tapes of two-way communications were obtained from Idlewild, Miami, Mexico City, and Accra (Ghana) international airports. Messages were examined to find words or phrases (pilots') and whole messages (controllers') which were addressed to both US and foreign listeners. The selected tape segments were then translated in terms of elapsed time for each item and differences examined.
T.

18,923
Moser, H.M., Fotheringham, W.C. & Henderhan, R.C. SINGLE-VOWEL INTELLIGIBILITY TESTS. Contract AF 19 (604) 6179, AFESD TN 61 39, RF Proj. 1080, Tech. Rep. 66, March 1961, 19pp. Ohio State University Research Foundation, Columbus, Ohio.

18,923
This study considered the use, as tests of intelligibility, of 1) an expanded single-vowel word list composed of different beginning and ending consonants and consonantal combinations in the language, and 2) syllabic lists derived from word-halves of the same vowel list. In two separate experiments, these lists were compared with PB lists in which the most frequently occurring consonants and vowels in the language are represented. The usefulness of the syllabic lists were discussed in terms of the findings.
T. R 7

18,924
Mashhour, M. ON THE VALIDITY OF SCALES DERIVED BY RATIO AND MAGNITUDE ESTIMATION METHODS. Rep. 105, Nov. 1961, 14pp. Psychological Laboratory, University of Stockholm, Stockholm, Sweden.

18,924
Procedures for testing the validity of scales derived by ratio and magnitude estimation are considered. The procedures for scale construction by both methods are analyzed and discussed. Different procedures for testing the internal consistency of ratio matrices are reviewed and two tests are proposed. It is shown that, under special conditions, scales derived by magnitude estimation can likewise be subjected to these tests. The tests are illustrated by data from a series of experiments on velocity perception with both methods.
T. G. R 12

18,925
Kunnapas, T.M. MEASUREMENT OF THE INTENSITY OF AN UNDERLYING FIGURAL PROCESS. Rep. 104, Oct. 1961, 15pp. Psychological Laboratory, University of Stockholm, Stockholm, Sweden.

18,925
A method is developed for measuring the intensity of the figural process underlying the well-known phenomenon of figural fluctuation. A metric model is described according to which a measure of the underlying process is obtained in units of dispersion. Data from an experiment in which figural fluctuations were recorded for five Ss are used to illustrate the model. An equation involving four parameters is given that is analogous to that of the damped harmonic vibration. Techniques for determining the parameters are developed. Predicted and empirical scale values are compared for agreement.
T. G. I. R 24

18,926
Holdrege, F.E. & Born, G. GRAPHIC DETERMINATION OF COEFFICIENTS OF PART AND MULTIPLE CORRELATION IN THREE-VARIABLE PROBLEMS. Proj. 7719, Task 771902, ASD TN 61 144, Oct. 1961, 13pp. USAF Personnel Lab., Lackland AFB, Tex.

18,926
On many occasions it is convenient to solve equations graphically rather than algebraically. This report provides a convenient means for graphically determining the values of coefficients of part correlation, coefficients of multiple correlation, and beta weights for three-variable problems.
G.

18,927
Hart, E.M. EFFECTS OF OUTER-SPACE ENVIRONMENT IMPORTANT TO SIMULATION OF SPACE VEHICLES. Contract AF 33 (616) 6858, Proj. 6114, Task 60806, ASD TR 61 201, Aug. 1961, 106pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio. (Cornell Aeronautical Laboratory, Inc., Buffalo, N.Y.).

18,927
The results of a literature survey undertaken to define the effects of the outer space environment important to the simulation of space vehicles are presented. Specific vehicles and trajectories are not included. Only the natural environment of space is considered and the survey is limited to the solar system with particular emphasis on the region in the near vicinity of the earth-moon system at heights greater than 80 kilometers above the earth's surface. To specify those effects that need to be incorporated into a space training simulator, the exterior environment, its effect on vehicle and crew, and the malfunctions that may result are considered. Recommendations for further study are made.
T. G. I. R 127

18,928
Harnwell, G.P. (Chm.). AN ANNOTATED BIBLIOGRAPHY OF SUBMARINE TECHNICAL LITERATURE 1557 to 1953. Contract N7ONR 29103, Proj. NR 267 001, Publ. 307, March 1954, 261pp. Committee on Undersea Warfare, National Academy of Sciences - National Research Council, Washington, D.C.

18,928
This bibliography brings together the mass of unclassified material available on submarine development. There are eight sections: 1) general and historical-nontechnical; 2) special types of submarines; 3) design and construction; 4) operations (other than warfare); 5) maintenance, repairs, and related facilities; 6) the submarine in war; 7) antisubmarine warfare; and 8) data books. There are subheadings under each classification and within these the material is arranged alphabetically by author. An author index is included.
R 3500 (approx.).

18,929
Gruber, H.E. & Clark, W.C. PERCEPTION OF SLANTED SURFACES. Percept. Mot. Skills, 1956, 6, 97-106. (University of Colorado, Boulder, Colo. & University of Michigan, Ann Arbor, Mich.).

18,929
To provide further data on factors influencing the perception of slant, especially distance of observation and size and density of the units of texture composing the stimulus surface, two experiments were conducted using actual slanted surfaces viewed through a reduction screen aperture. The S's task was to adjust a comparison variable (rod) so that it appeared to be in a plane parallel to the stimulus surface (white dots on black background). In the first experiment, 15 Ss made judgments of four surface textures, three slants, and four distances. In the second, unit size and stimulus slant were held constant and texture density was varied (three surfaces). An explanation of the findings was offered.
G. I. R 12

18,930
Goldiamond, I. ONGOING VISUAL MONITORING: PROCEDURES FOR EXPERIMENTAL ANALYSIS AND CONTROL. SRD TR 61 22, 1961, 18pp. Arizona State University, Tempe, Ariz.

18,930
Two reports of procedures for controlled alteration and experimental analysis of ongoing visual monitoring are presented. First, reading is defined as a form of visual monitoring of a complex display in which the behaviors required have linear sequences. A projection procedure is described that is claimed to be sensitive to variables such as signal-to-noise ratio, item difficulty, transient and long-term effects, pay-offs attached to responding, and age. Procedures for training Ss to be differentially attentive to different parts of the display are described. Second, commercially available equipment that can be used for scheduled presentation and control of responses in the major psychophysical methods is described.
I. R 14

18,931
Frankenhaeuser, Marianne & Post, Birgitta. CATECHOLAMINE EXCRETION DURING MENTAL WORK AS MODIFIED BY CENTRALLY ACTING DRUGS. Rep. 102, Sept. 1961, 8pp. Psychological Laboratory, University of Stockholm, Stockholm, Sweden.

18,931
Experiments were performed to determine 1) whether changes in catecholamine excretion are sensitive indicators of the mild stress induced by performing psychological tasks, and 2) whether centrally acting drugs would modify such changes. The task consisted of subjective ratings and intellectual testing and were undertaken by 32 Ss who had been given capsules containing pentobarbitone, metamphetamine, or a lactose placebo one hour and fifteen min. before testing. Urinary catecholamines were determined from samples taken before and after testing. These were studied in relation to speed and number of items accurately solved as well as the effect of the drugs.
T. R 12

18,932
Engen, T. DIRECT SCALING OF ODOR INTENSITY. Rep. 106, Nov. 1961, 13pp. Psychological Laboratory, University of Stockholm, Stockholm, Sweden. (Brown University, Providence, R.I.).

18,932
A series of experiments was conducted to explore the ability of human observers to construct a magnitude scale of odor intensity. The first experiment used the method of ratio production (fractionation) and the following used variations of the method of magnitude estimation. The observers also judged the equivalence in magnitude of stimuli selected from different odorants in order to assess the validity of their numerical estimates with direct methods. Five experienced Ss were used throughout the series with five odorants--amyl acetate, n-heptane, phenylethyl alcohol, diacetone alcohol, and vanillin. Some explanations were offered for the form of the psychophysical functions obtained and the usefulness of this methodology for odorant scaling was discussed. G. R 19

18,933
Ekman, G. & Lindman, R. MULTIDIMENSIONAL RATIO SCALING AND MULTIDIMENSIONAL SIMILARITY. Rep. 109, Sept. 1961, 11pp. Psychological Laboratory, University of Stockholm, Stockholm, Sweden.

18,933
To test the generalizability of a similarity principle previously established for unidimensional continua to the multidimensional case, an experiment with nine stimulus words representing emotional states (happiness, sadness, agitation) was performed using 79 Ss. Each S made two types of judgments of similarity for each possible pairing of the words: 1) by ratio estimation, and 2) by similarity estimation. A multidimensional scaling method (recently developed) was used to determine the coordinates of the stimuli on three reference vectors; a multidimensional similarity equation (derived from the unidimensional one) was used to obtain values which were compared with the obtained values. The usefulness of the findings for experimentation was discussed.
T. G. R 12

18,934
Clark, W.C., Smith, A.H. & Rabe, Asuma. RETINAL GRADIENTS OF OUTLINE AS A STIMULUS FOR SLANT. Canad. J. Psychol., 1955, 9(4), 247-253. (Queen's University, Kingston, Ontario, Canada).

18,934
Seven observers were used to determine whether or not monocular gradient of outline convergence is, like surface texture gradient, a sufficient stimulus for the perception of slant and the relative stability or ambiguity of the related percepts. The observers recorded their perceptions of the slant of rectangular and trapezoidal film-forms produced under low illumination by white figures against a black background. Essential conditions were monocular vision and fixed head at a distance which minimized or eliminated accommodation. The stimuli were presented in the fronto-parallel plane and at angles of 20 degrees and 40 degrees with the background. The results were related to the theory of psychophysical correspondence.
T. R 8

18,935
Braunstein, M.L. & White, W.J. THE EFFECTS OF ACCELERATION ON VISUAL BRIGHTNESS DISCRIMINATION. FINAL REPORT. Contract NONR 3457(00), CAL Rep. ON 1570 G 1, Dec. 1961, 23pp. Cornell Aeronautical Laboratory, Inc., Buffalo, N.Y.

18,935
To determine the effects of acceleration on visual brightness discrimination and to observe the differential consequences of positive and transverse acceleration on the ability to make brightness discriminations, five Ss were tested at five levels of transverse g and four levels of positive g. Four background luminance levels, ranging from 31 to 0.03 ft.-L, were studied. A preliminary study was conducted on the effects of breathing 100 percent oxygen in a normal manner and under pressure on brightness discrimination under acceleration.
I. G. I. R 4

18,936
Ballhaus, W.F. (Chm.). VISTAS IN ASTRONAUTICS—1960. VOLUME III. PROCEEDINGS OF THIRD AFOSR ASTRONAUTICS SYMPOSIUM, LOS ANGELES, CALIF., OCTOBER 12-14, 1960. 264pp. Society of Automotive Engineers, Inc., New York, N.Y.

18,936
These proceedings include the papers and discussions presented at a symposium on astronautics research. There are six functional areas represented: 1) astronautic vehicle utilization, 2) astronautic propulsion, 3) bioastronautics, 4) planetary and space environment, 5) astronautic communications, and 6) astronautic guidance. A subject matter index is included.
T. G. I. R 27

18,937
Craven, C.W. & Cole, E.L. MANNED SPACE OPERATIONS. From: "Vistas in Astronautics—1960, Volume III. Proceedings of Third AFOSR Astronautics Symposium, Los Angeles, Calif., October 12-14, 1960," 83-84. Society of Automotive Engineers, Inc., New York, N.Y. (USAF Ballistic Missile Div., ARDC, Andrews AFB, Washington, D.C.).

18,937
A brief review is given of some of the activities and problems of manned space operations. Acceleration, weightlessness, isolation, work cycles, radiation, restraint and support, and ecological systems are pointed out as areas in which intensified research is needed.

18,938
Brown, E.L. HUMAN AND SYSTEM PERFORMANCE DURING ZERO G. From: "Vistas in Astronautics—1960, Volume III. Proceedings of Third AFOSR Astronautics Symposium, Los Angeles, Calif., October 12-14, 1960," 85-88. Society of Automotive Engineers, Inc., New York, N.Y. (USAF Ballistic Missile Div., ARDC, Andrews AFB, Washington, D.C.).

18,938
A summary of work conducted on a research program on human and system performance during zero g was presented. These studies were made in a C-131B transport-type airplane while it was flying a Keplerian trajectory; about 15 sec. of zero g were produced in each trajectory. The areas investigated and discussed included 1) human performance on motor and mental tasks, 2) locomotion of individual humans inside large space vehicles, 3) locomotion outside space vehicles, 4) human perceptive orientation, 5) behavior of liquids, 6) fluid transfer problems, and 7) heat transfer problems.

18,939
Miller, S.U., Namerow, N.S. & Strauss, P.G. A PRAGMATIC APPROACH TO BIO-INSTRUMENTATION. From: "Vistas in Astronautics—1960, Volume III. Proceedings of Third AFOSR Astronautics Symposium, Los Angeles, Calif., October 12-14, 1960," 95-102. Society of Automotive Engineers, Inc., New York, N.Y.

18,939
This paper discusses a number of problem areas associated with the abstraction of meaningful physiologic data from man and experimental animals under the actual or simulated conditions of space. The bioinstrumentation profiles essential to both current and future generations of space flight are considered. It is demonstrated that single measurements can at times be quite misleading, and that, optimally, several carefully chosen nonredundant physiologic and environmental parameters should be monitored. The practicality of bioelectric devices is briefly discussed.
T. G. I. R 6

18,940
Green, J. THE APPLICATION OF GEOLOGY TO MAN'S SURVIVAL ON THE MOON. From: "Vistas in Astronautics—1960, Volume III. Proceedings of Third AFOSR Astronautics Symposium, Los Angeles, Calif., October 12-14, 1960," 113-161. Society of Automotive Engineers, Inc., New York, N.Y. (Missile Div., North American Aviation, Inc., Downey, Calif.).

18,940
The application of geology to man's survival on the moon is discussed under five headings: use of terrain, of rocks and dust, of minerals, of heat and power, and of geological tools in lunar exploration.
T. G. I. R 112

18,941
Swets, J.A. & Green, D.M. SEQUENTIAL OBSERVATIONS BY HUMAN OBSERVERS OF SIGNALS IN NOISE. Inform. Theory, 1961, 177-195. (Massachusetts Institute of Technology, Cambridge, Mass.). (AFCCDD TR 60 21).

18,941
The results of a preliminary investigation of the trading relationship between time and error in a very simple perceptual task of signal detection were reported. The observer must decide, during each observation interval, whether a signal exists or not or whether he would like to continue observing before making an identification; thereupon a new sequence of observation intervals begins. In three experiments reported here, the probability of signal occurrence was 0.50 and the cost of each additional observation was 1.0. Values associated with the terminal decision outcomes were varied and signal strength was varied. A statistical-decision model was described and extended to the sequential case represented here.
T. G. R 8

18,942
Pitz, G.F., Gregg, L.W. & Karn, H.W. RESPONSE TENDENCIES IN THE VISUAL DETECTION OF SINGLE TARGETS. Percept. Mot. Skills, Dec. 1961, 13, 275-280. (Carnegie Institute of Technology, Pittsburgh, Penn.).

18,942
An attempt was made to determine the conditions that gave rise to differing frequencies of two types of error (reporting a dot as present when it was not and the reverse response) in an earlier experiment on the visual detection of targets. Responses of 25 Ss to a single circle in which a dot appeared 50 percent of the time were studied as the size of the circle in which the dot appeared, brightness of the dot, and duration of presentation were varied. The data were analyzed by variance techniques. Possible determinants of the response tendencies observed were discussed.
T. G. R 3

18,944
Loeb, M. & Hawkes, G.R. DETECTION OF DIFFERENCES IN DURATION OF ACOUSTIC AND ELECTRICAL CUTANEOUS STIMULI IN A VIGILANCE TASK. Proj. 6X95 25 001, Task 02, Rep. 522, Dec. 1961, 11pp. USA Medical Research Lab., Fort Knox, Ky.

18,944
To determine the efficiency with which changes in duration of auditory and cutaneous signals could be detected and the efficiency with which the detection could be maintained over an appreciable period of time, 24 Ss were tested. Instructions were to attend to auditory, cutaneous, simultaneous auditory and cutaneous, or mixed auditory and cutaneous stimuli presented in separate sessions, and to respond as rapidly as possible by pressing a key when signals of double length occurred. Each session was approximately 100 min. Reaction times, failures to respond, and false responses were analyzed.
T. G. R 14

18,945
Hodge, M.H., Crawford, M.J. & Piercy, Mary L. THE CONSTANT-RATIO RULE AND VISUAL DISPLAYS. Contract AF 19(604) 7299, ESD TDR 61 56, Sci. Rep. 2, Dec. 1961, 40pp. Department of Psychology, University of Georgia, Athens, Ga.

18,945
Three experiments involving a simple recognition task were designed to evaluate a model of choice behavior—the constant-ratio rule. The stimulus objects consisted of a set of circles that varied in area or brightness. Also examined were effects of practice, interstimulus spacing, and stimulus range on the predictions of the rule.
T. G. R 15

18,946
Herner, S. & Herner, Mary. (Eds.). BASIC RESEARCH RESUMES 1960. A SURVEY OF BASIC RESEARCH ACTIVITIES IN THE OFFICE OF AEROSPACE RESEARCH. Contract AF 49(638) 903, AFOSR 925, June 1961, 389pp. USAF Office of Aerospace Research, Washington, D.C. (Herner and Company, Washington, D.C.).

18,946
This document presents a classification of the research program of the Office of Aerospace Research on the basis of scientific content. In the first portion of the document appear project outlines of each research study organized into 24 subject matter chapters (organic chemistry, metallurgy, astrophysics, cosmic radiation, behavioral sciences, etc.). The second portion consists of an index utilizing a system involving the permutation of key terms in phrases describing the contents of the project outlines (abstracts).
R 1,800 (approx.)

18,947
Evans, W.O. A TITRATION SCHEDULE ON A TREADMILL. Proj. 6X95 25 001, Task 03, Rep. 525, Dec. 1961, 7pp. USA Medical Research Lab., Fort Knox, Ky.

18,947
A method for measuring changes in the maximum speed of walking on a treadmill is described. The method involves the use of a titration schedule in which the S is forced to monitor continuously his estimate of maximum capability and to adjust the velocity of the treadmill in accordance with this estimate. The results show the method to be a stable technique for measuring performance decrement as a function of continued heavy muscular work.
I. R 4

18,949
Hooker, G.V., Duffner, Mabel H., Dann, A.S. & Yates, Doris C. AIR FORCE SCIENTIFIC RESEARCH BIBLIOGRAPHY 1950-1956. VOLUME I. AFOSR 700, 1961, 1150pp. USAF Office of Scientific Research, Washington, D.C. (Library of Congress, Washington, D.C.).

18,949
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.

18,950
Mead, L.C. THE TYPOGRAPHY OF TOMORROW. Bookbinding and Book Production, March 1954, 72-73. (Tufts University, Medford, Mass.).

18,950
The findings from a series of studies on typographic arrangements to promote improvement of comprehension and speed of reading of textbooks, tradebooks, and other printed materials of moderate complexity were summarized briefly. After demonstrating experimentally the close relation between oral-like stress factors and comprehension, a variety of formats were set up portraying the authors' oral stress in printed form: light and bold type, different line levels, and two-column balanced formats. The findings were discussed in relation to reader acceptability and eye-movement patterns.
I.

18,951
Beckman, F.H. & Stein, M.I. A NOTE ON THE RELATIONSHIP BETWEEN PER CENT ALPHA TIME AND EFFICIENCY IN PROBLEM SOLVING. J. Psychol., 1961, 51, 169-172. (University of Chicago, Chicago, Ill.).

18,951
This paper presents an empirical relationship, obtained in an exploratory study, between percent alpha time from EEG recordings and efficient problem-solving behavior among normal Ss. A problem-solving apparatus that allows for the investigation of an S's capacity to derive and integrate a series of logical relationships is used. The efficiency of problem-solving behavior of 33 Ss (graduate students and adult scientists aged 18 to 46 years) correlates with percent alpha time based on a 120-sec. sample from EEG records obtained over a one-hour period in a darkened room under quiet conditions.
R 7

18,952
Morin, R.E. & Grant, D.A. LEARNING AND PERFORMANCE ON A KEY-PRESSING TASK AS FUNCTION OF THE DEGREE OF SPATIAL STIMULUS-RESPONSE CORRESPONDENCE. J. exp. Psychol., 1955, 49(1), 39-47. (University of Wisconsin, Madison, Wisc.). (WADC TR 53 292).

18,952
To determine how learning and performance measures are influenced by changes in the degree of spatial correspondence between the stimulus elements and the response elements of a motor task, 64 Ss in nine groups practiced key-pressing responses to light stimuli under nine different degrees of spatial stimulus-response correspondence between lights and keys. The degree of correspondence was specified by Kendall's r, a measure of rank correlation.
T. G. R 11

18,953
Ammons, R.B. PRESENT SCIENCE PLANNING IN THE UNITED STATES: HIGHWAY TO DISASTER. Percept. Mot. Skills, 1960, 8, 107-110. (Montana State University, Missoula, Mont.).

18,953
A program for obtaining more scientists and increased productivity of present scientists in the United States is presented. A series of propositions are presented with comments consisting mainly of supporting arguments and elucidation of possible implications. A number of specific suggestions are made to implement the program suggested.

18,954
Bennett, P.B. & Cross, A.V.C. THE FUSION FREQUENCY OF FLICKER AND NITROGEN SATURATION. RNP 60/999, UPS 191, RNPL 7/59, Dec. 1959, 16pp. Royal Naval Personnel Research Committee, MRC, London, England.

18,954
To measure the fusion frequency of flicker (FFF) of men exposed to raised pressures of compressed air, five Ss were exposed to various pressures on different days and the time recorded to a maintained change in FFF. The time of this change (nitrogen threshold) was analyzed as a function of pressure. Individual differences and reproducibility of results were discussed. The connection of the nitrogen threshold with gas saturation of the body and its theoretical implications were discussed.
T. G. R 8

18,955
Blackwell, H.R., Ohmart, J.G. & Brainard, R.W. EXPERIMENTAL EVALUATION OF OPTICAL ENHANCEMENT OF LITERAL VISUAL DISPLAYS. Contract AF 33(616) 5463, Proj. 7184, Task 718401, ASD TR 61 568, Oct. 1961, 66pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio. (Institute for Research in Vision and Research Foundation, Ohio State University, Columbus, Ohio).

18,955
Visual displays of aerial views of terrain possessing both high resolution and a scale of luminance based upon a simple transformation of the luminances of ground objects (literal displays) were subjected to optical enhancement, and the target information extracted by human observers was determined. The visual displays were obtained from photographic negatives of uniform gray in a terrain model. The enhancement techniques were usual manipulation of photographic processing to alter luminance contrast (gamma) values and optical spatial filtering to suppress or eliminate selected sizes of luminance discontinuities. Performance was measured in terms of probability of target detection under conditions of veiling light.
T. G. I. R 4

18,956
Chisum, Gloria T. & Hill, J.H. FLASH BLINDNESS RECOVERY TIME FOLLOWING EXPOSURE TO HIGH-INTENSITY SHORT-DURATION FLASHES. Subtask MR005.13 6002.1, Rep. 14, WepTask RAE 13J 012/2021/R006 01 001, Prob. J04AE23 1, Rep. NADC MA 6142, Nov. 1961, 13pp. USN Aviation Medical Acceleration Lab., Johnsville, Penn.

18,956
The time to recover visual sensitivity following exposures to adapting flashes of high intensity and short duration was measured for three Ss. Adapting flashes of 33 and 165 msec. and 9.8 msec. in duration with luminances up to 8.6 log mL were used. Visual sensitivity was determined by the resolution of gratings requiring acuities of 0.13 and 0.33 at display luminances from minus 2.50 to plus 2.25 log mL. On the basis of the findings, recommendations were made regarding flash blindness protective equipment and recovery of visual sensitivity.
G. R 6

18,957
Collins, W.E. & Poe, R.H. AMPHETAMINE, AROUSAL, AND HUMAN VESTIBULAR NYSTAGMUS. Proj. 6X95 25 001, Task 04, Rep. 526, Dec. 1961, 13pp. USA Medical Research Lab., Fort Knox, Ky.

18,957
To determine the effects of a normal clinical dosage of amphetamine on the human nystagmic response to angular acceleration under conditions of mental activity and reverie, both the drug and a placebo were administered to groups of "rotation-naive" and "rotation-experienced" Ss by the double-blind method. The Ss were then tested on a rotation table in darkness. Mental arithmetic problems were assigned for two trials and relaxation or daydreaming for two trials; eyes were open under both instructions. Eye-movements were recorded throughout and subjected to analysis.
T. I. R 24

18,958
Folley, J.D., Jr. RESEARCH PROBLEMS IN THE DESIGN OF PERFORMANCE AIDS. Contract AF 33(616) 7233, Proj. 1710, Task 171004, ASD TR 61 548, Oct. 1961, 51pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio. (American Institute for Research, Pittsburg, Penn.).

18,958
Performance aids are auxiliary devices provided to facilitate on-the-job performance by humans in man-machine systems. They may be included in the system at any stage of development with their potential contribution greater if they are considered early. A number of research problems identified during preparation of a procedure for incorporating performance aids into systems are presented under five major headings: 1) determining the need, 2) determining functional characteristics, 3) specifying design features, 4) evaluation, and 5) coordinate changes in performance aids with developmental changes in the evolving system.
T. G. R 19

18,959
Fritz, E.L., Grubmeyer, R.S. & Miller, R.S. A MATHEMATICAL ANALYSIS OF SOME PHASES OF THE CONTROL OF AIR TRAFFIC FLOW. Contract AF 33(616) 3613, Proj. 6 (7 431L), ARDC TR 58 57, July 1958, 56pp. USAF Directorate of Flight and All-Weather Testing, Wright-Patterson AFB, Ohio. (Laboratories for Research and Development, Franklin Institute, Philadelphia, Penn.).

18,959
The problems associated with smoothing the flow of air traffic approaching the terminal phase of flight were investigated. The feasibility of smoothing by means of speed control (slow-down and speed-up) was of particular interest. The mechanics of flow control in the enroute area using speed-reduction control methods and a combination of speed-up and slow-down control methods were investigated and mathematically defined with suitable models. Paper-and-pencil simulation was used to validate the work. Navigation errors were also studied. Some details of the possible application of speed control to a specific area were outlined.
T. G. I. R 5

18,961
Bennett, P.B., Dossett, A.N. & Kidd, D.J. PREVENTION IN RATS OF THE NARCOTIC EFFECT PRODUCED BY INERT GASES AT HIGH PARTIAL PRESSURE. RNP 60/998, UPS 190, RNPL 2/60, Oct. 1959, 7pp. Royal Naval Personnel Research Committee, MRC, London, England.

18,961
Preliminary investigations of the use of a new drug "Frenquel," i.e., alpha (-4 piperidyl) benzhydrol hydrochloride, in the control of inert gas narcosis were reported. A change in response to electrical stimulation to nitrogen at several different pressures was used on a series of 36 adult Wistar rats before and after administration of Frenquel. The protective effects of the drug were analyzed; side effects were noted.
T. G. R 13

18,962
Bennett, P.B., Dossett, A.N. & Kidd, D.J. THE EFFECT OF RATE OF INCREASING PRESSURE ON THE NARCOSIS PRODUCED IN RATS BY HIGH PARTIAL PRESSURES OF OXYGEN AND NITROGEN. RNP 60/1001, UPS 192, RNPL 4/60, June 1960, 13pp. Royal Naval Personnel Research Committee, MRC, London, England.

18,962
Animal (rats) experiments were described in which an electroshock technique was used to measure the narcotic level produced by gases at pressure. Oxygen/nitrogen mixtures varying between 3 oxygen/nitrogen 192 lb. inch^2 and 155 oxygen/nitrogen 40 lb. inch^2 were used with a total pressure of 195 lb. inch^2 absolute or 180 lb. inch^2 gauge applied at rates of 1, 12, and 120 lb. inch^2 min. The narcotic effect was measured by the increase in voltage required to produce a minimal response (caudal twitch) to the electric stimulus. The comparative narcotic effects of oxygen and nitrogen were discussed.
T. G. R 15

18,963
Fletcher, J.L. A FIELD EVALUATION OF THE ACOUSTIC REFLEX EAR DEFENDER SYSTEM. Proj. 6X95 25 001, Task 02, Rep. 524, Dec. 1961, 7pp. USA Medical Research Lab., Fort Knox, Ky.

18,963
A field evaluation of the Acoustic Reflex (AR) Ear Defender System was accomplished in two phases. 1) Pre- and postexposure tests of the hearing of 16 tank crew members firing the 76 mm cannon or an M41 tank were made with and without the protection of the reflex system. Temporary threshold shift (difference between pre- and postexposure threshold for a 4,000-cps tone) was the criterion of protection. 2) Ten expert gunnery instructors accomplished one firing course at a moving target with the AR system and without the system. Differences in scores which might be attributed to the time delay introduced by the AR system were examined.
T. R 3

18,964
Fletcher, J.L. ACOUSTIC REFLEX RESPONSE TO HIGH INTENSITIES OF IMPULSE NOISE AND TO NOISE AND CLICK STIMULI. Proj. 6X95 25 001, Task 02, Rep. 527, Dec. 1961, 6pp. USA Medical Research Lab., Fort Knox, Ky.

18,964
Temporary threshold shifts in 15 Ss were measured following exposure to 170 or 160 db SPL impulse noise under three conditions of acoustic reflex (AR). In one, the AR was not aroused prior to exposure; in another, the impulse noise was preceded (150 msec.) by clicks at either 105 or 120 db sensation level; and in a third, the impulse was preceded by noise at 105 or 120 db sensation level. Differences in TTS attributable to these conditions were analyzed.

18,965
Graveline, D.E. EFFECTS OF POSTURE ON CARDIOVASCULAR CHANGES INDUCED BY PROLONGED WATER IMMERSION. Proj. 7222, Task 722201, ASD TR 61 563, Oct. 1961, 6pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio.

18,965
Previous hypodynamic research using water-immersion techniques has been done with the Ss in a semireclining position. To evaluate the possible influences of posture and relative immobilization on the cardiovascular deterioration associated with prolonged water immersion, a technique was used which allowed complete freedom of activity, position, and attitude. Five Ss were evaluated for functional change after six hours in this environment.
G. R 7

18,966
Gordon, A.S., Frye, C.W., Miller, R.D. & Wyant, G. ARTIFICIAL RESPIRATION METHODS FOR CASUALTIES WEARING GAS MASK. Contract DA 18 108 CML 2395, Rep. 45, Nov. 1954, 9pp. USA Chemical Corps Medical Labs., Army Chemical Center, Md. (Clinical Science Dept., College of Medicine, University of Illinois, Urbana, Ill.).

18,966
To determine whether manual methods (push-pull) of artificial respiration will satisfactorily ventilate casualties wearing a gas mask in a contaminated atmosphere, tests were conducted on totally apneic, anesthetized-curarized normal adults and warm, nonrigid corpses. Each of the three recommended manual methods (back-pressure arm-lift, hip-lift back-pressure, and arm-lift chest-pressure) as well as the prone and supine Eve rocking methods were used on the normal Ss, with and without gas masks and cannister, and on the corpses. Ventilatory values were obtained and analyzed.
T. I. R 15

18,967
Holaday, D.A. TEST OF MOUTH-TO-MASK RESUSCITATION APPARATUS. Spec. Rep. 53, Sept. 1954, 17pp. USA Chemical Corps Medical Lab., Army Chemical Center, Md.

18,967
To determine whether mouth-to-mask insufflation maintains arterial blood oxygen saturations and carbon dioxide tensions within satisfactory ranges in Ss who are apneic or whose ventilation is inadequate, surgical patients were anesthetized with thiopental and rendered apneic either by curarization or as a result of controlled respiration. Mouth-to-mask insufflation was maintained by a single operator for 90 min. or as long as could be tolerated by the S. Arterial blood samples were obtained intermittently for analysis of pH, carbon dioxide content, and oxygen capacity. Oxygen saturation and carbon dioxide tensions were calculated. Suggestions for improvement of the apparatus were made.
T. G. I.

18,969
Legg, J.C., Jr. AIRPORT SURVEILLANCE RADAR APPROACH STUDY. Task 64541, WADC TN 56 350, Jan. 1957, 9pp. USAF Directorate of Flight and All-Weather Testing, Wright-Patterson AFB, Ohio.

18,969
To evaluate the Airport Surveillance Radar (ASR) Approaches, the accuracies of this type of approach were determined. The test procedures and equipment used were as close to those of a normal radar approach control center as weather, safety, and traffic conditions would permit. Fifty-three ASR approaches were completed and recorded by photo theodolite. The results were analyzed for accuracy and graphs constructed which show the limits within which 95 percent of all approaches can be expected to fall. It was recommended that these results be used as criteria in determining requirements for an approach and landing system using ASR as the feeder element.
G.

18,970
Shenkle, W. GLOSSARY OF PHOTOGRAPHIC AND RECONNAISSANCE TERMS. WADC TN 56 510, Nov. 1956, 60pp. USAF Aerial Reconnaissance Lab., Wright-Patterson AFB, Ohio.

18,970
Definitions of photographic and reconnaissance technical terms are presented alphabetically. The glossary is intended as a desk-reference for use in laboratories that are active primarily in the aerial reconnaissance field.

18,971
Parker, J.F., Jr. & Downs, Judith E. SELECTION OF TRAINING MEDIA. Contract AF 33(616) 5738, Proj. 1710, Task 71607, ASD TR 61 473, Sept. 1961, 94pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio. (Psychological Research Associates, Matrix Corporation, Arlington, Va.).

18,971
This report is designed to assist a training analyst in the selection of specific training aids and devices for use in the support of the development of the personnel subsystem of a military system. The translation of statements of desired personnel performances and capabilities, as presented in Qualitative and Quantitative Requirements Information and task analysis documents, into training objectives is discussed. The effectiveness of various training media in meeting specific objectives is indicated and justified in terms of available objective evidence. An example is presented of the selection of training media in support of a typical USAF operator position.
T. I. R 74

18,972
Reininger, E., Carter, E.T., Hitchcock, F. & Epps, R. CARDIOVASCULAR EFFECTS OF A PRESSURE SUIT ON THE DOG. Contract AF 33(616) 3825, Proj. 7160, Task 71814, WADC TR 57 700, June 1958, 25pp. USAF Aero Medical Lab., Wright-Patterson AFB, Ohio. (Ohio State University Research Foundation, Columbus, Ohio.).

18,972
To evaluate the efficiency of a specially constructed altitude suit in maintaining normal cardiovascular performance under pressure, 13 animals were fitted with the suit. Four of the dogs served as controls with no pressurization of the suit. Physiological evaluation was accomplished by observing the general hemodynamic effects of the suit when activated. The significance of the results were discussed and recommendations for modification of the altitude suit were made to improve its effectiveness as a counterpressure garment.
T. G. R 31

18,973
Mascianica, F.S. EFFECT OF METHOD OF SUPPORT UPON BALLISTIC PERFORMANCE OF FLEXIBLE PERSONNEL ARMOR. OO Proj. TB4 10, DA Proj. 593 08 020, Rep. MAL 710/1048, Jan. 1956, 37pp. USA Watertown Arsenal Lab., Watertown Arsenal, Mass.

18,973
To determine whether the ballistic testing of fabric armors by firing at test panels tautly stretched over rigid frames with no support behind the armor yields results comparable to tests in which the flexible fabric armor is wrapped around a dummy, 12-ply, spot-laminated panels of a two-by-two basketweave nylon armor were tested. The following methods of support were used: 1) clamped to a wooden frame; 2) rigidly supported on a steel frame; 3) strapped tightly against rolled mattress; 4) strapped tightly against an aluminum-alloy witness-plate backed by a rolled mattress; and 5) supported against sponge-rubber (one-fourth inch thick), witness plate, and rolled mattress. All were impacted by 5.85-, 17-, and 44-grain, fragment-simulating projectiles; the ballistic limits were obtained. T.

18,974
Madden, J.M. & Giorgia, M. Joyce. THE METHODS AND FOUNDATIONS OF JOB EVALUATION IN THE UNITED STATES AIR FORCE WITH AN APPENDIX ANNOTATED BIBLIOGRAPHY OF JOB EVALUATION. Proj. 7734, Task 773402, ASD TR 61 100, Oct. 1961, 58pp. USAF Personnel Lab., Lackland AFB, Tex.

18,974
This report summarizes the history of job evaluation and gives a critical review of the technical literature as a background for the USAF job evaluation plan. The USAF plan is described with the rationale for each phase. A discussion of unsolved problems includes an outline of research needed to discover solutions to these problems. An appendix lists an extensive bibliography with abstracts.
R 207

18,975
Lohrenz, C.A. & Zymet, B.L. SYNTHESIZED EQUIPMENT FOR GROUND BASED RADAR SYSTEMS. I: RADAR OPERATOR TRAINING--THE MAN, THE MACHINE, AND THE SIMULATOR. Contract AF 33(616) 5998, Proj. 0(8 6114), Task 60172, ASD TR 61 411 (I), Oct. 1961, 301pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio. (Electronics Div., Curtiss-Wright Corporation, East Paterson, N.J.).

18,975
The requirements of training for the ground-based radar operators are analyzed by looking at the man and the training structure, the machine he operates, and last, the training devices used in training for the task. The USAF specialty codes are given. Various radar types including search, precision, height-finding, and tracking are reviewed from the operator's viewpoint. Next, existing ground-based simulators are reviewed for their applicability to the more complex radar situation. A hybrid synthetic technique capable of more complete radar environment simulation is described which would provide the USAF with a tool for faster and more adequate radar operator training.
T. G. I. R 604

18,976
Levin, A., Peryam, D.R., Seaton, R., Morane, N., et al. SYSTEMS RESEARCH IN "MICROLOGISTICS" AND HUMAN FACTOR ASPECTS OF SMALL GROUP CAPABILITIES IN A POLAR AREA. Proj. PPO 59, Dec. 1961, 186pp. USA Quartermaster Research & Engineering Command, Natick, Mass.

18,976
The initial phase of research on systems of USA Quartermaster equipment, supplies, and related materiel in a selected polar environment is described. The emphasis is on the form in which such systems may be assembled and the measures for their effectiveness. The degree to which logistical inputs and operational outputs interact with system component design and activity of personnel is examined also. Three levels of accomodation are organized from available materiel and their interactions on the functional capabilities of six-man user "Modules" are examined. Over-all input-output relations of each are derived.
T. G. I. R 16

18,977
Egan, J.P., Greenberg, G.Z. & Schulman, A.I. INTERVAL OF TIME UNCERTAINTY IN AUDITORY DETECTION. J. acoust. Soc. Amer., June 1961, 33(6), 771-778. (Hearing and Communications Lab., Indiana University, Bloomington, Ind.). (AFCCDD TR 60 32).

18,977
Three experiments were conducted to measure the decrement in performance that results from uncertainty in the time of onset of a signal presented against a continuous background of noise; the fixed-interval observation experiment was employed. A light defined an observation interval for the listener during which the signal (1,000-cps tone) either was or was not presented (probability of 0.5). This signal started at an instant randomly selected within the observation interval. This interval of time uncertainty was varied systematically from one series of trials to the next. After each observation interval the listener indicated his confidence that a tone was presented on a rating scale. Operating characteristics were plotted and measures of detectability computed. G. I. R 16

18,978
Egan, J.P., Schulman, A.I. & Greenberg, G.Z. MEMORY FOR WAVEFORM AND TIME UNCERTAINTY IN AUDITORY DETECTION. J. acoust. Soc. Amer., June 1961, 33(6), 779-781. (Hearing and Communications Lab., Indiana University, Bloomington, Ind.). (AFCCDD TN 61 1).

18,978
An experiment was conducted to determine how well listeners could judge whether or not a signal was presented in a noisy observation interval which had already occurred. The observation interval was not marked off for the listeners until after its occurrence. With a probability of 0.5, the signal (1,000 cps, 25 sec.) was presented at a randomly selected instant. At a fixed time thereafter, the listener was informed by a light flash of the real time at which the signal might have occurred and he responded with a rating of confidence. Measures of detectability were derived from operating characteristics and plotted against memory time.
G. I. R 2

18,979
Forsyth, D.M. & Brown, C.R. NONLINEAR PROPERTY OF THE VISUAL SYSTEM AT FUSION. Science, Sept. 1961, 134(3479), 612-614. (Psychology Dept., Goucher College, Towson, Md. & USAF Operational Applications Lab., Electronic Systems Div., Hanscom Field, Bedford, Mass.). (ESD PN61 50).

18,979
To study some aspects of the visual system at fusion, alternating trains of light pulses of two differing frequencies were presented to each of three observers successively in a continuous sequence. For each series of measurements the period (on-off time) of pulses in the standard train was set at a fixed value. The observer then adjusted the period of the pulses in the variable train until a point of fusion was reached. Settings of the standard train periods ranged from 1 to 18 msec. Fusion data were analyzed as a function of the periods of the pulses in the alternating trains of intermittent photic data.
G. I. R 3

18,980
Rahm, W.E., Jr., Strother, W.F., Gulick, W.L. & Crump, J.F. THE EFFECTS OF ANESTHETICS UPON THE EAR. III. TETRACAINE HYDROCHLORIDE. Ann. Oto-, Rhino-, Laryngology, June 1961, 70(2), 403-409. (Psychological Lab., Princeton University, Princeton, N.J.).

18,980
To study the effects of tetracaine hydrochloride (Pontocaine, two percent) upon the response of the cochlea of the cat, the methods used in two previous studies (18,981 and 18,982) were duplicated. Intensity functions and cochlear response reduction to the solution were recorded and analyzed. Comparisons were made with data drawn from the two previous studies.
G. R 9

18,981
Rahm, W.E., Jr., Strother, W.F., Gulick, W.L. & Crump, J.F. THE EFFECTS OF ANESTHETICS UPON THE EAR. II. PROCAINE HYDROCHLORIDE. Ann. Oto-, Rhino-, Laryngology, Dec. 1960, 69(4), 969-975. (Psychological Lab., Princeton University, Princeton, N.J.).

18,981
The effects of procaine hydrochloride (two percent) upon the cochlear response of the cat were studied. It is customary to use procaine hydrochloride as a reference for measuring the potency of anesthetics; therefore, data from this study could be used to make comparisons with selected anesthetics currently in use for ear surgery. The procedure used in a previous study (18,982) was duplicated with effects of the chemical and of normal saline upon the cochlear response evaluated in two ways: 1) changes in magnitude of response produced by a constant stimulus were observed over extended periods of time, and 2) intensity functions were plotted immediately before and after application and at regular intervals for 120 min.
G. R 8

18,982
Rahm, W.E., Jr., Strother, W.F., Gulick, W.L. & Crump, J.F. THE EFFECTS OF TOPICAL ANESTHETICS UPON THE EAR. Ann. Oto-, Rhino-, Laryngology, Dec. 1959, 68(4), 1037-1046. (Psychological Lab., Princeton University, Princeton, N.J.).

18,982
This experiment studied the effects of certain chemical substances, often used as topical anesthetics for middle ear surgery, on the cochlear response of the cat. One control (physiological saline) and three experimental solutions (cocaine in saline, ten percent; and hexylcaine hydrochloride, five or one percent). Animals (16) were used, four for each solution. Cochlear response of 50 microvolts was initially established and one of the anesthetics was applied to round window membrane. Changes in magnitude of the cochlear response were observed over extended periods of time; intensity functions were plotted immediately before and after application of anesthetic as well as at regular intervals thereafter.
G. R 11

18,983
Baker, L.E. (Chm.). SEVENTH ANNUAL ARMY HUMAN FACTORS ENGINEERING CONFERENCE. USA SIGNAL CORPS PROJECT MICHIGAN, UNIVERSITY OF MICHIGAN, ANN ARBOR, MICH. 3-6 OCTOBER 1961. 334pp. USA Office of the Chief of Research and Development, Washington, D.C.

18,983
This is a record of an annual conference held for the purposes of interchange of information among developing and using agencies and personnel connected with the effectiveness of USA man-machine systems in the operational environment. Both military and civilian agencies are represented. The theme of the conference is combat communications and surveillance. A current and authoritative compendium of the human factors engineering work programs of the USA Technical Services is appended.
T. G. I. R 31

18,984
Weber, H.C. COMBAT COMMUNICATIONS AND COMMUNICATORS. Report from: "Seventh Annual Army Human Factors Engineering Conference. USA Signal Corps Project Michigan, University of Michigan, Ann Arbor, Mich. 3-6 October 1961," 4-6. USA Office of the Chief of Research and Development, Washington, D.C.

18,984
Various examples are cited of future developments anticipated in the field of combat communications and surveillance systems. These examples serve to illustrate the kind of problems in this area of research and development on which human factors research will be needed. The effort needed to achieve the desired development is an interdisciplinary one in which soldiers, scientists, and engineers from various fields must pool their skills and talents.
R I

18,985
Davidson, H.E., Jr. THE ARCTIC ENVIRONMENT AND ITS EFFECT ON MEN AND MATERIEL. Report from: "Seventh Annual Army Human Factors Engineering Conference. USA Signal Corps Project Michigan, University of Michigan, Ann Arbor, Mich. 3-6 October 1961," 7-26. USA Office of the Chief of Research and Development, Washington, D.C. (USA Arctic Test Board, Fort Greely, Alaska).

18,985
The arctic geographic, climatic, weather, and terrain factors, especially as applied to Alaska, are discussed. Some of the problem areas caused by the operation of troops and materiel under conditions in the arctic, especially those problems caused by extreme cold, then are presented.
G. I.

18,986
Melton, A.W. HUMAN FACTORS RESEARCH APPROACHES TO COMBAT SURVEILLANCE IN THE CONTEXT OF PROJECT MICHIGAN. Report from: "Seventh Annual Army Human Factors Engineering Conference. USA Signal Corps Project Michigan, University of Michigan, Ann Arbor, Mich. 3-6 October 1961," 29-52. USA Office of the Chief of Research and Development, Washignton, D.C. (Institute of Science and Technology, University of Michigan, Ann Arbor, Mich.).

18,986
The establishment of Project MICHIGAN in 1958 to study human factors problems of USA combat surveillance operations is discussed. It is pointed out that the research responsibility is restricted to the physical sciences and engineering research and development with the problem of human interpretation of airborne sensor output displays (photo, radar, and infrared) being the principal focus. A brief summary is presented of results from experiments using actual sensor displays and those using simulated displays. Future directions in the program are indicated.
T. G. I. R 2

18,987
Smith, S.W. DISPLAY FACTORS IN VISUAL SEARCH OF COMPLEX TWO-DIMENSIONAL DISPLAYS. Report from: "Seventh Annual Army Human Factors Engineering Conference. USA Signal Corps Project Michigan, University of Michigan, Ann Arbor, Mich. 3-6 October 1961," 53-62. USA Office of the Chief of Research and Development, Washington, D.C. (Institute of Science and Technology, University of Michigan, Ann Arbor, Mich.).

18,987
This study was concerned with human capabilities and limitations for interpreting two-dimensional visual displays. Experiments were reported on the time required to find a target in complex abstract displays (small bright elements on a fairly bright background). The observer's task was to search the display as rapidly as possible and to locate a particular object, the target. Time to find the target was recorded as the major dependent variable. Two types of display variables were investigated: 1) number of elements in the field (clutter or noise), and 2) degree of similarity between target and clutter objects (pseudotargets). The results were presented graphically.
T. G. I. R 5

18,988
Edwards, W.D. PROBABILISTIC PROCESSING OF SURVEILLANCE INFORMATION. Report from: "Seventh Annual Army Human Factors Engineering Conference. USA Signal Corps Project Michigan, University of Michigan, Ann Arbor, Mich. 3-6 October 1961," 63-69. USA Office of the Chief of Research and Development, Washington, D.C. (Institute of Science and Technology, University of Michigan, Ann Arbor, Mich.).

18,988
Since a great deal of the information which military commanders must use as a basis for decisions is fallible, incomplete, or both, a method for improving the design of information processing man-machine systems for coping with this type of information is needed. It is here proposed that techniques for processing information probabilistically (Bayesian statistics) be utilized. Since the probabilities required as inputs for the suggested application are not easily obtained, human estimation of probabilities may be a solution. An experiment is reported here that was concerned with estimation of time-varying probabilities in a very simple situation. Further study is recommended.
T. G. I. R 7

18,989
Ide, H.A. SOME HUMAN FACTORS CONSIDERATIONS IN THE TEST AND EVALUATION OF COMBAT SURVEILLANCE SYSTEMS. Report from: "Seventh Annual Army Human Factors Engineering Conference. USA Signal Corps Project Michigan, University of Michigan, Ann Arbor, Mich. 3-6 October 1961," 70-73. USA Office of the Chief of Research and Development, Washington, D.C. (USA Electronic Proving Ground, Fort Huachuca, Ariz.).

18,989
A brief summary is presented of the test and evaluation of Combat Surveillance sensors and systems at the USA Electronics Proving Ground. Attention is directed to two areas in which human factors are of prime importance: 1) the interpretation by the operator of ground surveillance radars of what he thinks the aural and visual radar returns mean, and 2) the information derived from the aerial photograph by the image interpreter.
I.

18,990
Zeleny, C.E., McGrane, F.J. & Lerner, H.D. APPRAISING HUMAN FACTORS ALTERNATIVES IN COMBAT SURVEILLANCE SYSTEMS. Report from: "Seventh Annual Army Human Factors Engineering Conference. USA Signal Corps Project Michigan, University of Michigan, Ann Arbor, Mich. 3-6 October 1961," 74-80. USA Office of the Chief of Research and Development, Washington, D.C. (Applied Psychology Corporation, Arlington, Va.).

18,990
In the design stages of any system, the design engineers need help in evaluating the human factors effectiveness of design alternatives under consideration. The main features of one effort in this direction are described in this paper; that is, the development of a means for rating the effectiveness of proposed tasks and systems. The mathematics of effectiveness indices for comparing tasks and systems is also presented. Illustrative examples are given.
T.

18,991
Feddersen, W.E. SIMULATOR RESEARCH: VALIDATION AND MOTION STUDIES. Report from: "Seventh Annual Army Human Factors Engineering Conference. USA Signal Corps Project Michigan, University of Michigan, Ann Arbor, Mich. 3-6 October 1961," 81-84. USA Office of the Chief of Research and Development, Washington, D.C. (Bell Helicopter Company, Fort Worth, Tex.).

18,991
Research studies in the validation of the Bell dynamic simulator and supporting equipment against the helicopter are reported in summary form. Experimental data are presented to demonstrate the extent to which performance results on the simulator approximate those obtained from the helicopter when the tasks are equivalent. Three areas in which research studies have been made are discussed: 1) the effect of various types of motion upon operator performance, 2) the contribution of motion cues relative to no-motion in the simulator tracking situation, and 3) various measures for evaluating operator and system performance.
G.

18,992
Bloom, J.N. PEOPLE, ORGANIZATIONS AND COMMUNICATIONS. Report from: "Seventh Annual Army Human Factors Engineering Conference. USA Signal Corps Project Michigan, University of Michigan, Ann Arbor, Mich. 3-6 October 1961," 85-96. USA Office of the Chief of Research and Development, Washington, D.C. (Franklin Institute, Philadelphia, Penn.).

18,992
A research study of the fundamental principles of the interrelationship of people, organizations, and communications as related specifically to Army Headquarters Communications is presented. The command control network is described and the conceptual background of the research is presented. From among the many measurement techniques that have been developed, one is reviewed in detail—the headquarters delay and error measurement program.
G. I.

18,993
Kneisel, R.S. HUMAN FACTORS ENGINEERING AS RELATED TO CBR TRAINING AND OPERATIONS. Report from: "Seventh Annual Army Human Factors Engineering Conference. USA Signal Corps Project Michigan, University of Michigan, Ann Arbor, Mich. 3-6 October 1961," 99-103. USA Office of the Chief of Research and Development, Washington, D.C. (USA Chemical Corps School, Fort McClellan, Ala.).

18,993
The thesis here developed is that the individuals and their training must be basic to the development of a given weapons system or a piece of equipment. The application of this philosophy to training and operations in the USA Chemical Corps is presented in some detail.
R 2

18,994
Christian, J.F. A HUMAN FACTORS REVIEW OF THE CREW COMPARTMENT OF THE ARMORED VEHICLE LAUNCHED BRIDGE/M60. Report from: "Seventh Annual Army Human Factors Engineering Conference. USA Signal Corps Project Michigan, University of Michigan, Ann Arbor, Mich. 3-6 October 1961," 107-120. USA Office of the Chief of Research and Development, Washington, D.C. (USA Engineer Research and Development Labs., Fort Belvoir, Va.).

18,994
The crew compartment of the Armored Vehicle Launched Bridge/M60 (a "second generation" 60-ft. bridge transported and launched by a modified battle tank) presented several human factors problems. How these were approached and resolved in the Engineering Design stage through the use of a full-size mock-up were described. Crew space problems, entrance and egress, operation of equipment, maintenance, and so on were covered.
I.

18,995
Berry, H.A. & Horowitz, P. INVESTIGATIONS OF THE TACTICAL INTERPRETABILITY OF TOPOGRAPHIC DISPLAYS. Report from: "Seventh Annual Army Human Factors Engineering Conference. USA Signal Corps Project Michigan, University of Michigan, Ann Arbor, Mich. 3-6 October 1961," 121-126. USA Office of the Chief of Research and Development, Washington, D.C. (Aeronutronic, Ford Motor Company, Newport Beach, Calif.).

18,995
The hypothesis of this paper is that aerial photographs, in large scale presentations and with some modifications, may be equal or superior to conventional maps for purposes of orientation, travel, and terrain appreciation. A series of four investigations is described and summarized: 1) the interpretability of presently used topographic symbols, 2) the relative interpretability of vertical aerial photographs and standard topographic maps, 3) the qualitative interpretability of oblique aerial photographs, and 4) the effects of image tilt on the interpretability of oblique aerial photographs.
T. R 3

18,996
Loeb, M. EXPERIMENTS ON VIGILANCE FOR AUDITORY AND CUTANEOUS SIGNALS. Report from: "Seventh Annual Army Human Factors Engineering Conference. USA Signal Corps Project Michigan, University of Michigan, Ann Arbor, Mich. 3-6 October 1961," 139-147. USA Office of the Chief of Research and Development, Washington, D.C. (USA Medical Research Labs., Fort Knox, Ky.).

18,996
Five experiments concerned with the detection of the simple presence of auditory, cutaneous-vibratory, or cutaneous-electrical signals over a prolonged period of time are reported. Certain features of the physical stimulus (signal intensity, rise and decay time, spectrum, and spacing) and certain task-related variables (knowledge of results and incentive) are manipulated to explore the nature and generality of observed results and to determine procedures by which the quality of responding could be maintained.
T. G. R 16

18,997
Downing, T.S. AVID - ADVANCED VISUAL INFORMATION DISPLAY. Report from: "Seventh Annual Army Human Factors Engineering Conference. USA Signal Corps Project Michigan, University of Michigan, Ann Arbor, Mich. 3-6 October 1961," 163-170. USA Office of the Chief of Research and Development, Washington, D.C. (McDonnell Aircraft Corporation, ST. Louis, Mo.).

13,997
An investigation of display techniques suitable for the presentation of target information to the commander of an antiaircraft battery is described. An Advanced Visual Information Display (AVID) systems concept is discussed and two widely different displays that were developed in the study are described—the Matrix and the Predicted Situation displays. The displays are designed to reduce perceptual saturation of the battery commander by eliminating information not germane to the decision-making process and, further, by reducing the amount of information simultaneously displayed.
I.

18,998
Hicks, S.A. VEHICLE CONFINEMENT STUDIES. Report from: "Seventh Annual Army Human Factors Engineering Conference. USA Signal Corps Project Michigan, University of Michigan, Ann Arbor, Mich. 3-6 October 1961," 171-179. USA Office of the Chief of Research and Development, Washington, D.C. (USA Ordnance Human Engineering Labs., Aberdeen Proving Ground, Md.).

18,998
A series of studies was conducted to determine the psychological and physiological limitations and capabilities of individuals operating in tanks and Armored Personnel Carriers for sustained periods of time. The effects on performance were studied by gradually increasing the length of time of exposure in each experiment; thus far five studies ranging from 4 to 24 hours confinement have been concluded. Pre- and postexposure test scores on obstructed-run, grenade-throw, rail-walking, and rifle-fire courses were obtained. Variables of activity, noise due to engine, and vibration due to movement have been investigated in addition to the time variable.
I.

18,999
Moler, C.G. AIR-TO-GROUND TARGET DETECTION AND IDENTIFICATION. Report from: "Seventh Annual Army Human Factors Engineering Conference. USA Signal Corps Project Michigan, University of Michigan, Ann Arbor, Mich. 3-6 October 1961," 180-182. USA Office of the Chief of Research and Development, Washington, D.C. (USA Ordnance Human Engineering Labs., Aberdeen Proving Ground, Md.).

18,999
An investigation was conducted in an effort to establish a baseline for susceptability of typical ground target types of detection, identification, and range estimation from helicopters operating in "contour" flight (flying as close to ground as possible, rising only to clear obstacles). A test region was subdivided into nine equal squares into which one of each of five types of target (tank, jeep, machine gun, etc.) were placed. In the course of a standardized flight pattern, observers (32 experienced pilots) were asked to detect the target, identify it, and give slant range estimation in yards and by clock position. By comparing photographs taken during each run with a previously prepared pattern, performance scores were determined.

19,000
Webber, H.E. MANAGEMENT AND HUMAN FACTORS AT MARTIN-ORLANDO. Report from: "Seventh Annual Army Human Factors Engineering Conference. USA Signal Corps Project Michigan, University of Michigan, Ann Arbor, Mich. 3-6 October 1961," 183-187. USA Office of the Chief of Research and Development, Washington, D.C. (Martin Company, Orlando, Fla.).

19,000
The organization and implementation of a Human Factors Program at Martin-Orlando is described. The steps taken by management in initiating the program are set forth as well as its functional aspects. Specific tasks performed by Human Factors engineers are subsumed under the following areas: 1) systems analysis, 2) human engineering, 3) field evaluation, 4) experimental research, 5) personnel selection and training, 6) human capabilities and limitations, 7) specifications, 8) reports, 9) subcontract relations, 10) design review, 11) manuals, 12) education and training, and 13) state-of-the-art advancement.
G. I.

19,001
Weisz, J.D. THE HUMAN FACTORS ENGINEERING PROGRAM IN THE ORDNANCE CORPS. PROGRESS REPORT. Report from: "Seventh Annual Army Human Factors Engineering Conference. USA Signal Corps Project Michigan, University of Michigan, Ann Arbor, Mich. 3-6 October 1961," 188-190. USA Office of the Chief of Research and Development, Washington, D.C. (USA Ordnance Human Engineering Labs., Aberdeen Proving Ground, Md.).

19,001
The Ordnance Corps human factors engineering program applies to all Ordnance installations and activities concerned with research, development, and evaluation of Ordnance materiel including both in-house and contractor effort. Basic and supporting research are performed as well as evaluation and redesign studies. The policies, organization, personnel, facilities, projects and funding, and planned improvements are described in this paper.
I.

19,002
Clark, R.E. MANUAL PERFORMANCE DURING COLD EXPOSURE AS A FUNCTION OF PRACTICE LEVEL AND THE THERMAL CONDITIONS OF TRAINING. Report from: "Seventh Annual Army Human Factors Engineering Conference. USA Signal Corps Project Michigan, University of Michigan, Ann Arbor, Mich. 3-6 October 1961," 202-205. USA Office of the Chief of Research and Development, Washington, D.C. (USA Research Institute of Environmental Medicine, QM Research & Engineering Center, Natick, Mass.).

19,002
To determine whether highly skilled Ss exhibit any cold-related performance decrements and, if they do, whether they can learn to overcome the manually restraining effects of cold, 30 Ss were given equal amounts of training on a standard task (knot-tying) under varied thermal experiences. One group (ten Ss) performed each day with cold hands (46 degrees F hand surface temperature, HST); another group performed on odd-numbered days with warm hands (90 degrees F HST) and on even-numbered days with cold hands; the third group performed for ten days with warm hands and for the remaining five days with cold hands. Warm-up trials were given on Mondays of the first and second weeks. The combined effects of practice level, thermal experience, and exposure conditions on manual performance were presented. G. R 17

19,003
McCourt, F.P. AVIATION CRASH INJURY RESEARCH. Report from: "Seventh Annual Army Human Factors Engineering Conference. USA Signal Corps Project Michigan, University of Michigan, Ann Arbor, Mich. 3-6 October 1961," 209-217. USA Office of the Chief of Research and Development, Washington, D.C. (USA Transportation Research Command, Fort Eustis, Va.).

19,003
A long-range research program to obtain technical crash-performance data for rotary wing and VTOL aircraft has been initiated. This report presented the results of an exploratory, experimental study. A Piesecki Model H-25A helicopter was used to recreate a typical accident approximating an unsuccessful attempt to attain an autorotation from a low-altitude power failure. The helicopter, fully instrumented, was dropped from a moving crane at a height of 30 ft. and a forward speed of 30 mph. The recorded data were analyzed for their validity as actual crash-force measurements. The feasibility of airborne testing and the problems of dynamic testing were discussed.
G. I.

19,004
Sadacca, R. DEVELOPMENT OF NEW TECHNIQUES FOR USE IN IMAGE INTERPRETATION SYSTEMS. Report from: "Seventh Annual Army Human Factors Engineering Conference. USA Signal Corps Project Michigan, University of Michigan, Ann Arbor, Mich. 3-6 October 1961," 221-227. USA Office of the Chief of Research and Development, Washington, D.C. (USA Human Factors Research Branch, Adjutant General's Research and Development Command, Washington, D.C.).

19,004
A research program designed to provide knowledge of basic psychological factors operating when image interpreters interpret real imagery from tactical and strategic air reconnaissance missions is described. Five of the experimental techniques that were tried in an effort to gain insight into how interpreter performance might be improved are described. They make use of: 1) degree of confidence expressed in identifications, 2) efficient viewing time periods, 3) performance feedback, 4) repeated exposures to imagery, and 5) teamwork procedures. The findings are discussed in terms of their implications for human engineers designing visual displays.
T. G. R 1

19,005
Rengel, S. TRACKING PERFORMANCE IN THE MISSILE MASTER FIRE DISTRIBUTION SYSTEM. Report from: "Seventh Annual Army Human Factors Engineering Conference. USA Signal Corps Project Michigan, University of Michigan, Ann Arbor, Mich. 3-6 October 1961," 228-236. USA Office of the Chief of Research and Development, Washington, D.C. (USA Human Factors Research Branch, Adjutant General's Research and Development Command, Washington, D.C.).

19,005
The development of fire distribution systems for rapid and accurate transmission of air defense data is discussed and the need for human factors research is indicated. This paper presents an exploratory study of the relationship between tracking performance (as an early input in the system) and load level (number of targets), duration of tracking time, and rated proficiency of the Missile Master Fire Distribution System. Trackers, ranked as to relative proficiency by supervisors, are presented with varying numbers of targets to track over a one-hour period. Stimuli are selected from the operational radar input to the system. Implications of the findings for design of fully automated tracking systems are discussed.
T. G. I.

19,006
Bishop, C.K. TEACHING MACHINES--AN OVERVIEW. Report from: "Seventh Annual Army Human Factors Engineering Conference. USA Signal Corps Project Michigan, University of Michigan, Ann Arbor, Mich. 3-6 October 1961," 237-239. USA Office of the Chief of Research and Development, Washington, D.C. (USN Training Device Center, Port Washington, N.Y.).

19,006
An educational technique--programmed instruction--is discussed. The presentation is concerned with the basis for the present wide-spread interest in the technique, programmed instruction's current status, and some of the issues yet to be resolved. These issues concern: 1) lack of criticism, 2) lack of long-term studies, 3) the so-called Hawthorne effect, 4) the question of retention of knowledge, and 5) the lack of provision for individual differences.

19,007
Leskinen, J.I. ELECTRONIC WARFARE TRAINING IN ANTI-JAMMING TECHNIQUES. Report from: "Seventh Annual Army Human Factors Engineering Conference. USA Signal Corps Project Michigan, University of Michigan, Ann Arbor, Mich. 3-6 October 1961," 240-244. USA Office of the Chief of Research and Development, Washington, D.C. (USN Training Device Center, Port Washington, N.Y.).

19,007
The problem of the vulnerability of various electronic devices that have been designed to extend man's vision to its own and to other means of electromagnetic radiation, particularly to planned interference or jamming, is indicated. The operator of a radar must be trained to identify and classify detected interfering signals. Training in antijamming techniques and a group of devices that have been designed and built for such training are described.
I.

19,008
Thomas, F.H. AERIAL OBSERVER PROBLEMS. Report from: "Seventh Annual Army Human Factors Engineering Conference. USA Signal Corps Project Michigan, University of Michigan, Ann Arbor, Mich. 3-6 October 1961," 245-248. USA Office of the Chief of Research and Development, Washington, D.C. (USA Aviation Human Research Unit, Fort Rucker, Ala.).

19,008
As part of a larger research effort directed toward increasing the effectiveness of the combat intelligence system, training methods and techniques for aerial observation were studied. The working environment in which the aerial observer may be expected to operate was discussed and experiments dealing with the following questions were summarized. 1) Does the performance of the observer match the system requirements? 2) If not, then what are the indicated directions for performance improvement? Studies concerned with training methods and with the mechanical aids needed for improved performance were discussed.

19,009
Rupe, J.C. PROCEDURES FOR OBTAINING HUMAN FACTORS INFORMATION AS AN INTEGRAL PART OF WEAPON SYSTEM DESIGN AND DEVELOPMENT. Report from: "Seventh Annual Army Human Factors Engineering Conference. USA Signal Corps Project Michigan, University of Michigan, Ann Arbor, Mich. 3-6 October 1961," 249-252. USA Office of the Chief of Research and Development, Washington, D.C. (USA Air Defense Human Research Unit, Fort Bliss, Tex.).

19,009
A summary is given of a study made to develop systematic procedures for use during weapon system research, development, and testing in order to assure the effective and economical production of human factors data and products required for the concurrent building of a Personnel Support System. The study reported herein is concerned with training requirements and training support materials. The background and importance of the problem, current practice of the state-of-the-art, and a proposed system are discussed.
T.

19,010
Blatt, S.J. & Stein, M.I. EFFICIENCY IN PROBLEM SOLVING. J. Psychol., 1959, 48, 193-213. (Psychosomatic and Psychiatric Institute for Research and Training, Michael Reese Hospital, Chicago, Ill. & Center for the Study of Creativity and Mental Health, University of Chicago, Chicago, Ill.).

19,010
The characteristics of processes involved in solving purely "rational" problems that consist solely of logical relationships and their relationships to efficiency were investigated. By means of an electromechanical apparatus S was presented with a series of logical relationships which he had to derive and then coordinate for the final solution. Efficiency was defined as one who asked the smallest number of unnecessary questions (redundant, nonabstract, or unique). Time for various phases of the task were recorded also. Ss were 35 Ph.D. chemists. Analysis of the data was related to the various hypotheses originally stated. Intelligence and personality variables were related to the findings.
I. R 13

19,011
Sturtevant, J.V. PERCENT DIVERSION VERSUS MEASUREMENT LIMITS. Rep. 117, April 1952, 31pp. United States Steel Corporation, New York, N.Y.

19,011
This working paper discusses the problem of quality control in manufactured products, each item of which should possess a certain measured value of one or more particular quality characteristics. Setting limits on measurement values on an economical basis for both producer and consumer is necessary. Tables of percentages for any set of measurement values are presented for normally distributed data and also for those that deviate from the normal. Limits for a product having two or more characteristics that must be controlled are also discussed with tabulation and interpretation procedures given.
T. G. I.

19,012
Henry, W.O., Goldstein, D.A., Allen, F.L., Simoneau, G.R., et al. SQUIRE - A UNIFIED DISPLAY FOR SUBMARINE SHIP CONTROL. SHIP CONTROL XIII. Contract NONR 2512(00). EB Tech. Rep. U 411 61 094, Aug. 1961, 40pp. Electric Boat Div., General Dynamics Corporation, Groton, Conn.

19,012
A new submarine ship control display was described in nontechnical language. The display was developed to serve as the primary data presentation device for ship control operators of modern submarines and was designated "SQUIRE" for Submarine Quickened Response. It was based on an extension of the principle of quickening and presented the information required to control the submarine in course and/or in depth in a simple, useable form (simple position tracking). Applications of SQUIRE to future submarine developments were also considered.
G. I. R 16

19,013
Woolman, M. EVALUATING FLIGHT PERFORMANCE. FINAL REPORT. Rep. 55 1, Aug. 1953, 63pp. USAF Air Training Command, Scott AFB, Ill.

19,013
Objective and subjective grading methods in use at McConnell Air Force Base for evaluating flight performance are presented. Objective grades (called Sensitive Indicators) are instrument readings taken at standard check points during flight maneuvers that reflect a complex pattern of previously learned responses. Reliability studies on these grades are given. A Performance Proficiency Scale is described and its use in subjective grading is discussed. Some training results obtained from these methods are presented.
T. G. I.

19,016
Weber, J. A PHYSICAL ANALYSIS OF THE FORCE PLATFORM. Acta physiol. pharm. Neerlandica, 1958, VII(1), 1p. (Netherlands Institute for Preventive Medicine, Leiden, Netherlands).

19,016
This is an abstract of a paper in which an instrument for analyzing and measuring the physical effort as applied at various industrial tasks or athletics is described.

19,017
Educational Research Corporation. PLANNING DOCUMENT FOR RESEARCH ON SAGE OPERATOR PROFICIENCY EVALUATION. DRAFT. ERC Proj. 53, July 1959, 22pp. Educational Research Corporation, Cambridge, Mass.

19,017
This planning document was prepared after several months spent developing prototype proficiency measures for SAGE operators. Training research needs were indicated only as they are suggested by or affected by operator proficiency evaluation studies. Three types of items needed in proficiency evaluation were defined and recommendations were made concerning the research needed to develop them properly.

19,018
Garrow, J.S. POSITIVE ACCELERATION AND THE RELEASE OF ANTIDIURETIC HORMONE IN MAN. FPRC 1129, Nov. 1960, 43pp. Flying Personnel Research Committee, London, England. (RAF Institute of Aviation Medicine, Farnborough, Hants, England).

19,018
To investigate the relation between the imposition of increased positive acceleration and the release of antidiuretic hormone, experimentation on the centrifuge was conducted. After preliminary experimentation, the following procedure was used. Three Ss were maintained with a water load of 250 milliliters for three hours. At the middle of this period they were exposed for ten min. to two g positive acceleration. Position of the Ss was sitting upright. Urine was collected every 30 min. Chemical analyses of the urine were made; volume of urine was recorded also. The findings were discussed in relation to the literature on this subject.
T. G. R 55

19,019
Ernsting, J., Roxburgh, H.L. & Wagner, P.R. RAPID DECOMPRESSION IN THE HELMET, JERKIN, ANTI-G SUIT SYSTEM. A PRELIMINARY REPORT. FPRC 1150, April 1960, 44pp. Flying Personnel Research Committee, London, England. (RAF Institute of Aviation Medicine, Farnborough, Hants, England).

19,019
To study the effects of rapid decompression, such as might occur in military aircraft, upon both the occupant and his personal equipment as well as the protective value of such equipment, a series of studies was carried out over a range of five lbs. per square inch pressure loss at altitudes from 20,500 to 50,000 ft. occurring in 0.1 sec. In one series of tests, human Ss wearing the relevant aircrew equipment assembly were studied; in others, a rigid air-filled container was employed to simulate the human lungs. The physiology of rapid decompression and the effect of oxygen equipment were discussed in relation to the findings.
T. G. I. R 11

19,020
Ernsting, J., Gedye, J.L. & McHardy, G.J.R. ANOXIA SUBSEQUENT TO RAPID DECOMPRESSION. FPRC 1141, Part 1, Sept. 1960, 8pp. Flying Personnel Research Committee, London, England. (RAF Institute of Aviation Medicine, Farnborough, Hants, England).

19,020
To determine the physiological and psychological effects of delivering oxygen at various times before and after rapid decompression from 8,000 to 38,000 ft., a series of experiments was conducted on six Ss. Respiratory responses, instantaneous expired nitrogen concentration, and reactions of the central nervous system (EEG and performance on a sequential motor task) were determined under the following breathing conditions: 1) air both before and after decompression, 2) air before and oxygen delivered two sec. following decompression, 3) air before and oxygen delivery after eight sec., and 4) oxygen throughout.
G. R 1

19,021
Crawford, W.A. FALSE PERCEPTION OF THE HORIZONTAL AND VERTICAL PLANES IN A DYNAMIC SETTING. FPRC Memo 150(H), Oct. 1960, 5pp. Flying Personnel Research Committee, London, England. (RAF Institute of Aviation Medicine, Farnborough, Hants, England).

19,021
It was observed that when a human S is lying on his side with the transverse axis through the eyes being vertical, a target moving in the horizontal plane is seen as having an inclination to the horizontal. The extent of this illusion was examined in six Ss and the degree and direction of the inclination recorded. The errors in determination of the horizontal were analyzed and discussed in relation to studies on the relationship between visual and proprioceptive functions.
T. R 16

19,022
Crawford, W.A. THE PERCEPTION OF MOVING OBJECTS. IV. THE ACCURACY OF FIXATION REQUIRED IN THE PERCEPTION OF DETAIL IN MOVING OBJECTS. FPRC 150.D, Oct. 1960, 8pp. Flying Personnel Research Committee, London, England. (RAF Institute of Aviation Medicine, Farnborough, Hants, England).

19,022
This study is concerned with the degree of inaccuracy in fixation which would need an involuntary corrective eye movement (fixation reflex) to be activated for the perception of detail in moving objects. Position errors (of line of sight with regard to object), velocity errors (differential velocity between eyes and target), and combined errors were examined experimentally. The position error tolerance of six Ss was found in a typical visual acuity from fovea to right and left in the periphery. The two other error tolerances were examined by use of moving targets displayed for a time less than the latent period of eye movement to insure that fixation reflex did not occur.
T. G. R 22

19,023
Crawford, W.A. THE PERCEPTION OF MOVING OBJECTS. V. THE MOMENT OF PERCEPTION. FPRC Memo. 150.E, Sept. 1960, 21pp. Flying Personnel Research Committee, London, England. (RAF Institute of Aviation Medicine, Farnborough, Hants, England).

19,023
To test the hypothesis that perception of detail in a moving object only takes place when a steady state of tracking (visual pursuit), which was not immediately followed by a further saccade, has been achieved, the eye movements of four Ss were recorded as they engaged in an experimental task. The task was to recognize the position in the gap of a Landolt ring that was presented during visual pursuit of a moving light spot. Target angular velocities used were 50 and 75 degrees/sec. Eye movements were recorded by the corneoretinal potential method. The data were analyzed for the pattern in localization of the moment of perception.
T. G. I. R 4

19,024
Crawford, W.A. THE PERCEPTION OF MOVING OBJECTS. VI. THE PRACTICAL APPLICATION IN AVIATION. FPRC Memo. 150.G, Sept. 1960, 7pp. Flying Personnel Research Committee, London, England. (RAF Institute of Aviation Medicine, Farnborough, Hants, England).

19,024
The finds of laboratory experiments on the perception of moving objects are considered from the realistic view of conditions met in flight. The three factors that have been demonstrated to contribute to ability to discriminate detail of moving objects are considered in relation to this problem: time available for viewing objects, angular velocity of object viewed, and natural coordinated use of head and eyes.
G. R 15

19,025
Crawford, W.A. THE PERCEPTION OF MOVING OBJECTS. VII. SOME OBSERVATIONS ON THE PRESENCE OF PROPRIOCEPTIVE INFORMATION FROM EXTRAOCULAR EYE MUSCLES. FPRC Memo. 150.F, Sept. 1960, 5pp. Flying Personnel Research Committee, London, England. (RAF Institute of Aviation Medicine, Farnborough, Hants, England).

19,025
To assess the presence or absence of position sense of the eye, four Ss were studied. Each S, sitting in a totally dark chamber with his head firmly held in a rotatable head-cage, fixated a small Landolt ring projected directly in front of him. As the fixation point was moved to other positions, the S turned his head until he thought it was pointing directly at the ring. Deviations between head position and target were recorded. In a control experiment, the S was asked to turn his head through varying angles up to 40 degrees to assess knowledge of head position acquired during normal life. Theoretical implications for control of eye movements were discussed.
T. I. R 19

19,026
Feller, R.P. MODIFICATION OF THE TRIHYDROXYINDOLE METHOD FOR THE ESTIMATION OF EPINEPHRINE AND NOREPINEPHRINE IN URINE. Rep. 60 71, Aug. 1960, 7pp. USAF School of Aviation Medicine, Brooks AFB, Tex.

19,026
A procedure developed from existing techniques for the estimation of epinephrine and norepinephrine in urine is described. The precision of the method, based on 28 sets of duplicate determinations, is given. Recovery studies are described. The advantages of the method are indicated.
T. G. R 13

19,027
Cain, S.M. A VENTILATORY EFFECT OF CARBONIC ANHYDRASE INHIBITION IN MAN. Rep. 60 93, Oct. 1960, 6pp. USAF School of Aviation Medicine, Brooks AFB, Tex.

19,027
To investigate the effect on resting ventilation in man of the carbonic anhydrose inhibitor acetazolamide when the dose is administered orally and when given intravenously, five normal males were given 25 mg/kg of the drug by both methods in separate experiments. Data on resting ventilation were collected for three hours following oral dosage and for two hours following intravenous injection.
G. R 9

19,028
Brooks, R.A. & Reeves, J.L. INFLUENCE OF INTERMITTENT EXPOSURE TO SIMULATED ALTITUDE ON ORGAN HISTOLOGY IN RATS. Rep. 60 81, Sept. 1960, 8pp. USAF School of Aviation Medicine, Brooks AFB, Tex.

19,028
A study of histologic changes in kidney, lung, liver, spleen, testis, brain, hypophysis, and striated muscle was made as part of an investigation of male Sprague-Dawley rats exposed four hours a day to 18,000 ft. equivalent altitude. Observed changes were interpreted as reflections of physiologic changes that could be attributed to intermittent exposure at this altitude.
T. I. R 20

19,029
Brehm, H.E. COMPACT FEEDING CONSOLE DESIGN, FABRICATION, AND EVALUATION. Contract AF 33(616) 7503, Proj. 6373, Task 63121, ASD TR 61 569, Oct. 1961, 90pp. USAF Life Support Systems Lab., Wright-Patterson AFB, Ohio. (Whirlpool Corporation, St. Joseph, Mich.).

19,029
The design, fabrication, and evaluation of a Compact Feeding Console meeting the sustenance requirements of three men for an extreme altitude mission of 14 days duration are described in detail. A comprehensive study of the human and environmental conditions is first conducted to determine the basic equipment, devices, facilities, and needs of the astronauts. The system design and fabrication, based upon these needs, are tested to evaluate expected performance under 1) operating conditions from normal g and one atmosphere pressure to zero g and one-half atmosphere pressure and 2) acceleration forces from two to eight g's. The use of the Console as a research tool is discussed also.
T. G. I. R 1

19,030
Bates, Mary E. & Bates, J.H. BLOOD VOLUME IN RATS EXPOSED TO POTENTIAL SPACE CABIN ATMOSPHERES. HEMATOLOGIC RESPONSES TO PURE OXYGEN ATMOSPHERES AT 190 MM. HG TOTAL PRESSURE. Rep. 60 64, July 1960, 13pp. USAF School of Aviation Medicine, Brooks AFB, Tex.

19,030
The hypothesis was proposed that exposure to reduced barometric pressures, if accompanied by an increased supply of oxygen, would result in no significant physiologic changes. Three experiments were conducted in which three groups of rats were exposed to an experimental space cabin atmosphere of pure oxygen at 190 mm Hg total pressure for 7, 5, and 4 days, respectively. Control and experimental determinations of hematocrit values, hemoglobin, plasma volume, total blood volume, red cell volume, erythrocytes, leukocytes, and leukocyte differential were obtained and analyzed for significant changes attributable to the experimental conditions.
T. I. R 30

19,031
Carter, N.L. & Kryter, K.D. MASKING OF PURE TONES AND SPEECH. Contract AF 19(604) 4061, AFCCDD TR 61 11, ESD TDR 62 1, Oct. 1961, 76pp. Bolt Beranek and Newman, Inc., Cambridge, Mass.

19,031
The studies reported herein investigated the masking effects of intense pure tones and bands of noise upon other pure tones and speech with the intent of gathering information useful for formalizing the general pattern of the upward spread of masking, particularly as it might apply to speech interference. Of special interest were the masking effects of very intense low frequency sounds such as are present near missile launch sites. On the basis of test results, spread of masking functions were obtained and incorporated into procedures for calculating a "new" Articulation Index that is valid for a wide variety of noise conditions.
T. G. I. R 9

19,032
Kryter, K.D., Flanagan, Gail & Williams, C. A TEST OF THE 20-BAND AND OCTAVE-BAND METHODS OF COMPUTING THE ARTICULATION INDEX. Contract AF 19(604) 4061, AFCCDD TN 59 58, ESD TDR 62 4, Oct. 1961, 20pp. Bolt Beranek and Newman, Inc., Cambridge, Mass.

19,032
Studies were conducted to test the accuracy with which the Articulation Index (AI), calculated by both the octave-band and the 20-band method, predicts the intelligibility of speech presented to listeners in a variety of types of broad band noises. The results were discussed in terms of the feasibility of using the less complex octave-band method for calculating the AI.
T. G. R 10

19,033
Ormiston, D.W. & Finkelstein, Beatrice. THE EFFECTS OF CONFINEMENT ON INTELLECTUAL AND PERCEPTUAL FUNCTIONING. Proj. 1710, Task 171002, ASD TR 61 577, Oct. 1961, 17pp. USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio. (USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio & USAF Biomedical Lab., Wright-Patterson AFB, Ohio).

19,033
To investigate the effects of 48 hours of confinement on intellectual and perceptual performance and, secondarily, to determine the acceptability of a proposed diet for use in orbital flights and its effects upon performance, ten Ss were individually confined in a small capsule and required to work intermittently on various intellectual, perceptual, and compensatory tracking tasks. Half the Ss received conventional meals; the others received the experimental diet. The normal cycle of sleep and wakefulness was maintained. Ten control Ss underwent the same conditions except they were confined only while eating or working. Test scores, performance data, and food ratings were compared for the two groups.
T. G. I. R 17

19,034
Zellmer, R.W. & Pickering, J.E. BIOLOGIC EFFECTS OF NUCLEAR RADIATION IN PRIMATES. Rep. 60 66, Aug. 1960, 11pp. USAF School of Aviation Medicine, Brooks AFB, Tex.

19,034
Macaca mulatta primates were exposed to the neutron and gamma radiation of nuclear detonations as one phase of an extensive animal program designed to yield a better understanding of the biologic effects of ionizing radiation. A field test using ionizing radiation from nuclear devices was chosen to simulate as closely as possible the conditions of dose, dose rate, and radiation distribution that have occurred in human exposures. In both detonations the radiation dose required to produce death in 30 days for 50 percent of the animals was determined. All animals were followed for acute radiation effects and where no mortality occurred, they are being followed for long-term effects.
T. G. I. R 22

19,035
Waters, R.O. OTOTOXIC DRUGS. Rep. 5 60, Oct. 1960, 9pp. USAF School of Aviation Medicine, Brooks AFB, Tex.

19,035
This paper discusses specific toxicity of drugs to the ear and, more specifically, the loss of hearing directly related to the use of certain drugs: quinine, streptomycin, dihydrostreptomycin, neomycin, and kanamycin. Case studies are given to illustrate the drug-induced hearing loss that can be either partial or complete, temporary or permanent.
G. R 9

19,036
Upton, A.C. IONIZING RADIATION AND AGING. Rep. 61 8, Nov. 1960, 12pp. USAF School of Aviation Medicine, Brooks AFB, Tex. (Biology Div., Oak Ridge National Lab., Oak Ridge, Tenn.).

19,036
This review surveys briefly the effects of ionizing radiation on longevity in terms of their possible gerontologic significance. Animal data and human data are examined for effects on life span. Mortality from diseases associated with senescence and mechanisms of life shortening are examined for relations between certain effects of radiation and aging.
T. G. R 72

19,037
Lewis, F.J. PROLONGED HYPOTHERMIA. Rep. 61 45, April 1961, 5pp. USAF School of Aviation Medicine, Brooks AFB, Tex. (Department of Surgery, Northwestern University Medical School, Chicago, Ill.).

19,037
In a study of prolonged hypothermia, an automatic control system was used to maintain the body temperature of dogs below 25 degrees C for 20 hours. Anesthetic effects of hypothermia, survival rate, physiologic changes occurring, and electrocardiographic recordings were discussed.
T. R 15

19,038
McKenzie, R.E. & Hartman, B.O. AN APPARATUS FOR THE SPIRAL AFTEREFFECT TEST (SAET). Rep. 60 69, Sept. 1960, 4pp. USAF School of Aviation Medicine, Brooks AFB, Tex.

19,038
An apparatus for the spiral aftereffect is described which will permit the evaluation of variables in the technique of administering this test. With this device it will be possible to develop standardized experimental techniques that maximize and minimize the spiral afterimage. Thus, the value of the spiral aftereffect test as a clinical diagnostic tool in the assessment of cortical brain damage can be established.
I. R 5

19,039
McKenzie, R.E., Hartman, B.O. & Graveline, D.E. AN EXPLORATORY STUDY OF SLEEP CHARACTERISTICS IN A HYPODYNAMIC ENVIRONMENT. Rep. 60 68, Oct. 1960, 8pp. USAF School of Aviation Medicine, Brooks AFB, Tex.

19,039
Sleep characteristics were evaluated as part of an exploratory study of the effects of prolonged weightlessness, as produced by the body-immersion technique. EEG techniques were used to monitor and assess sleep states during the fifth week of the study. Four-hour sleep periods on seven successive days were scored in five-min. blocks by a rating procedure. Changes in sleep characteristics were identified. Theoretical as well as applied (space flight) implications of the findings were discussed.
T. G. I. R 8

19,040
Kraus, R.N. PROGRESS IN STAPES MOBILIZATION SURGERY. AVIATION MEDICINE IMPLICATIONS. Rev. 4 60, Sept. 1960, 13pp. USAF School of Aviation Medicine, Brooks AFB, Tex.

19,040
Surgery for otosclerosis, the most common cause of progressive hearing loss of a conductive type in adults, may restore hearing to a normal level but may necessitate the permanent "grounding" of flying personnel. Some of the factors that must be considered in the selection of a surgical procedure for otosclerosis in flying personnel are presented. Stapes mobilization both by indirect and direct methods are described with emphasis on newer procedures that have been developed since 1955. Aviation medicine implications in the use of these procedures are discussed.
T. R 27

19,041
Reger, S.N. EFFECT OF MIDDLE EAR MUSCLE ACTION ON CERTAIN PSYCHOPHYSICAL MEASUREMENTS. Rep. 61 20, Nov. 1960, 15pp. USAF School of Aviation Medicine, Brooks AFB, Tex. (Otolaryngology and Maxillofacial Surgery Dept., University Hospitals, State University of Iowa, Iowa City, Iowa).

19,041
A brief review of literature pertinent to intratympanic muscle action in man is presented. The present approach to the psychophysical measurement is a by-product of a comprehensive study of so-called pseudorecruitment in the normal ear. The threshold of a given test tone is raised or shifted by means of a masking noise and loudness level balances obtained for a second tone of the same frequency in quiet. It is noted that the 60-db masked threshold curve was atypical in slope. It is hypothesized, on the basis of observed experimental facts, that middle ear muscle contraction attenuated the loudness. Further experimentation testing this hypothesis is reported.
G. I. R 20

19,042
Kopra, L.L. & Strickland, L.E. HEARING THRESHOLD LEVELS OF NON-JOB-NOISE-EXPOSED AIR FORCE PERSONNEL. Rep. 61 21, Feb. 1961, 12pp. USAF School of Aviation Medicine, Brooks AFB, Tex. (University of Texas, Austin, Tex.).

19,042
The auditory sensitivity of a group of nonjob-noise-exposed USAF personnel was described. Pure-tone threshold tests were administered with the Rudmose ARJ-3 automatic audiometer to 446 Ss. The results were summarized and compared with those reported in other studies of groups having little or no military service.
T. G. R 19

19,043
Hutchinson, F. DOSIMETRY AND TECHNIC FOR THE IRRADIATION OF BIOLOGIC SAMPLES WITH HEAVY IONS. Rep. 60 55, Dec. 1960, 6pp. USAF School of Aviation Medicine, Brooks AFB, Tex. (Biophysics Dept., Yale University, New Haven, Conn.).

19,043
A system of dosimetry employed in the radiation of biologic samples in the Yale heavy ion linear accelerator (Hilac) is described. The physical apparatus required and the dosimetry problems involved are presented in detail. Schematic figures present the arrangement of the apparatus, calorimetric scheme for measuring total energy delivered by ion beam, and arrangement for rotating samples into the beam.
I. R 2

19,044
Graveline, D.E. & Balke, B. THE PHYSIOLOGIC EFFECTS OF HYPODYNAMICS INDUCED BY WATER IMMERSION. Rep. 60 88, Sept. 1960, 11pp. USAF School of Aviation Medicine, Brooks AFB, Tex.

19,044
Body immersion in water is used to produce an experimental situation in which the normal weight sensation is altered and in which slow movements are effortless. This condition approximates the hypodynamic effects of weightlessness. The hypodynamic effects of such immersion on orthostatic tolerance, on cardiorespiratory adaptability to physical stress, and on other biologic and psychobiologic parameters are studied on one human S in experiments of two and seven days' duration, respectively. The implications of the findings for the man-in-space program are discussed.
T. G. I. R 6

19,045
Hartman, B.O. & McKenzie, R.E. THE COMPLEX BEHAVIOR SIMULATOR--A DEVICE FOR STUDYING PSYCHOLOGIC PROBLEMS IN MODERN WEAPONS SYSTEMS. Rep. 61 9, Dec. 1960, 20pp. USAF School of Aviation Medicine, Brooks AFB, Tex.

19,045
A research tool for studying problems of task-induced stress in complex man-machine systems is described. The rationale for the development of the tool emphasizes the changing characteristics of the jobs of operators in current and future weapons systems. The operator of these systems must perform a large array of discrete, discontinuous functions against a continuous background of monitoring and information testing. Technical descriptions of the simulator are presented along with some of the typical data obtained with it, its possible applications, and some of the technical problems involved in its use.
T. I. R 7

19,046
Lamb, L.E., Green, H.C., Combs, J.J., Cheeseman, S.A., et al. INCIDENCE OF LOSS OF CONSCIOUSNESS IN 1,980 AIR FORCE PERSONNEL. Rep. 61 6, Oct. 1960, 15pp. USAF School of Aviation Medicine, Brooks AFB, Tex.

19,046
To learn the incidence of loss of consciousness among members of the USAF military population, four different surveys have been carried out to include 1,578 individuals on flying status and 402 Academy cadets (totals 1,980). The questionnaires used in the surveys were anonymous and were designed to obtain incidence of episodes of unconsciousness, age at which they occurred, and the precipating conditions identified as causative factors; present age of the respondent was included also. The findings were discussed as applied to disposition of problems of loss of consciousness occurring in flying personnel.
T. R 3

19,047
Zwislocki, J.J. RELATION OF ADAPTATION TO FATIGUE, MASKING AND RECRUITMENT. Report from: "Comptes Rendue du V^e Congres de Bonn, 28 Septembre-2 Octobre 1960." 279-285. International Society of Audiology, Lyon, France. (Syracuse University, Syracuse, N.Y.).

19,047
This brief paper first classifies and defines the phenomena of auditory adaptation, fatigue, masking, and recruitment. Data are presented to demonstrate that there are phenomena in audition which fit the terms "adaptation" and "fatigue." Finally, the relationships of adaptation to masking and to loudness recruitment are discussed.
T. G.

19,048
Zuckerman, C.B., Marshall, G.R. & Groesberg, S. RESEARCH IN THE AUTOMATION OF TEACHING. Contract N61339 661, NAVTRADEVCEN TR 661 1, Feb. 1961, 155pp. USN Training Device Center, Port Washington, N.Y. (Psychology Dept., Brooklyn College, Brooklyn, N.Y.).

19,048
To investigate the value of the teaching machine as compared with more traditional methods of teaching and to compare different means of presenting the material to be learned, a series of experiments was conducted. Material from the USN Basic Electricity was programmed into three series of items: completion, multiple-choice, and true-false. Each series was presented in a logical and a random sequence. Six groups of Ss were used for each combination of response and presentation modes. A second experiment repeated these conditions using prompting cards rather than the machine. In other experiments Ss learned the material by programmed lecture and by programmed text. Examinations were given before and after learning. Attitudes toward machine learning also were assessed. T. I. R 1

19,049
Womack, G.J. EFFECT OF SMALL DOSES OF QUININE ON THE TEMPORARY THRESHOLD SHIFT OF HEARING INDUCED BY HIGH-ENERGY NOISE EXPOSURE. Rep. 61 70, May 1961, 10pp. USAF School of Aerospace Medicine, Brooks AFB, Tex.

19,049
To investigate the effect of quinine on the hearing threshold during exposure to marginally hazardous noise, the TTS of hearing at 4,000 cps after seven-min. exposure to white noise with an over-all SPL of 117 db was examined in 14 male Ss of normal hearing. Seven Ss took quinine sulfate, 300 mg daily for three days, and seven took a placebo for three days. Threshold shifts were measured at two min., six min., and 24 hours after noise exposure. The findings were discussed in relation to a case in which there was apparent clinical evidence that a cold preparation containing quinine had certain adverse effects on a pilot's hearing.
T. G. R 18

19,050
Waldron, D.L. & McNee, R.C. INTRA-AURAL TEMPORARY THRESHOLD SHIFT DIFFERENCES. Rep. 61 95, Aug. 1961, 4pp. USAF School of Aerospace Medicine, Brooks AFB, Tex.

19,050
The question of whether the left and right ears of an individual experience the same degree of TTS and recover at the same rate when subjected to high-level noise was investigated. Thirty young male Ss (ages 17 to 20) of normal hearing were studied. Ten Ss were assigned randomly to each of three stimulus-level groups: over-all white noise levels of 95, 105, and 115 db. Within each group, half were presented the fatiguing stimulus in the left ear in the morning and in the right ear in the afternoon with reverse procedures for the other half. Threshold shifts and recovery patterns were obtained for three min. following a six-min. noise stimulation. The results were analyzed by covariance and correlational procedures.
T. R 2

19,051
Moore, E.W. & Cramer, R.L. PERCEPTION OF POSTURAL VERTICALITY. BACKGROUND AND APPARATUS. Rep. 61 84, Aug. 1961, 8pp. USAF School of Aerospace Medicine, Brooks AFB, Tex.

19,051
An apparatus for the study of perception of postural orientation was described. It was designed to tilt in the lateral plane and to permit the recording of responses by an ink tracing. With this device, it will be possible to develop experimental research procedures to be used in vestibular physiology and standardized clinical techniques to be used by USAF otolaryngologists.
I. R 21

19,052
Neville, J.R. AN ELECTROCHEMICAL DEVICE FOR MEASURING OXYGEN. Rep. 61 79, June 1961, 11pp. USAF School of Aerospace Medicine, Brooks AFB, Tex.

19,052
An electrochemical device for measuring oxygen is described. A gold indicator electrode and a cadmium reference are utilized in the device. This cell, when filled with electrolyte and encapsulated with a thin polyethylene membrane, gives a current proportional to the oxygen partial pressure in the ambient gas. The functional characteristics of the device are described. Laboratory, clinical, and field applications are illustrated and discussed.
G. I. R 15

19,053
Lyle, C.B., Jr. & Dahl, E.V. PROTECTION OF RAPIDLY DECOMPRESSED RATS BY PHARMACOLOGIC AND PHYSICAL MEANS. Rep. 61 101, Aug. 1961, 5pp. USAF School of Aerospace Medicine, Brooks AFB, Tex.

19,053
To determine whether or not the nervous system plays a part in the pulmonary changes and in the mortality found after rapid decompression, seven groups of rats were treated with one of six drugs or with physiologic salt solution sufficient to cause tense abdominal distension. In each group, there were at least six treated rats and six untreated or control rats. The animals were decompressed from an ambient pressure of 520 mm mercury to 30 mm mercury in 0.075 sec. Those rats that died within a 30-min. period were counted and the survivors were killed. Weight of lungs and ratio of lung weight to body weight were recorded. The findings were discussed in relation to protective measures for rapid decompression.
T. G. R 13

19,054
Hale, H.B., Ellis, J.P., Jr., Balke, B. & McNee, R.C. EXCRETION TRENDS IN MEN UNDERGOING DEACCLIMATIZATION TO HEAT. Rep. 61 81, July 1961, 7pp. USAF School of Aerospace Medicine, Brooks AFB, Tex.

19,054
To investigate the possibility that exercise or good physical condition influences deacclimatization rate, 21 male residents of a locality (Texas) in which the summer-fall transition is comparatively slow were studied over a ten-week period as daily peak temperatures declined from 95 degrees to 50 degrees F. Two overnight (timed) urine specimens per S per week were analyzed and compared for exercising and sedentary Ss. Five of the men exercised daily, nine exercised twice a week, and seven never exercised (exercise was defined as cross-country runs of three to eight miles).
T. G. R 7

19,055
Johnson, L.F., Jr. AUTOMATIC ESCAPE SYSTEMS OF CURRENT USAF FIGHTER AIRCRAFT. Rev. 9 61, Aug. 1961, 7pp. USAF School of Aerospace Medicine, Brooks AFB, Tex.

19,055
An automatic escape system is one that, once activated, will eject a pilot from his aircraft, separate him from his seat, and activate his parachute. Characteristics of the different sections of systems of current USAF fighter aircraft are described: ejection seats, catapults, lapbelt initiators, parachute timers, and parachutes. A time comparison of two escape systems is presented.
T. R 21

19,056
Hagen, D.H. CREW INTERACTION DURING A THIRTY-DAY SIMULATED SPACE FLIGHT. PRELIMINARY STUDY. Rep. 61 66, June 1961, 9pp. USAF School of Aerospace Medicine, Brooks AFB, Tex.

19,056
An analysis was presented of crew interaction during a two-man simulated space chamber flight. By use of the Bales Interaction Process Analysis, the behavior of the two Ss was rated during two hours of observation each day throughout the 30-day flight. The observation periods coincided with the "ground control" time when the Ss were relatively free to relax, sleep, or behave as they wished. The over-all interaction profile, changing patterns due to time of day and also to duration of flight, was presented and discussed. The usefulness of this type of crew interaction analysis for future research was discussed.
T. I. R 7

19,057
United Research Incorporated. VOLUME II. CHARACTERISTICS OF HUMAN LOCALIZATION OF SOUND. FINAL REPORT. Contract N123(60530) 23545A, May 1961, 32pp. United Research Incorporated, Cambridge, Mass.

19,057
The role of the pinnae, or external ears, in sound localization is presented from a theoretical and mathematical viewpoint. The pinna is regarded as a mechanical device for performing a transformation on incoming sound. Since the transformation depends on relative orientation of sound source and pinna, the resultant signal provides localization. Experiments involving a synthetic mechanical structure of the ear, an electronic transformation of an incident sound, and localization synthesis by electronic signals and controls alone (through the headphone) are performed to test the theoretical formulations.
G. I. R 10

19,058
Williams, H.D. (Mrs.). THE TESTING OF SAFETY SPECTACLES, LENSES, GOGGLES AND VISORS. Tech. Memo. 7/M/60, WAC/92/04, Sept. 1960, 16pp. Explosives Research and Development Establishment, Ministry of Aviation, Essex, England.

19,058
Nineteen types of spectacles, goggles, and visors of various kinds were tested for resistance to blast and flying fragments. Tests varied with the type of protector, but all were made with a distance of 38 cm from explosive to lens, as this corresponds to a reasonable distance from an object held in the hands to the lens of the spectacle. The attack was either by blast with exclusion of fragments, or by fragments from detonators or glass beakers shattered by explosive. Explosive charges ranged from 2.5 to 10.0 grams weight of tetryl. Ordinary spectacles were tested for resistance to effects of bursting flasks by nitrogen pressure.
T. I. R 2

19,059
Linaweaver, P.G., Jr. USE OF HELIUM-OXYGEN MIXTURES IN MIXED-GAS SCUBA OXYGEN LIMITS "OPERATION PULSE-BEAT". Proj. NS 186 201, Subtask 2, Res. Rep. 6 61, Jan. 1961, 24pp. USN Experimental Diving Unit, Naval Weapons Plant, Washington, D.C.

19,059
To explore the use of helium-oxygen mixtures in mixed-gas diving with regard to oxygen toxicity, 80 dives were executed. The double-blind technique was used to test 40 and 50 percent oxygen in helium mixtures at eight depth-time intervals. The Experimental Diving Unit method of underwater electrocardiography was used in an attempt to predict the onset of oxygen toxicity prior to the convulsion manifestations. The results were discussed in relation to the feasibility of using helium-oxygen for diving and the operational use of the Experimental Diving Unit system.
T. G. I. R 28

19,060
Michielsen, C.E., Hoffman, C.J., Kruse, J.C., Eicher, M., et al. END TIDAL GAS SAMPLING IN DIVING RESEARCH. Proj. NS 185 005, Subtask 4, Res. Rep. 4 61, Jan. 1961, 26pp. USN Experimental Diving Unit, Naval Weapons Plant, Washington, D.C.

19,060
The possible use of the Rahn Sampler and the Experimental Diving Unit for obtaining reliable end-tidal gas samples from Ss in physiological studies under pressure and under water was studied. Both systems were described.
I. R 10

19,061
Silverman, R.E. & Alter, Millicent. RESPONSE MODE, PACING, AND MOTIVATIONAL EFFECTS IN TEACHING MACHINES. Contract N61339 507, NAVTRADEVCEN TR 507 3, June 1961, 61pp. USN Training Device Center, Port Washington, N.Y. (Department of Psychology, New York University, New York, N.Y.).

19,061
A series of experiments was conducted which was concerned with certain problems of teaching machine programming and teaching machine design. Three experiments were done to study the effects of response mode (overt responses of writing, speaking, or both as opposed to covert response of thinking); one experiment was done to study the effect of external pacing or timing for each item; one experiment dealt with the motivational effects of the teaching machine (both complex and simplified) as compared with a programmed textbook. The learning material consisted of an 87-item unit on basic electricity; the Ss were college students. Implications of the findings were discussed.
T. I. R 9

19,062
Spells, K.E. THEORETICAL MODEL OF THE AIR-VENTILATED SUIT: THE CASE WHEN THE BOUNDARY CONDITION AT THE OUTER SURFACE IS THAT OF HEAT FLUX DEPENDENT ON A HEAT TRANSFER COEFFICIENT. FPRC Memo. 1137, Jan. 1961, 11pp. Flying Personnel Research Committee, London, England. (RAF Institute of Aviation Medicine, Farnborough, Hants, England).

19,062
Calculations of the thermal protection due to air flow through the material of an air-ventilated suit previously have been based on the assumption of a fixed prescribed temperature at both the inner and outer boundaries of the material. The formulae were modified in this study in accordance with the assumption of a heat flux across the outer surface proportional to the temperature difference between the surface and its surroundings. Comparisons were made between the results of calculations based on both formulae.
T. R 5

19,063
Jordan, N. THE SOCIAL SCIENCE PRACTITIONER AND HIS CLIENT—EXPERIENCE WITH THE MILITARY. July 1961, 9pp. Rand Corporation, Santa Monica, Calif.

19,063
A case description of concrete experience in implementing what may be called social engineering in a military setting is presented. The case involves the introduction of a novel technique for training selected military personnel. The point of emphasis in the description is the required relation between those attempting to conduct a field experiment to test the new technique and all of the individuals involved—presumably the clients. Some comments are made as to the reason for the study of cases in the present social science milieu.

19,064
Kiessling, R.J. & Wood, W.B. THE DEVELOPMENT OF A TEST TO DETERMINE THE ADEQUACY OF DECOMPRESSION FOLLOWING A DIVE. PHASE II. Proj. NS 186 201/2(4), Res. Rep. 3 61, June 1961, 47pp. USN Experimental Diving Unit, Naval Weapons Plant, Washington, D.C.

19,064
To develop the altitude technique into a test of decompression adequacy for use as a research tool in the evaluation of existing and new decompression procedures in the standard range of nitrogen-oxygen diving, USN divers performed 393 working dives in a pressure tank. A variety of exposures were simulated. Reliability and validity measures were obtained by pairing the divers in a manner such that they acted as their own controls. Several dive schedules were repeated and comparisons between original altitude scores and retests were made. The usefulness of the test was discussed.
T. G. R 41

19,065
Karn, H.W. & Gregg, L.W. THE EFFECTS OF INSTRUCTIONAL SETS ON THE PERCEPTION OF PERIPHERAL VISUAL STIMULI. Contract AF 49(638) 770, AFOSR TN 1919, 1961, 17pp. Psychological Labs., Carnegie Institute of Technology, Pittsburgh, Penn.

19,065
An experiment was conducted to determine the effects of different instructions on a task requiring the detection of a learnable cue under conditions that precluded the possibility of complete observation of three targets in a peripheral visual field. The task was to detect the presence or absence of a dot in each of three circles in a triangular array: in one of the circles a dot was always present; in the second it was never present; in the third it appeared randomly. Observation time was limited to 0.1 sec. (time to observe only one circle). Instructions were varied from nonspecific to increasingly explicit ones designed to induce a problem-solving set. Prior experience of 30, 10, or 0 prepresentations was given at one sec. exposure. There were 162 Ss.
T. G. R 7

19,066
Janney, G.M. EVALUATION OF A NEW, POSITIVE DISPLACEMENT MECHANICAL RESPIRATOR FOR USE IN THE TESTING OF BREATHING APPARATUS. Proj. NS 185 005, Subtask 4, Res. Rep. 2 61, Aug. 1960, 11pp. USN Experimental Diving Unit, Naval Weapons Plant, Washington, D.C.

19,066
A "positive displacement" mechanical respirator, designed by the Experimental Diving Unit for testing breathing equipment, is described. Its operating characteristics were determined and compared with those of a bellows-type respirator previously used for testing equipment. Recommendations for minor modifications and for the use of the new respirator are made.
T. G. I.

19,067
Horst, P. MATRIX ALGEBRA FOR SOCIAL SCIENTISTS. PART IV. MATRIX SOLUTIONS. Contract NONR 477(08), Public Health Research Grant M 743(C6), Aug. 1961, 171pp. University of Washington, Seattle, Wash.

19,067
This report is the fourth part of a series on notation, terminology, concepts, and computational procedures that have been found useful in the application of matrix algebra to multivariate experimental designs in the social and biological sciences (see also 19,068 and 19,069). This part on matrix solutions contains five chapters (19, 20, 21, 22, and 23) as follows: the inverse of a matrix, computations involving inverses, inverse of a supermatrix, the general matrix reduction theorem, and solving linear equations.
T. I.

19,068
Horst, P. MATRIX ALGEBRA FOR SOCIAL SCIENTISTS. SECTION I OF PART II. SIMPLE MATRIX COMPUTATIONS. Contract NONR 477(08), Public Health Research Grant M 743(C6), Aug. 1961, 199pp. University of Washington, Seattle, Wash.

19,068
This report is a portion of the second part of a series on notation, terminology, concepts, and computational procedures that have been found useful in the application of matrix algebra to multivariate experimental designs in the social and biological sciences (see 19,069 for Part I). Chapters 7, 8, 9, and 10 are contained herein: addition and subtraction of matrices, vector multiplication, matrix multiplication, and special matrix products.
I.

19,069
Horst, P. MATRIX ALGEBRA FOR SOCIAL SCIENTISTS. PART I. Contract NONR 477(08), Public Health Research Grant M 743(C6), Aug. 1961, 159pp. University of Washington, Seattle, Wash.

19,069
This report is the first part of a series on notation, terminology, concepts, and computational procedures that have been found useful in the application of matrix algebra to multivariate experimental designs in the social and biological sciences. The presentation is directed to those with no more than a moderately good working knowledge of high school algebra and introductory statistics. Traditional and rigorous mathematical treatment is not striven for. The six chapters contained in this report consist of introduction, language of matrices, kinds of matrices, the transpose of a matrix, supermatrices, and the transpose of supermatrices.
I.

19,070
Horst, P. GENERALIZED CANONICAL CORRELATIONS AND THEIR APPLICATIONS TO EXPERIMENTAL DATA. Contract NONR 477(08), Public Health Research Grant M 743(C5), Feb. 1961, 37pp. University of Washington, Seattle, Wash.

19,070
The general problem considered here may be stated as follows. Suppose there are m sets of measures on a group of N entities where the number of measures in set i is n_i. How can a transformation be found for each set of measures so that m sets of transformed measures will be maximally congruent, one with another? The extent of mutual similarity or congruency will indicate to what extent they are all measures of the same set of underlying variables. Four models, developed to answer this problem, are discussed and applied to the same set of data to provide a comparison of the four methods.
T. R 10

19,071
Horst, P. ESSENTIAL CHARACTERISTICS AND SPECIAL CASES OF MULTIVARIATE ANALYSIS DESIGNS. Contract NONR 477(08), Public Health Research Grant M 743(C5), Dec. 1960, 39pp. University of Washington, Seattle, Wash.

19,071
A set of characteristics is considered in terms of which most multivariate analysis designs may be described: the matrix of experimental data; classification of attributes and of measures; the problem of metric, nonlinear relations; multivariate analysis operations; the transformation of matrices; matrix approximation and residuals; operations with residual matrices; the incomplete data matrix, significance tests; and cross-validation. Special cases are then discussed in terms of these characteristics: multiple regression analysis, factor analysis, relations among sets of varistes, analysis of variance, the Eta coefficient, multiple discriminant functions, multidimensional scaling, latent class analysis, and others.
R 17

19,072
Horst, P. MATRIX REDUCTION AND APPROXIMATION TO PRINCIPAL AXES. Contract NONR 477(08), Public Health Research Grant M 743(C6), July 1961, 15pp. University of Washington, Seattle, Wash.

19,072
The method of factor analysis that gives the best fit in the least square sense to the covariance or correlation matrix for a specified number of factors is said to be the principal axes solution. This solution utilizes the largest latent roots and corresponding vectors of the matrix. The Hotelling iteration technique for calculating the latent roots and vectors of a gramian matrix is discussed critically. A modification of the technique is then proposed for studies concerned primarily with linear combinations of arbitrary factors that will satisfy rank reduction and maximum total variance criteria. The application of the technique to five different matrices is described.
T. R 12

19,073
Horst, P. COMPUTATIONS INVOLVING INVERSES. Contract NONR 477(08), Public Health Research Grant M 743(C5), Feb. 1961, 54pp. University of Washington, Seattle, Wash.

19,073
This report is one in a proposed series detailing the elementary matrix notation and operations that underlie most multivariate analysis designs. A preceding paper defined the inverse matrix and how, by means of matrix algebra, the inverse of various kinds of matrices can be solved. This report describes in detail how the computational work sheets may be drawn up and how the computations may be organized so as to make the solutions as routine and mechanical as possible.
I.

19,074
Haythorn, W.W. THE USE OF SIMULATION IN LOGISTICS POLICY RESEARCH. Rep. P 1791, Sept. 1959, 43pp. Rand Corporation, Santa Monica, Calif.

19,074
This paper is the initial form of one chapter in a book entitled Sequential Decisions and Simulation (editors, Rosenstiel and Ghoulia-Houri) to be published in France by Dunod, Paris. The chapter reported here provides a short description of two large systems simulation experiments that were performed by the Logistics Systems Laboratory of the Rand Corporation, a nonprofit research corporation established to provide the USAF with scientific assistance in its long-range planning. Some discussion of the philosophy underlying the methodology used is followed by a methodological description of 1) an evaluation of proposed supply policies and procedures and 2) a support-planning study of a ballistic missile system.
T. I. R 1

19,075
Grant, G. & Hostetter, R. DISPLAY PROBLEMS IN AEROSPACE SURVEILLANCE SYSTEMS. Contract AF 19(604) 7368, ESD TDR 61 57, HRB Rep. 256 F, Oct. 1961, 109pp. USAF Aerospace Surveillance Sciences Lab., Bedford, Mass. (HRB Singer, Inc., State College, Penn.).

19,075
This is the final report of a study designed to determine the information presentation requirements for human data processing roles in future air and aerospace surveillance systems. Conclusions and recommendations are based upon information gathered in a literature search and data reflecting the present state-of-the-art in displays and related human data processing roles. Various chapters provide an approach to the problem of specifying and comparing human information requirements, a discussion of display problems and requirements, a structure for collection and use of system information requirements in determining display needs, a technique for screening and evaluating displays in terms of informational requirements, and a program for future research.
T. G. I. R 75

19,076
Green, C.D., Welch, B.E., Brown, W.L., Lamb, L.E., et al. STUDIES OF ESCAPE FROM BALLISTIC SPACE VEHICLES. I. BIOMEDICAL EVALUATION. Rep. 61 29, April 1961, 24pp. USAF School of Aviation Medicine, Brooks AFB, Tex.

19,076
Biomedical information on primates successfully flown through programmed escape profiles was obtained in conjunction with a National Aeronautics and Space Administration project. Animal response during acceleration, deceleration, re-entry, and water impact demonstrated survivability. Also recorded and evaluated were 1) environmental data, 2) physiological data, 3) oculomotor movement, and 4) psychomotor performance data. The physical and biologic design criteria for biopacks, physiologic system responses, and performance were thus evaluated during all phases of flight and recovery operations.
G. I. R 14

19,077
Adams, R.M. & Dickey, J.R. STUDIES OF ESCAPE FROM BALLISTIC SPACE VEHICLES. II. INSTRUMENTATION. Rep. 61 29, April 1961, 16pp. USAF School of Aviation Medicine, Brooks AFB, Tex.

19,077
Specific details of a biopack instrumentation system were discussed as well as the design philosophy underlying the approaches used. Biomedical information on primates successfully flown through programmed escape profiles was obtained by the instrumentation in conjunction with a National Aeronautics and Space Administration project. The instrumentation consisted of devices for 1) sensing the life cell temperature, humidity, atmospheric pressure, and oxygen partial pressure; 2) detecting and measuring the S's respiratory rate, pulse, eye movements, vectorelectrocardiogram, and psychomotor performance; and 3) photographing the facial area of the animal during flight.
G. I. R 2

19,085
Akerblom, B. CHAIRS AND SITTING. ca. 1961, 7pp. Rilling & Sons Ltd., London, England. (Reprinted from: The Ergonomics Research Society, Proceedings Volume II, Symposium on Human Factors in Equipment Design).

19,085
The design of chairs in relation to seating comfort is discussed and related specifically to anthropometric measurements of the human body. The chair height, depth and slope of seat, provision for changes in posture while sitting, and lumbar support, are discussed and some requirements of the "ideal" chair are set forth. Finally, the relation of chair to table is indicated.
T. I. R 15

19,086
Angell, D. & Lumsdaine, A.A. A STUDY OF SUBJECT-CONTROLLED PARTIAL CUEING IN PAIRED-ASSOCIATE LEARNING. Contract AF 49(638) 681, AFOSR 1342, Res. Rep. AIR C14 9/61 SR4, Sept. 1961, 13pp. USAF Office of Scientific Research, ARDC, Washington, D.C. (American Institute for Research, San Mateo, Calif.).

19,086
To determine what effect a training procedure that utilized partial cueing at the option of the learner would have upon the learning of paired-associate materials, 40 Ss learned 12 paired-city names on three-letter airline codes. Two training treatments were used: a standard anticipation and a subject-controlled technique that provided partial cueing by successive revelation of the letters of the airline code. No instrumentation was employed; the experimenter served as a device by which response components were revealed. Performance data (criterion was two consecutive perfect repetitions) were compared for the two procedures. Applicability of results to autoinstructional programming was discussed.
T. R 8

19,087
Angell, D. & Lumsdaine, A.A. THE EFFECTS OF PROMPTING TRIALS AND PARTIAL-CORRECTION PROCEDURES ON LEARNING BY ANTICIPATION. Contract AF 49(638) 681, AFOSR 1343, Res. Rep. AIR C14 9/61 SR5, Sept. 1961, 47pp. USAF Office of Scientific Research, ARDC, Washington, D.C. (American Institute for Research, San Mateo, Calif.).

19,087
Two experiments were reported which were designed to provide data on some issues relevant to autoinstructional techniques: 1) the relative effectiveness of prompting trials and anticipation (confirmation) trials, and 2) the effectiveness of partial-cueing techniques. Paired-associate materials were used in both experiments with different procedures and designs. In both, the same two independent variables (number of initial prompting trials prior to responding by anticipation and degree of correction following errors on anticipation) were investigated. The results were discussed in terms of theoretical considerations and for their implications for training strategies.
T. G. R 36

19,088
Bell Helicopter Corporation. HUMAN FACTORS QUARTERLY PROGRESS REPORT. ARMY-NAVY INSTRUMENTATION PROGRAM. Contract NONR 1670(00), June 1959, 19pp. Bell Helicopter Corporation, Fort Worth, Tex.

19,088
This report is the first to be issued quarterly about the work of the Human Factors Group on a research program for instrumentation of the helicopter. The following areas are covered: 1) mission and systems analysis, 2) vertical display, 3) situation display, 4) controls, 5) motion thresholds, 6) Bendix Radar evaluation, 7) Research Helicopter-1 and -2 programs, and 8) obstacle identification and display.

19,089
Assadourian, A. & Cheatham, D.C. LONGITUDINAL RANGE CONTROL DURING THE ATMOSPHERIC PHASE OF A MANNED SATELLITE RE-ENTRY. NASA TN D 253, May 1960, 46pp. National Aeronautics and Space Administration, Washington, D.C. (Langley Research Center, Langley Field, Va.).

19,089
To determine the feasibility of guiding the trajectory of a manned satellite re-entering the earth's atmosphere to some desired destination, an investigation was conducted using two control techniques (ground-controlled and pilot-controlled). A high-drag variable-lift class of vehicle was assumed and a fixed cockpit simulation provided the pilot with vehicle attitude control and instrument display of attitude and trajectory parameters. An analog computer was used to solve the equations of motion corresponding to a simulated re-entry. Controlled trajectories were obtained for initial flight-path angles up to minus five degrees and for ranges from about 600 to 2,600 miles.
T. G. I. R 6

19,090
Christensen, E.H. SPEED OF WORK. Report from: "First International Congress on Ergonomics, Stockholm, Sweden, 20-23 August, 1961." 8pp.

19,090
Speed of work, as discussed here, concerns work output per minute, per hour, or per day; the type of work is heavy or moderately heavy muscular work. Present-day knowledge of the physiology of muscular work is indicated with special emphasis upon problems of determining what is a reasonable work load. Various testing methods are discussed in relation to recent experimental evidence and present knowledge about interrupted or discontinuous heavy work is reviewed.
R 8

19,091
de Jong, J.R. SPEED OF WORK AND MACHINES - ERGONOMICAL ASPECTS. Report from: "First International Congress on Ergonomics, Stockholm, Sweden, 20-23 August, 1961." 25pp.

19,091
Human factors aspects of work speed (pace with which the operator carries out his work) in conjunction with machines (material devices serving to transmit and modify force and motion in such a way as to do some desired work) are reviewed. The character of work with machines as opposed to work without machines is discussed. The following topics are developed: 1) intra- and interindividual variability of human performance times, 2) human time variability and man-machine systems, 3) measurement of the work load, and 4) technical development of types of control in machines.
T. G. R 17

19,092
Ernsting, J., McHardy, G.J.R. & Roxburgh, H.L. THE CHOICE OF GAS MIXTURE FOR BREATHING IN HIGH PERFORMANCE AIRCRAFT. FPRC 1142, Oct. 1960, 12pp. Flying Personnel Research Committee, London, England. (RAF Institute of Aviation Medicine, Farnborough, Hants, England).

19,092
This paper examines the ideal pressure environment of the lung alveoli considering both the aircraft cabin pressure and the gas breathed. Methods of insuring the efficiency of the human operator, particularly after failure of cabin pressure, are discussed.
G. 1. R 5

19,093
deCharms, R. & Bridgeman, Winnie J. LEADERSHIP COMPLIANCE AND GROUP BEHAVIOR. Contract NONR 816(11), Tech. Rep. 9, Aug. 1961, 60pp. Social Science Institute, Washington University, St. Louis, Mo.

19,093
An attempt was made to manipulate one aspect of leadership behavior (compliance to a request of group members) which is seen to be one important difference between authoritarian and democratic leaders. Independent manipulations involved variations in verbal willingness to comply and behavioral attempts to comply. The member's reactions to the leaders were studied essentially in the realm of morale although productivity was also measured. A factor analysis was made of the premanipulation measures to determine the number of factors involved in responses to the leader's behavior.
T. R 13

19,094
Ekman, G. A SIMPLE METHOD FOR FITTING PSYCHOPHYSICAL POWER FUNCTIONS. Contract AF 61(052) 300, AFOSR TN 60 1085, Tech. Note 1, May 1960, 7pp. USAF Office of Scientific Research, ARDC, Washington, D.C. (University of Stockholm, Stockholm, Sweden).

19,094
A simple method combining graphic and algebraic procedures for fitting psychophysical power functions is described. An illustration is provided using the results from an experiment concerning the photopic brightness of monochromatic light of wavelength 649 mu obtained by a method of magnitude estimation.
G. R 7

19,095
Davis, D.D.W. AN EVALUATION OF THE SIMPLIFIED TYPEWRITER KEYBOARD THROUGH AN ANALYSIS OF STUDENT TYPEWRITING ERRORS ON THE UNIVERSAL AND THE DVORAK-DEALEY SIMPLIFIED KEYBOARD. J. Bus. Educ., May, June, Sept., Oct. 1935, 5-12. (Seattle Public Schools, Seattle, Wash.).

19,095
An experimental study was made to compare accuracy of typing on two typewriter keyboards: the standard or universal and the simplified (Dvorak-Dealey). Six groups of typing students, three using the universal and three using the simplified keyboard, were given training at each of three levels, Junior High School, Senior High School, and Junior College. Analyses were made of the errors made on each type of keyboard and of student net attainment.
T. G. I. R 28

19,096
Kryter, K.D. THE VALIDITY OF THE ARTICULATION INDEX. Contract AF 19(604) 4061, ESD TDR 62 3, AFCCDD TN 61 35, Oct. 1961, 20pp. Bolt Beranek and Newman, Inc., Cambridge, Mass.

19,096
French and Steinberg proposed the basic concept and method of calculating the Articulation Index (AI) about 15 years ago. Although improvements and modifications have been made the AI has not been used generally because of lack of sufficient evidence of its validity. This paper reported the results of some experiments on the effects of "remote" masking and spread of masking due to noise and intense low-frequency tones and the effects of single and multiple bandpass filtering upon speech intelligibility. These results were presented as evidence of the validity of AI along with results of calculations of relations between AI and test scores obtained by other investigators. The usefulness of the AI was discussed.
T. G. R 8

19,097
Majesty, M.S. HUMAN FACTOR CONCEPTS FOR TESTING COMPLEX MAN/MACHINE SYSTEMS. June 1961, 13pp. USAF Ballistic Systems Div., Los Angeles, Calif.

19,097
Human factors in system development are discussed and the Personnel Subsystem (PSS) concept introduced. Test concepts for system development testing and evaluation are established as one category of PSS testing. Some conceptual problems involving the kind and number of subjects, such as sampling, are discussed. The PSS Test Plan Annex, that was a part of the ATLAS E Integrated Test Plan, is reviewed for illustrative purposes.
I. R 5

19,098
Haythorn, W.W. HUMAN FACTORS IN SYSTEMS RESEARCH. Rep. P 2337, June 1961, 32pp. Logistics Dept., Rand Corporation, Santa Monica, Calif.

19,098
The goal of systems research and analysis is stated as the improvement of over-all systems performance. The ways in which human factors considerations can assist in such improvement is the thesis of this paper. The research described uses the methodological device of simulation combining symbolic representations of some aspects of systems, realized on a digital computer, with individual decision-makers drawn from the population of ultimate users. The topics considered include: 1) allocation of tasks to men and machines, 2) estimation of manpower requirements by skill types and levels, 3) systems training, 4) decision analysis, 5) use of simulation in systems design, and 6) basic human factors research.
I. R 26

19,099
Jordan, N. THE ALLOCATION OF FUNCTIONS BETWEEN MAN AND MACHINES IN AUTOMATED SYSTEMS. Rep. P 2310, May 1961, 11pp. Logistics Dept., Rand Corporation, Santa Monica, Calif.

19,099
The lack of adequate systematic methodology for allocating functions between man and machine in spite of ten years of hard and intensive labor is discussed. It is suggested that the concept of "comparability" of functions is faulty and that "complementary" is probably the correct concept to use. Some implications of such a changed approach for the allocation problem are discussed and several general principles that may serve as guidelines are proposed. These include the proper use of machines as tools and as production machines, planning for manual backup, assignment of responsibility, and planning for the psychological environment of man.
R 5

19,100
Jordan, N. MOTIVATIONAL PROBLEMS IN HUMAN-COMPUTER OPERATIONS. Rep. P 2332, June 1961, 11pp. Rand Corporation, Santa Monica, Calif.

19,100
The neglect of the whole area of operator motivation by the profession of Human Factors Engineering is discussed. The thesis is advanced and defended that in designing a complex man-machine system one should, in fact must, consider the human performance necessary for the system not only from an instrumental standpoint but also from a consummatory standpoint, that is—how satisfying the job is per se. Three conditions satisfy this standpoint: jobs must demand of the operator utilization of skills, they must be meaningful, and the operator must have real responsibility. Examples are drawn from the SAGE system, many variants of automated checkout equipment, and others.
R 1

19,101
Bellaire, F.R. & Elder, F.C. SCINTILLATION AND VISUAL RESOLUTION OVER THE GROUND. Contract DA 36 039 SC 78801, Rep. 2900 134 T, Oct. 1960, 43pp. Willow Run Labs., University of Michigan, Ann Arbor, Mich.

19,101
The scintillation, or fluctuation in intensity, of the light from a constant target source affects visual resolution and therefore reduces the usefulness of optical devices. An experimental study is being conducted to determine the meteorological conditions and other contributing factors that are significant in producing scintillation. This report covers work done in 1958 in which observations were made over level terrain with a uniform ground cover and under relatively uniform weather conditions. Measurements included specified meterological, scintillation, and resolution parameters. The data were analyzed in conformance with several theories on the transfer of heat and momentum within the surface layers of the atmosphere.
T. G. I. R 20

19,102
Lott, D.N. $14,172 SAVED IN EIGHT MONTHS WITH DVORAK TYPEWRITER KEYBOARD! Office Economist, 1946, XXVIII (4), 8-9.

19,102
The Dvorak Simplified Keyboard for the typewriter was discussed in terms of its advantages in increased speed and decreased errors. Proof of the efficiency was offered in terms of results on an experiment conducted by the USN in which typists were trained on the new keyboard.
I.

19,103
Lerner, R.M. A METHOD OF SPEECH COMPRESSION. Contract AF 19(604) 5200, Rep. 36 41, Aug. 1959, 121pp. Lincoln Lab., Massachusetts Institute of Technology, Lexington, Mass.

19,103
A study was undertaken to determine what improvements could be effected in the operation of Vocoder-type speech compression systems by properly making use of the structure introduced into the speech waveform by the period voicing of most sounds. Basic to the experimental work was the observation that the waveform of voiced speech sounds are quasi-periodic. The principles underlying the pitch-synchronous processing of speech were reviewed and speech-processing systems were studied from a signal theory point of view. The experimental apparatus, a pitch-synchronous speech chopper, was built and its performance evaluated in terms of the intelligibility of words in its output and in terms of subjective quality.
G. I. R 40

19,104
Lythgoe, C. & Green, D. THE EFFECTS OF AVIATION TURBINE GASOLINE (AVTAG) AND OTHER AEROSOLS ON ANOXIC RATS. FPRC Memo. 154, Dec. 1960, 24pp. Flying Personnel Research Committee, London, England.

19,104
To determine what effects breathing aviation turbine gasoline (avtag) aerosol would have on a rat in an atmosphere of reduced oxygen tension, a series of experiments was performed using the decompression chamber. It was first determined at what altitude the rat would become unconscious in four to ten min. Further experiments were then performed in the ground level chamber with gas mixtures containing from zero to five percent oxygen. The times to unconsciousness with and without avtag aerosol were recorded. Other experiments were made using various aviation fuels and fluids.
T. G. I. R 1

19,105
Mudd, S.A. & Karsh, R. DESIGN OF A PICTURE LANGUAGE TO IDENTIFY VEHICLE CONTROLS. I. GENERAL METHOD. II. INVESTIGATION OF POPULATION STEREOTYPES. Tech. Memo. 22 61, Dec. 1961, 81pp. USA Ordnance Human Engineering Labs., Aberdeen Proving Ground, Md.

19,105
A general approach to the development of a picture language or a set of picture symbols as labels for equipment controls is discussed along with negative and positive arguments for such a system. The results of the first of a series of research studies are reported in which United States and foreign military personnel are asked to make line drawings to convey the meaning of various wheeled-vehicle controls. Common design elements are extracted by a qualitative analysis and a preliminary set of 34 symbols is compiled. Recommendations for further research are included.
T. I. R 7

19,107
Heron, A. FOUR APPROACHES TO THE STUDY OF AGEING IN INDUSTRY. Aug. 1961, 16pp. University of Liverpool, Liverpool, England.

19,107
A progress report is presented to give some indication of what can be attempted by way of systematic research on aging in industry, when the ultimate practical aim is that of encouraging a human factors or ergonomic approach to this question. Projects of four types that have been initiated recently are described: 1) long-term follow-up studies designed to establish what job-changes, whether attributed to age or not, actually occur and at what ages these begin and become most frequent; 2) laboratory investigations of learning to generate hypotheses about retraining; 3) opportunistic follow-up studies of effect on workers of different ages involved in major process changes within the firm; and 4) schemes of preparation for retirement.
R 5

19,108
Hamblin, R.L. THE ELEMENTS AND LOGIC OF GENERAL THEORY IN SOCIAL SCIENCE. Contract NONR 816 (11), Tech. Rep. 11, Sept. 1961, 29pp. Small Groups Research Center, Social Science Institute, Washington University, St. Louis, Mo.

19,108
The essential elements and logic of general theory are outlined in an effort to suggest how general theory might be formulated systematically. First, an important distinction is made between the conceptual and operational levels of theory; five key metaconcepts (conceptual variables, conceptual hypotheses, operational variables, operational hypotheses, and epistemic correlations) are defined, illustrated, and discussed. The discussion is focused on the relationships of the five key metaconcepts to one another, and finally, on the logic of the epistemic derivations, of testing general theory, and of establishing epistemic validity.
I. R 7

19,109
Helme, W.H., Trump, J.B. & Fitch, D.J. VALIDATION OF COMMON CORE PATTERN ANALYSIS AND MECHANICAL KNOWLEDGE TESTS FOR MECHANICAL MAINTENANCE COURSES. Proj. 21.95 60 001, PRB Tech. Res. Note 107, July 1960, 17pp. USA Personnel Research Branch, Adjutant General's Office, Washington, D.C.

19,109
Two experimental tests (Pattern Analysis Test, PAT, and Mechanical Knowledge Test, MKT) developed under a joint Armed Services program to provide common core classification tests were evaluated for USA use. The two tests were administered to samples in ten USA school courses. The PAT was compared to the operational PAT of the USA Classification Battery with respect to its effectiveness in classifying personnel for Precision Maintenance courses. The MKT was compared with the Army Classification Battery mechanical ability measures for its effectiveness in predicting success in Precision Maintenance, Military Crafts, and Motor Maintenance courses.
T. R 4

19,110
Johansson, G. & Backlund, F. A VERSATILE EYE-MOVEMENT RECORDER. Scand. J. Psychol., 1960, I, 181-186. (Psychological Lab., University of Uppsala, Uppsala, Sweden).

19,110
A small, light-weight eye-movement recorder, capable of registering eye movements from the smallest voluntary movements to those of 20 degrees of arc, is described. The construction of the equipment is mainly based on principles of photoelectric recording technique and overcomes the problem of head movements by being small and light enough to put on the S's head. Some remarks on the performance of the eye-movement recorder are offered.
I. R 5

19,111
Geisler, C.D. AVERAGE RESPONSES TO CLICKS IN MAN RECORDED BY SCALP ELECTRODES. Tech. Rep. 380, Nov. 1960, 158pp. Research Laboratory of Electronics, Massachusetts Institute of Technology, Cambridge, Mass.

19,111
Electric potentials were recorded from scalp electrodes in response to different sensory stimuli and, in particular, to clicks. These electrical responses are usually too small to be detected in the EEG. An average-response computer was used to study those components of the response that are time-locked to the delivery of sensory stimuli. The present study dealt with the characterization of average responses to acoustic-click stimuli in man. These responses were compared with evoked responses in subhuman species and tentatively identified as "secondary" responses.
T. G. I. R 87

19,112
Horstein, M. SEQUENTIAL TRANSMISSION OF DIGITAL INFORMATION WITH FEEDBACK. Contracts AF 19(604) 5200 & DA 36 039 SC 78108, Proj. 3 99 00 000, Task 3 99 20 001, Lincoln Lab. Rep. 34G 0006, Research Laboratory of Electronics Tech. Rep. 375, Sept. 1960, 64pp. Research Laboratory of Electronics, Massachusetts Institute of Technology, Cambridge, Mass.

19,112
Most of the known error-correcting procedures for digital communication involve codes of fixed constraint length. In a two-way communication system, however, it is possible to base the inclusion of redundancy on information (received over a feedback channel) concerning the results of previous transmissions. A wide variety of sequential transmissions is thereby made possible. This report is concerned with the asymptotic error-correcting capability of several types of sequential transmission and the examination of a particular sequential transmission scheme.
T. G. I. R 17

19,113
Fleishman, E.A., Thomas, P. & Munroe, P. THE DIMENSIONS OF PHYSICAL FITNESS—A FACTOR ANALYSIS OF SPEED, FLEXIBILITY, BALANCE, AND COORDINATION TESTS. Contract NONR 609(32), Tech. Rep. 3, Sept. 1961, 29pp. Department of Industrial Administration & Department of Psychology, Yale University, New Haven, Conn.

19,113
The present study was one of a series concerned with identifying the important factors that need to be assessed in any comprehensive evaluation of physical proficiency. The areas of skill studied here were those which minimize strength but emphasize such features as speed, flexibility, balance, and possibly coordination. The technique of factor analysis was applied to data from 30 tests developed specifically to measure these skills which were administered to 204 USN recruit subjects. The factors found to account for performance on these tests were identified and interpreted for meaningfulness from the loadings of the tests.
T. I. R 3

19,114
McFarland, R.A. RE-EVALUATION OF THE CRITERIA OF RETIREMENT. Aug. 1961, 19pp. Harvard School of Public Health, Cambridge, Mass.

19,114
The basic problem of the older worker in industry is said to be the re-evaluation of the criteria for ability to work, not for retirement or quitting work. First, the process of aging must be understood more fully, i.e., how people change with age. In this connection, a brief review of the literature is presented with emphasis on changes in sensory and mental functions. The second problem is a consideration of the kind of work the older worker is asked to do. Methods of prolonging the useful working careers of the older person are discussed.
R 20

19,115
McFarland, R.A. EXPERIMENTAL STUDIES OF SELECTED SENSORY FUNCTIONS IN AN ANALYSIS OF THE AGING PROCESS. Aug. 1961, 3pp. Harvard School of Public Health, Cambridge, Mass.

19,115
A brief analysis of selected examples of changes in sensory functions with age is presented. The examples include auditory acuity; nervous activity; and fatigue as measured by cff, light sensitivity, and glare recovery. The significance of these changes to the aging industrial worker is indicated.

19,116
Murrell, K.F.H. INDUSTRIAL ASPECTS OF AGING. Aug. 1961, 10pp. University of Bristol, Bristol, England.

19,116
The effect of machine design and work organization on an individual's ability to maintain optimum performance as he gets older is the general topic discussed in relation to different types of industry. A review of research work is made to see if evidence confirms two assumptions: 1) moderately heavy physical work can be tolerated up to quite an advanced age; and 2) heavy perceptual demands, especially when accompanied by speed, are not well-tolerated by the older worker. Then three topics are discussed briefly: 1) elements in the task, 2) environmental changes, and 3) organizational factors.
G. I. R 15

19,117
USN Electronics Laboratory. SUGGESTIONS FOR DESIGNERS OF ELECTRONIC EQUIPMENT. Rep. 11ND P 393, Reprint June 1961, 44pp. USN Electronics Lab., San Diego, Calif.

19,117
This booklet is prepared to serve as a handy checklist for engineers during the development of military electronic equipment. The contents include: 1) common design faults (technical and human factors considerations); 2) design suggestions—electrical, mechanical, thermal, maintenance, safety, man-machine; 3) human engineering for designers; and 4) a list of references.
I. R 25

19,118
USAF Ballistic Missile Division. AEROSPACE SYSTEM PERSONNEL-EQUIPMENT DATA FOR PERSONNEL SUBSYSTEM DEVELOPMENT. AFBM Exhibit 60 65A, Nov. 1961, 33pp. USAF Ballistic Missile Div., ARDC, Los Angeles, Calif.

19,118
This exhibit specifies the Personnel-Equipment Data to be prepared by the contractor in support of Personnel Subsystem development. Applicable documents are listed; general requirements are set forth in detail; quality assurance provisions and directions for delivery are included. Attached is a sample task analysis worksheet.
I. R 9

19,119
USAF Ballistic Missile Division. TRAINING EQUIPMENT PROCUREMENT FOR AIR FORCE BALLISTIC MISSILES AND MILITARY SPACE SYSTEMS. AFBM Exhibit 59 17B, Feb. 1961, 38pp. USAF Ballistic Missile Div., ARDC, Los Angeles, Calif.

19,119
This document was established for incorporation into USAF Ballistic Missile and Space Program contracts to provide standardized requirements for development and procurement of training equipment for all USAF training programs. A description was given of procedures, responsibilities, terms and conditions governing initial identification of all training equipment; design and development of trainers; selection and procurement of weapon system equipment needed for trainers, installation, and checkout of training equipment; idenfification, selection, and/or procurement of special support equipment needed for installation or maintenance; and idenfification of training films and transparencies.

19,120
USAF Ballistic Missile Division. PERSONNEL SUBSYSTEM TESTING FOR BALLISTIC MISSILE AND SPACE SYSTEMS. AFBMD Exhibit 60 1, April 1960, 9pp. USAF Ballistic Missile Div., ARDC, Los Angeles, Calif.

19,120
This document defines the nature of the personnel subsystem test effort, which, as an integral part of weapon system development, serves to determine the: 1) effects of human performance on system performance, 2) capability of military personnel to provide the performance required by the system, and 3) adequacy of the procedures and products essential to the development and support of the personnel subsystem.
R 23

19,121
Nisbet, T.R. & Happ, W.W. FLOW-GRAPH ANALYSIS. A VISUAL FORM OF ENGINEERING MATHEMATICS. Rep. LMSD 48357, Dec. 1958, 36pp. Missiles & Space Div., Lockheed Aircraft Corporation, Sunnyvale, Calif.

19,121
A self-contained course in flow-graph analysis is designed. The value of this technique is shown to lie in its ability to provide both a general view of the interdependence of variables and a particular view of any required aspect. Rules are developed from the simplest possible mathematical structures. Although transistor engineering (to which flow-graph analysis is particularly suited) is employed in some specific examples, the main work is treated in general terms that are applicable in many branches of engineering. An analysis of the mechanical differential gear is appended.
T. I. R 8

19,122
Nicks, D.C. & Fleishman, E.A. WHAT DO PHYSICAL FITNESS TESTS MEASURE?—A REVIEW OF FACTOR ANALYTIC STUDIES. Contract NONR 609(32), Tech. Rep. 1, July 1960, 39pp. Department of Industrial Administration & Department of Psychology, Yale University, New Haven, Conn.

19,122
This critical review describes 14 factors of physical proficiency identified from previous research. Other possible factors that might be discovered are also described. A number of questions are raised regarding the structure of skill in this area and suggestions made for future investigations. The development of a battery of basic reference tests providing comprehensive coverage in the area of physical proficiency is the goal of a projected research study. An outline and description of tests that might be included in such a battery is appended.
I. R 84

19,123
Marill, T. AUTOMATIC RECOGNITION OF SPEECH. RADC TN 60 196, Oct. 1960, 19pp. Bolt Beranek and Newman Inc., Cambridge, Mass.

19,123
The three fundamental concepts underlying the construction of automatic speech recognizers which have been built to date are discussed--the sound spectrograph, articulatory analysis, and linguistic analysis. Those machines that actually have been built and exhibited are examined briefly. Finally, some of the major difficulties in the way of achieving a workable general automatic speech recognizer are discussed.
R 20

19,124
Shackel, B. ERGONOMICS IN THE DESIGN OF A LARGE DIGITAL COMPUTER CONSOLE. WRITTEN VERSION OF PAPER TO THE 1ST INTERNATIONAL ERGONOMICS CONFERENCE, STOCKHOLM, SWEDEN, 20-23 AUGUST, 1961. Rep. 76, Rep. ED 144, 29pp. E.M.I. Electronics Ltd., Hayes, Middlesex, England.

19,124
The work of an engineering psychologist as a member of a system design team in the design of the central console desks and other units of a large general-purpose digital computer is described. Three broad categories of work are discussed: 1) man-machine interaction (layout, coding, warning system, etc.), 2) workspace (console size and panel positions with respect to the size, position, and reach of the operator), and 3) environment (lighting problems). Some of the problems are described with their solutions and illustrated with before and after pictures of the prototype and the final design.
I.

19,125
Shipstone, Eva I. SOME VARIABLES AFFECTING PATTERN CONCEPTION. Psychol Monogr., 1960, 74(17), 1-42. (Isabella Thoburn College, Lucknow, India).

19,125
A series of studies was conducted to explore possible variables affecting pattern conception or conceptual recoding of information to reduce apparent variability of the environment. Conceptual recoding was discussed here in terms of the discovery and formulation of rules to describe cognitive structures. Finite state systems were used to simulate natural languages; Ss were given a set of linguistic strings, random or constrained, generated by some finite state systems; they were asked to group the strings in some appropriate way. Length of messages, number of instances, number of alternatives, and structural similarity were some of the experimental variables. The type and quality of the strategies adopted and time scores were analyzed.
T. G. I. R 54

19,126
Taylor, D.W. (Ed.). EXPERIMENTS ON DECISION MAKING AND OTHER STUDIES. Contract NONR 609(20), Proj. NR 150 166, Tech. Rep. 6, Dec. 1960, 56pp. Industrial Administration Dept. & Psychology Dept., Yale University, New Haven, Conn.

19,126
Four studies in the area of decision-making are reported in full as to: 1) amount and generality of information-seeking behavior in sequential decision-making as dependent on level of incentive, 2) maximization of utility in economic decisions under risk, 3) group and individual economic decision-making in risk conditions, and 4) information seeking in sequential decision-making as dependent upon test anxiety and upon prior success or failure in problem-solving. Two additional studies include: 1) two exploratory studies of the effect of separation of production from evaluation of ideas, and 2) a note on the reliability of five rating scales.
T. R 26

19,127
Ward, A.A., Jr. EXPERIMENTAL CONCUSSION. FINAL REPORT. Contract NONR 942(00), Proj. NR 101 127, ca. 1960, 2pp. Neurosurgery Div., University of Washington School of Medicine, Seattle, Wash.

19,127
A brief summary was given of research directed at physiological mechanisms responsible for the coma that follows acceleration—acceleration concussion. The technique used was that of monitoring alterations in neural activity after a blow to the head in cats and monkeys. Neurophysiological studies following acceleration concussion were made. A study of drugs for clinical treatment of this condition was also conducted.
R 4

19,128
Ware, W.H. (Ed.). SOVIET COMPUTER TECHNOLOGY - 1959. Proj. RAND, Res. Memo. 2541, March 1960, 192pp. Rand Corporation, Santa Monica, Calif.

19,128
A factual account of the trip of the US technical delegation on computers to the Soviet Union in May, 1959, is presented. Included are the itinerary, descriptions of specific Soviet computers, descriptions of certain computing centers, a discussion of Soviet computer-oriented education, and a description of current circuit and component development. Appendices give the instruction repertoire of the URAL-I and the URAL-II machines and an analysis of some magnetic cores. The report is illustrated extensively and contains a bibliography of relevant Soviet documents.
T. G. I. R 50

19,129
Welford, A.T. CHANGES IN THE SPEED OF PERFORMANCE WITH AGE AND THEIR INDUSTRIAL SIGNIFICANCE. Aug. 1961, 8pp. St. John's College, Cambridge, England.

19,129
The slowing of performance with age and some of its ramifications and industrial consequences are dealt with in this article. The nature of this slowing and its locus within the chain of mechanisms leading from the sense organs through various central mechanisms to the effectors has been the subject of much research. Three rather distinct patterns of slowing with age are identified and discussed: constant, proportional, and disproportional increases of time. The effects of slowing, both direct and indirect, as seen in industry are discussed.
R 22

19,130
Vernon, J.A. PRINCETON STUDIES OF SENSORY DEPRIVATION. FINAL REPORT. Contract DA 49 007 MD 671, Aug. 1961, 20pp. Psychology Dept., Princeton University, Princeton, N.J.

19,130
A summary is given of a long-term research study on sensory deprivation and how man responds to this condition. The rationale and procedures for the experiments are described in the first section of the report. In the second section, all the significant findings are summarized in the following major areas: 1) learning at various levels of complexity; 2) perceptual and motor skills; 3) visual perception—color, depth, hallucinations; 4) pain perception; 5) suggestibility; and 6) time perception. An analysis is given of those Ss who could not endure confinement. A list of publications emanating from these studies is appended.
R 10

19,131
Coulter, D.C., Early, D.M. & Irons, R.E. A DIGITALIZED SPEECH COMPARISON SYSTEM. FINAL REPORT. DEVELOPMENT AND FABRICATION PHASE. Contract AF 33(600) 39962, Proj. 4335, Task 433519, ASD TR 61 494, Sept. 1961, 142pp. USAF Aeronautical Systems Div., Wright-Patterson AFB, Ohio. (Melpar, Incorporated, Falls Church, Va.).

19,131
The electrical, mechanical, and reliability phases of the construction of a service test model Digitalized Speech Compression System are described. This flyable, fully transistorized system is designed to permit two-way voice communication through a digital channel at either 1,000 or 1,200 bits per sec. Operational data extracted from two service test models are given. Methods used to arrive at a suitable mechanical configuration in order to package the system in 1.3 cu. ft. are documented. Various kinds of testing--articulation, environmental, jamming, etc.--are discussed.
T. G. I. R 9

19,132
Bell, D.A. & Rosie, A.M. CHARACTER RECOGNITION. FINAL REPORT. Contract DA 91 591 EUC 1291, Sept. 1960, 22pp. Electrical Engineering Dept., University of Birmingham, Birmingham, England.

19,132
This report covers the following aspects of experimental research on character recognition: 1) correlation detection of five-unit telegraphic code signals, 2) correlation recognition of the printed numerals 0 to 9, and 3) the development of a mosaic reader to correlate the whole signal with a locally stored counterpart.
T. G. I. R 6

19,134
Brozek, J. & Henschel, A. TECHNIQUES FOR MEASURING BODY COMPOSITION. PROCEEDINGS OF A CONFERENCE. USA QUARTERMASTER RESEARCH AND ENGINEERING CENTER, NATIC, MASSACHUSETTS. JANUARY 22-23, 1959. 1961, 300pp. National Academy of Sciences - National Research Council, Washington, D.C. (Lehigh University, Bethlehem, Penn. & USA Quartermaster Research and Engineering Command, Natick, Mass.).

19,134
The papers presented in this monograph form a comprehensive and critical analysis of the entire problem of measuring body composition. Three general approaches to the problem, each represented by four papers, are presented: somatometric, volumetric, and biochemical. One section is devoted to body compositions interrelations and comparisons (three papers). A subject matter index is included.
T. G. I. R 650 (approx.)

19,135
Allison, R.B., Jr. LEARNING PARAMETERS AND HUMAN ABILITIES. Contracts NONR 694(00) & NONR 1858 (15), Projs. NR 151 113 & 150 088, NSF Grant G 642, May 1960, 158pp. Educational Testing Service, Princeton, N.J. & Princeton University, Princeton, N.J.

19,135
To explore the interrelationships among learning parameters and between learning parameters and measures of abilities, 13 learning situations were devised. The S's performance on each learning task was expressed as a rate parameter that described the average rate of learning, a curvature parameter that indicated whether learning was faster during the first or second half of the situation, and an initial ability parameter. Potential relations between learning and abilities were assessed by 39 reference measures of aptitude and achievement. Two factor analytic techniques were employed to organize the interrelationships into more meaningful dimensions based upon common factor variances.
T. G. I. R 59

19,136
Chapanis, A. ON SOME RELATIONS BETWEEN HUMAN ENGINEERING, OPERATIONS RESEARCH, AND SYSTEMS ENGINEERING. From: Eckman, D.P. (Ed.). "Systems: Research and Design," 1961, 124-166. John Wiley & Sons, Inc., New York, N.Y. (Johns Hopkins University, Baltimore, Md.).

19,136
Some of the significant ways in which human engineering contributes to operations research and systems engineering, and how human engineering in turn is influenced by the other two fields are discussed. Concrete examples are provided to illuminate the discussion.
T. G. I. R 24

19,137
Eldredge, D.H. THE PROBLEMS OF CRITERIA FOR NOISE EXPOSURE. Contract NONR 2300 (06), Oct. 1960, 27pp. Armed Forces-National Research Council Committee on Hearing and Bio-Acoustics, ONR, Washington, D.C. (Central Institute for the Deaf, St. Louis, Mo.).

19,137
This report resulted from an unsuccessful attempt to write comprehensive standards describing exposures to noise that are hazardous for the ear. An analysis of the problem was made which demonstrated why the task was not possible. Some of the concepts and principles in that analysis were described herein around these major topics: 1) purposes of criterion, 2) methods for describing noise exposure, 3) methods for evaluating hearing impairment, 4) the relations of noise exposure to hearing impairment, and 5) application of a useful standard and monitoring audiometry. An analysis of several specific criteria for noise exposure was appended.
T. R 46

19,138
Ekman, G. MULTIDIMENSIONAL RATIO SCALING APPLIED TO COLOR VISION. Rep. 92, March 1961, 9pp. Psychological Lab., University of Stockholm, Stockholm, Sweden.

19,138
A direct method for multidimensional ratio scaling, previously reported, was tested for its validity by applying it to a relatively simple problem, where the dimensionality was to some degree known from previous studies based on other techniques. The problem chosen was the perception of monochromatic light varying from 593 to 674 mu. The data from ten Ss were analyzed for the factors which would explain the qualitative variation in hue in this part of the visible spectrum. These factors were compared with factors expected on the basis of other research.
T. G. R 15

19,139
Graveline, D.E. & Jackson, Margaret M. DIURESIS ASSOCIATED WITH PROLONGED WATER IMMERSION. Proj. 7222, Task 71745, ASD TR 61 651, Dec. 1961, 11pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio.

19,139
Utilizing complete water immersion, balanced respiration, and unrestricted activity, the diuretic response of five human Ss to six-hour periods in this environment was studied. During the few weeks prior to the tests, control blood and urine collections were done at the same time of day and in the same sequence as during the test day. The same breakfast and fluid intake preceded the control and test days. All analyses were performed on both samples and differences due to test conditions were determined.
T. G. R 17

19,140
Glanzer, M. & Huttenlocher, Janellen. THE MECHANICS OF CONCEPT-WORK: CONCEPT SIZE, EXAMPLE SIGN, SERIES COMPLEXITY, AND INFORMATION ORDER. Contract DA 49 007 MD 1004, Nov. 1960, 28pp. Psychiatry Dept., University of Maryland, College Park, Md.

19,140
In a preceding study some of the factors that control the efficiency of concept-work (see 19,141) were considered and demonstrated. The present study explored further the factors controlling behavior in this area: 1) concept size—the effect of differences in the number of dimensions required to define the concept, 2) example sign—the comparative utility of positive and negative examples in the concept-work, 3) series complexity—the effect of adding redundant information to the example series, and 4) information order—the effect of various arrangements of a series of defining examples. Three experiments dealing with these factors were reported.
G. I. R 6

19,141
Glanzer, M. & Huttenlocher, Janellen. THE MECHANICS OF CONCEPT-WORK: EXPOSURE TIME AND NUMBER OF DIMENSIONS. Contract DA 49 007 MD 1004, Oct. 1960, 15pp. Psychiatry Dept., University of Maryland, College Park, Md.

19,141
"Concept-work" refers to the process by which Ss eliminate incorrect solutions and specify correct ones to a concept problem; "mechanics" refers to the details of this process. Two experiments are carried out to determine the effect of three variables on the process of concept-work. In the first, the experimental variables are number of dimensions and exposure time of examples. In the second, the variables are exposure time and rate at which irrelevant dimensions are eliminated by the example series (reduction rate). Various possible models for the data are considered. The relevance of the findings to a problem-solving as opposed to a learning model for concept formation is considered.
T. G. I. R 6

19,142
Goldbeck, R.A. THE EFFECT OF RESPONSE MODE AND LEARNING MATERIAL DIFFICULTY ON AUTOMATED INSTRUCTION. Contract NONR 3077(00), Tech. Rep. 1, AIR 328 60 IR 124, Sept. 1960, 36pp. American Institutes for Research, Santa Barbara, Calif.

19,142
To determine the effects on learning of different response modes in combination with varied levels of learning response difficulty, an experiment was conducted using 63 Ss at seventh grade level. The response modes were: 1) overt—writing response, 2) covert—thinking response, and 3) implicit—reading response; levels of difficulty were established by varying the amount of cues and prompts for the response word. The learning material was programmed as discrete discourse in which each of 35 frames was written to teach a single fact. Ss completed the booklet at a self-paced rate of speed and immediately completed a test covering the material. Learning efficiency (test score divided by time) and test scores alone were analyzed for effect of the different variables. T. G. R 12

19,143
Glanzer, M. THE MECHANICS OF CONCEPT-WORK: PLAN AND METHOD OF STUDY. Contract DA 49 007 MD 1004, Sept. 1960, 22pp. Psychiatry Dept., University of Maryland, College Park, Md.

19,143
A general strategy for the study of complex problem-solving is outlined, and the details on the method adopted for a series of studies subsequently carried out under this general strategy are presented. A brief review of alternative approaches and methods, a discussion of the special methods chosen for the experimental work, and a set of definitions of terms basic to the work are included.
I. R 25

19,144
Ghosh, B.K. & Freeman, H. INVESTIGATION OF SEQUENTIAL METHODS IN DESIGN AND ANALYSIS OF EXPERIMENTS. Contract DA 19 129 QM 1515, Proj. FEA MRS 60 77, Tech. Rep. R 11, Oct. 1961, 162pp. USA Quartermaster Field Evaluation Agency, Fort Lee, Va. (Groton Associates, Inc., Groton, Mass.).

19,144
A study is undertaken to develop a new methodology by which to make more efficient the design and conduct of field evaluation studies of materials and products. This monograph is an introduction to sequential experimentation in mathematical terms. It deals with sequential tests of the general linear hypothesis and gives, in detail, the sequential analysis of several examples of fixed-effects and random-effects models.
T. G. R 49

19,145
Henry, W.O., Goldstein, D.A., Allen, F.L. & Jones, J.F. ADVANCED FBM SUBMARINE SHIP CONTROL CONSOLE. SHIP CONTROL XIV. Contract NONR 2512(00), Rep. U411 61 102, Aug. 1961, 49pp. Electric Boat Div., General Dynamics Corporation, Groton, Conn.

19,145
An integrated ship control console is described. It is designed so one man, under normal watchstanding conditions, can perform effectively all normal ship control operations: steering and diving, hovering, submerging and surfacing, trim and ballast control, missile compensation, and speed ordering control. In emergency situations an additional man can perform at an emergency helmsman's station. The two most important features of the console are 1) a central data processor, and 2) the Submarine Quickened Response (SQUIRE) display. These features are described in detail.
R 27

19,146
Jones, F.P. PSYCHOPHYSICAL REEDUCATION AND THE POSTURAL REFLEXES. May 1953, 13pp. Institute for Psychological Research, Tufts University, Medford, Mass.

19,146
A method of re-education that is psychophysical in the sense that it brings about a change in the person as a whole by introducing a change in his total pattern of reaction is described. The basis of the method is control of a basic, reflex mechanism lying in the unconscious poise of the head to influence the way muscle tension (or tone) is distributed throughout the body. Studies of animal posture and human posture are cited as evidence for the physiological base on which the method operates. An hypothesis is presented requiring experimental testing to throw new light on this postural mechanism.
R 25

19,147
Jones, F.P. KINESTHETIC PERCEPTION AND THE POSTURAL REFLEXES. No date, 17pp. Institute for Psychological Research, Tufts University, Medford, Mass.

19,147
A process by which kinesthetic perception of postural change can be studied, both objectively and subjectively, is described. Background studies of postural reflexes in man and other animals are reviewed. The work of F. M. Alexander, who devised a means for controlling postural reflex of the head and neck and thus of the whole tensional pattern of the body, is discussed along with an introspective account of the phenomenon. A theory of posture and postural change is offered.

19,148
Metzner, J.J. & Morgan, K.C. RELIABLE FAIL-SAFE BINARY COMMUNICATION. SECOND SCIENTIFIC REPORT. Contract AF 19(604) 6168, AFCRL TN 60 791, July 1960, 69pp. Electrical Engineering Dept., New York University, New York, N.Y.

19,148
A new binary decision-feedback system is described that is very effective for high reliability transmission when the channel is subject to fading, intermittent strong noise bursts, or other changing conditions. A method of using long codes to obtain communication with negligible error probability and reasonable computing requirements is developed. The way in which the effect of feedback channel errors can be neutralized even when there is fading or burst-type noise in the feedback channel is shown.
T. G. R 40

19,149
Kaufman, W.C., Swan, A.G. & Davis, H.T. SKIN TEMPERATURE RESPONSES TO SIMULATED THERMONUCLEAR FLASH. Proj. 7222, Task 722204, ASD TR 61 510, Sept. 1961, 13pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio.

19,149
To assess the effects of simulated nuclear flash on the pilot and cockpit of a tactical fighter and to determine the tolerance of the operationally-clothed crew member to severe radiant energy pulses, skin temperatures and radiant energy are measured on an S wearing flight clothing and sitting in a tactical aircraft exposed to thermal energy characteristic of thermonuclear weapons. Radiant energy source is 960 lamps at power levels up to 4,000 kilowatts. Exposures of increasing severity are used until S's tolerance is established. The data provide a basis for calculating the nearest safe distance of aircrew members to a nuclear explosion.
I. G. I. R 13

19,150
Mickelson, W.F., Mills, B.J., Graves, J.B., Huey, R.S., et al. EMERGENCY ESCAPE CAPSULE STUDIES. PHASE II: FLOTATION AND SURVIVAL TESTS IN WARM-WATER ENVIRONMENT. PHASE III: FLOTATION, SURVIVAL, AND HABITATION TESTS IN COLD-WATER ENVIRONMENT. PHASE IV: SURVIVAL AND HABITATION TESTS IN COLD-LAND ENVIRONMENT. Proj. 6325, Task 63752, WADC TR 59 247 (Part II), Dec. 1961, 33pp. USAF Directorate of Operational Support Engineering, Wright-Patterson AFB, Ohio.

19,150
To determine the use of the escape capsule in warm-water, cold-water, and cold-land environments, flotation, survival, and habitation studies were conducted on full-scale crew escape capsules. The individual facets of the program included: 1) the design of capsule clothing, 2) donning of clothing in confined space, 3) stowage of emergency survival items, 4) air exchange requirements, 5) flotation, 6) inhabitation, and 7) communication studies.
T. I.

19,151
Palmer, M.E. A FLIGHT SIMULATOR STUDY OF THE LATERAL-DIRECTIONAL STABILITY REQUIREMENTS OF PILOTED AIR VEHICLES. Contract NOW 60 0314D, Rep. NA 61H 241, March 1961, 27pp. North American Aviation, Inc., Columbus, Ohio.

19,151
A stationary flight simulator study was made of the primary factors that affect pilot opinion of the lateral-directional stability of contemporary aircraft. Fourteen pilots made separate ratings for each of the following maneuvers: standard rate turns (30 degrees bank), rapid rolls to a given bank angle (60 degrees to 90 degrees), rapid roll reversals, rudder kicks, and lateral gusts consisting of a step input in sideslip. Parameters investigated were periods of lateral oscillation, damping values, roll excitation, and lateral control yawing moment.
T. G. I. R 10

19,152
Siegel, A.I. & Schultz, D.G. EVALUATING THE EFFECTS OF TRAINING. J. Amer. Soc. Train. Dir., Sept. 1961, 10pp. (Applied Psychological Services, Wayne, Penn.).

19,152
Job performance evaluation is advanced as a technique for providing training program effectiveness information in those situations in which an immediate and patent effect of training upon job performance is intended. One approach mentioned is the establishment of the functional relationship between training emphasis and job performance proficiency. A practical alternative approach, which is more fully developed herein, is job suitability (ability to perform the tasks at some point in time). Training effectiveness indices, based on data provided by the user of the products of the schools, are presented and their application discussed.
G. I. R 1

19,153
Sadacca, R., Castelnovo, A. & Ranes, J. HUMAN FACTORS STUDIES IN IMAGE INTERPRETATION: THE IMPACT OF INTELLIGENCE INFORMATION FURNISHED INTERPRETERS. Proj. 2L95 60 001, Tech. Res. Note 117, Aug. 1961, 16pp. USA Human Factors Research Branch, Adjutant General's Research & Development Command, Washington, D.C.

19,153
In the continuation of research concerned with development of techniques to improve performance of image interpreters, two closely related studies were undertaken to determine whether intelligence information furnished the interpreter influences the accuracy of his reports or the confidence he places in his interpretations. Using performance measures based on tactical and strategic photographs, the first study used matched groups of Ss—one with the usual background information, the other with additional information suggesting the presence of particular objects in the imagery. The second study evaluations of the source and accuracy of the information presented were systematically varied across nine groups of Ss. The uses of the findings were suggested. T. R 1

19,154
Sivertsen, Eva & Peterson, G.E. STUDIES ON SPEECH SYNTHESIS. PART I. OBJECTIVES AND TECHNIQUES OF SPEECH SYNTHESIS. PART II. SEGMENT INVENTORIES FOR SPEECH SYNTHESIS. Contract NONR 1224(22), Proj. NR 049 122, Rep. 5, Aug. 1960, 115pp. Speech Research Lab., University of Michigan, Ann Arbor, Mich.

19,154
The synthesis of speech is discussed as one of the simpler problems of language automation. Two basic methods of the generation of speech are considered: 1) from stored segments, and 2) through continuous control of the various speech parameters individually. In the latter case, the parameters may be physiological or acoustical. It is concluded that electronic analogs of the physiological speech mechanism provide a means of evaluating hypotheses about the physiologic-acoustic speech transformation, and that acoustical speech simulators are the most realistic and practical research tools for the experimental study of speech perception.
T. R 42

19,155
Tucker, L.R. DETERMINATION OF GENERALIZED LEARNING CURVES BY FACTOR ANALYSIS. A TECHNICAL REPORT. Contract NONR 1858 (15), Proj. NR 150 088, National Science Foundation Grant G 3407, July 1960, 44pp. Psychology Dept., Princeton University, Princeton, N.J. (Educational Testing Service, Princeton, N.J.).

19,155
The problem of individual differences in learning functions is discussed for the situations when generalized learning curves are being sought. Mean learning curves are appropriate only for a limited class of special cases when the individual learning curves are linear transformations on the dependent variable from each other. A factor analytic procedure is described to develop generalized learning curves, or families of curves, for a much extended class of cases. This procedure is illustrated with some probability learning data.
T. G. R 14

19,156
Torgerson, W.S. DISTANCES AND RATIOS IN PSYCHOPHYSICAL SCALING. Contract AF 19(604) 7400, Rep. 58G 0014, Oct. 1960, 15pp. Lincoln Lab., Massachusetts Institute of Technology, Lexington, Mass.

19,156
The question of the form of the psychophysical law, whether a logarithmic or a power relation, is discussed. Some empirical data are presented which are consistent with the notion that [illegible] single quantitative relation between stimuli. When this relation is interpreted as either a psychological distance or a psychological ratio, it can be shown that the subjective magnitudes obey the properties of the corresponding commutative group--the addition group for distance interpretation (logarithmic function) and the multiplication group for the ratio interpretation (power function). It is contended, therefore, that the proper form of the psychophysical law cannot be directly resolved empirically.
G.

19,157
Spira, S.L. STUDY OF TESTING OF CONTROL SYSTEMS UNDER SIMULATED ENVIRONMENTS. Contract AF 29(600) 2059, Proj. 6889, Task 68892, ARMDC TR 60-19, Aug. 1960, 251pp. USAF Missile Development Center, Holloman AFB, N.M. (Kearfott, General Precision, Inc., Little Falls, N.J.).

19,157
The findings of a study to establish appropriate yardsticks for the testing and evaluating of future control systems and components for high performance aircraft, ballistic missiles, satellites, and space vehicles under simulated environments are discussed. An analysis of the environments that can be expected and methods of simulating these environments (altitude, radiations, ionized layers, solid particles, temperature and gravity) are investigated. Induced surroundings of shock and vibration are discussed; material fatigue is analyzed. Test devices such as rocket sleds, centrifuges, altitude chambers, and the like are reviewed. Over-all recommendations are made for further investigation in support of the over-all environmental test and evaluation. T. G. I. R 1[illegible]

19,158
Brogden, H.E. A NEW RATIONALE FOR HANDLING ITEM COEFFICIENTS. Report from: "Tri-Service Conference on Selection Research. Pensacola, Fla., May 25, 26, 27, 1960." ONR Symposium Rep. ACR 60, 118-124. USN Office of Naval Research, Washington, D.C. (USA Personnel Research Branch, Adjutant General's Office, Washington, D.C.).

19,158
In any prediction study involving many variables and a limited number of Ss, extensive shrinkage is to be expected upon cross-validation and, as the complexity of the analysis increases, the expected shrinkage tends to increase. A rationale for handling item coefficients is presented here which centers around the shrinkage problem. Information on the behavior of item coefficients is presented; implications of this information and procedures for handling the selection of items are proposed. Problems associated with item clusters are discussed also.
T. R 2

19,159
Elliott, Lois L. MEASUREMENT OF MORALE. Report from: "Tri-Service Conference on Selection Research. Pensacola, Fla., May 25, 26, 27, 1960." ONR Symposium Rep. ACR 60, 197-205. USN Office of Naval Research, Washington, D.C. (USAF Personnel Lab., Lackland AFB, Tex.).

19,159
Work accomplished on a research study of morale measurement is summarized briefly. Four aspects are treated: 1) review of literature, particularly factor analytic studies; 2) preliminary morale questionnaire construction and administration to a group of USAF enlisted men; 3) revision of questionnaire on basis of factor analysis of results; and 4) administration to a sample of enlisted men for whom a variety of personal and criterion data were also collected. The homogeneity and independence of the scales are checked and their validity against available criteria determined. The seven scales are appended. New approaches for future research are outlined.
T. R 4

19,160
Ledley, R.S. INTRODUCTION TO DIGITAL COMPUTERS AND AUTOMATIC PROGRAMMING. IRE Trans. on Bio-Medical Electronics, July 1961, BME-8(3), 158-167. (National Biomedical Research Foundation, Silver Spring, Md.).

19,160
The role of computers in processes utilized for biomedical research is discussed and the capabilities of a digital computer are described. An exposition of the programming of digital computers, including the so-called automatic programming methods, is presented. The basic concepts of "machine language" are described first and then a sketch of some of the techniques for composing and utilizing automatic programming languages is given.
T. I. R 3

19,161
Geddes, L.A., Hoff, H.E. & Spencer, W.A. SHORT DISTANCE BROADCASTING OF PHYSIOLOGICAL DATA. IRE Trans. on Bio-Medical Electronics, July 1961, BME-8(3), 168-172. (Physiology & Rehabilitation Depts., Baylor Medical College, Houston, Tex.).

19,161
The need for short distance transmission of physiological measurements being made on a hospital patient for diagnostic study, monitoring of therapeutic techniques, or for teaching is discussed. The development of facilities to telemeter such data is described. A direct wire system is described and its advantages discussed.
G. I. R 27

19,162
Bennett, E.M. & Degan, J.W. THE DIAGNOSTIC PROCESS IN MEN AND AUTOMATA. IRE Trans. on Hum. Factors in Electronics, Sept. 1961, HFE-2(2), 68-72. (Mitre Corporation, Bedford, Mass.).

19,162
Diagnostic skill is described as the recognition of symptoms of unusual or atypical functioning or structure, understanding the meaning of these symptoms, and evolving ways in which such knowledge can be applied in the discovery of other existing symptoms and in the isolation of existing defects. The talents involved in diagnosis and the characteristics of the search for symptoms and defects are outlined.
T. R 39

19,163
Manheimer, B.H. & Kelley, J.R. AN OVERVIEW OF HUMAN FACTORS IN ELECTRONIC MAINTENANCE. IRE Trans. on Hum. Factors in Electronics, Sept. 1961, HFE-2(2), 73-77. (Federal Electric Corp., Paramus, N.J.).

19,163
A review and critique of human-factors effort in design for maintenance and for each major support area are presented. The support areas dealt with are: 1) maintenance methods and procedures, 2) manpower data, 3) supply, 4) support environment, 5) installation, 6) publications, and 7) training. Future trends are assessed.
I. R 16

19,164
Silvern, L.C. THE INFLUENCE OF TEACHING MACHINE TECHNOLOGY ON ELECTRONIC SYSTEMS MAINTENANCE TRAINING. IRE Trans. on Hum. Factors in Electronics, Sept. 1961, HFE-2(2), 78-83. (Hughes Aircraft Company, Culver City, Calif.).

19,164
The evolution of electronic systems maintenance philosophy is explored in terms of performance requirements, studies of behavioral patterns, technical training requirements, engineering design, and management competence. The probable degree of success in utilizing the teaching machine for employee and customer technical training involving the maintenance of complex electronic systems is considered.
R 47

19,165
Rigney, J.W., Schuster, D.H., Runyan, T.L. & Budnoff, I.J. ANALYSIS OF FAULT-LOCATION BEHAVIOR IN ELECTRONIC EQUIPMENT. IRE Trans. on Hum. Factors in Electronics, Sept. 1961, HFE-2(2), 84-87. (Electronics Personnel Research Group, University of Southern California, Los Angeles, Calif.).

19,165
The importance of a careful analysis of fault-location behavior in equipment to the designer, to the educator planning training curricula, and to the psychologist studying problem-solving behavior is discussed. The analysis of intermediate moves in trouble shooting is shown to be a fruitful technique. Two examples of this type of analysis are discussed in some detail.
T. R 7

19,166
Wohl, J.G. WHY DESIGN FOR MAINTAINABILITY? IRE Trans. on Hum. Factors in Electronics, Sept. 1961, HFE-2(2), 87-92. (Dunlap and Associates, Inc., Stamford, Conn.).

19,166
The relative importance of a system-maintainability measure (down time) in the design of basic equipment and of systems is developed. The relationships among down time (a system-reliability measure--failure), equipment availability, number of equipments, number of on-call technicians, and system-readiness reliability are developed under the assumption of constant failure and repair rates. Design trade-off between reliability and maintainability is analyzed and a technique is developed for specifying reliability, maintainability, and availability constraints to manufacturers. The need for research to establish quantitative effects of design upon down time is explored.
T. G. I. R 3

19,167
McKendry, J.M., Corso, J.F. & Grant, G. DESIGNING MAINTAINABLE CIRCUITS. IRE Trans. on Hum. Factors in Electronics, Sept. 1961, HFE-2(2), 93-97. (HRB-Singer, Inc., State College, Penn.).

19,167
To provide electronic equipment designers with specific knowledge concerning the design of more maintainable circuits, a study was conducted using 210 engineers, all of whom had considerable experience in electronics, as Ss. Questionnaires, designed to elicit information on the primary factors affecting fault-location time, were devised for 13 representative circuits varying over a wide frequency range. Responses were analyzed to determine whether any general conclusions could be drawn from the group. Certain parameters were found that yield more trouble-shooting information on all circuits studied. Other problem areas were discussed.
T.

19,168
Munger, M.R., Willis, M.P. & Altman, J.W. QUANTIFICATION OF EXPERT JUDGMENTS IN MAINTENANCE DESIGN DECISIONS. IRE Trans. on Hum. Factors in Electronics, Sept. 1961, HFE-2(2), 97-102. (American Institute for Research, Pittsburgh, Penn.).

19,168
Generalized findings, based on work carried out in the development of the Index of Electronic Maintainability for the USA Signal Corps, are reported on the quantification of expert judgment in the area of maintenance and maintainability. The topics discussed are: 1) construction of rating scales, 2) selection of raters, 3) reliability of ratings, and 4) uniqueness of maintenance-consequence areas. Finally, three suggested applications of the techniques described are presented and some of the benefits in maintenance design decisions are briefly discussed.
T. G. R 3

19,169
Wasserman, W.L. EVALUATION OF TROUBLE-SHOOTING OVERLAY DESIGNS. IRE Trans. on Hum. Factors in Electronics, Sept. 1961, HFE-2(2), 102-103. (Government and Industrial Group, Philco Corporation, Philadelphia, Penn.).

19,169
An experiment was conducted to compare two parameters of trouble-shooting overlay design--type of point-to-point connection and type of coding. Each of 18 Ss were required to trace four tests on each of four different designs encompassing the two parameters: straight-line point-to-point connection with color coding and with line-type coding; and schematic-type point-to-point connection with color coding and with line-type coding. Mean times and errors were analyzed to find the optimum combination.
T. I. R 1

19,170
Cooper, J.I. HUMAN-INITIATED FAILURES AND MALFUNCTION REPORTING. IRE Trans. on Hum. Factors in Electronics, Sept. 1961, HFE-2(2), 104-109. (Norair Div., Northrop Corporation, Hawthorne, Calif.).

19,170
Two studies were conducted to determine the extent and nature of human-initiated failures in missile systems. The first study compared malfunction data obtained from written reports with data gathered from interviews with line and supervisory personnel. The second study attempted to establish the extent of unreported human-initiated malfunctions. Human-initiated malfunction data were classified into the kinds of operations in which these malfunctions occurred; percentages were given in this report. Malfunction-reporting practices were reviewed to establish their effectiveness in revealing these data and to indicate what corrective action may be taken.
T. G. R 3

19,171
Demaree, R.G. DESIGNING THE HUMAN ELEMENT INTO MAINTENANCE. IRE Trans. on Hum. Factors in Electronics, Sept. 1961, HFE-2(2), 110-111. (Psychological Research Associates, Arlington, Va.).

19,171
The problem in maintainability design of automation of maintenance versus maintenance by the human technician is discussed. To capitalize upon both the merits of automation and the capabilities of humans, an integrated program is proposed for the analysis of maintenance requirements and the evaluation of man-machine alternatives for meeting these requirements.
I.

19,172
Wohl, J.G. RESEARCH DATA ON MAINTAINABILITY. IRE Trans. on Hum. Factors in Electronics, Sept. 1961, HFE-2(2), 112-113. (Dunlap and Associates, Inc., Stamford, Conn.).

19,172
The results of two experimental studies (the only ones found by the author) on the effectiveness of design practice in reducing equipment down time (see 19,166) are summarized. In both instances, only one source of down time, namely, fault localization time, is studied. All data are normalized and plotted as probability distributions on semilog paper to emphasize their apparent exponential nature. The results are compared with similar data on effects of training to indicate the efficiency of design considerations for maintainability. A plea is made for more research data in the area of design for maintainability.
G. R 5

19,173
Anderson, N.M., Sekelj, P. & McGregor, M. THE TRANSMISSION OF RED AND INFRARED LIGHT THROUGH THE HUMAN EAR. IRE Trans. on Bio-Medical Electronics, April 1961, BME-8 (2), 134-135.

19,173
To test the assumption that if the ear were rendered truly bloodless the light transmitted to a red filtered photocell would bear a constant relationship to the infrared filtered photocell in all anatomically normal ears, the light transmission characteristics of the compressed "bloodless" ear in 70 Ss of white, Indian, and Negro stock were studied. Red/infrared ratios in the bloodless ear were calculated for each S and averaged for the various groups. An index of "experimental error" inherent in measurements was established in order to study the constancy of the ratios in the three groups.
T. R 6

19,174
Lowenberg, E.C. SIGNAL THEORY APPLIED TO THE ANALYSIS OF ELECTROENCEPHALOGRAMS. IRE Trans. on Bio-Medical Electronics, Jan. 1961, BME-8(1), 7-12. (Electrical Engineering Dept., University of Texas, Austin, Tex.).

19,174
Considered as a special problem in signal analysis, the representation of EEG involves the problem of determining a unique number for each degree of freedom. A method of representation is usually chosen because of the convenience of making the empirical measurements. One particular method of representation is discussed with emphasis on the problem of making the desired measurements using electronic equipment. It is suggested that the goal of EEG signal analysis should be to represent as uniquely as possible the intervals of interest so that significant information is not discarded in an averaging process.
G. I. R 9

19,175
Frey, A.H. A RATIONAL FRAMEWORK FOR INTERPRETING THE BEHAVIORAL EFFECTS OF ATMOSPHERIC IONS. IRE Trans. on Bio-Medical Electronics, Jan. 1961, BME-8(1), 12-16. (G.E. Advanced Electronics Center, Cornell University, Ithaca, N.Y.).

19,175
Air ionization is a normal phenomenon in the vicinity of electrical equipment. These atmospheric ions and their effect upon man's behavior have been studied experimentally. These studies are criticized because of deficiencies in instrumentation, lack of control of interacting variables, and lack of a rational framework. A first approximation of such a framework is presented. A number of studies are considered from the point of view provided by the framework.
R 16

19,176
Knoll, M., Rheinstein, J., Leonard, G.F. & Highberg, P.F. INFLUENCE OF LIGHT AIR IONS ON HUMAN VISUAL REACTION TIME. IRE Trans. on Bio-Medical Electronics, Oct. 1961, BME-8(4), 239-245. (Institute for Technical Electronics, Technical University, Munich, West Germany).

19,176
A long-term study of the effect of light air ions on human visual reaction time was described. An automatic visual-reaction-time meter was described which includes a random-pulse generator controlled by nuclear radiation for starting the S's light pulse. With this instrument (using radioactive ion generators) several hundred Ss have been investigated in over 12,900 tests. The density of ions inhaled, positive or negative ion inhalation, breathing through the nose and through the mouth, and the effect of the electric field set up by the generator were studied. The results were summarized in this report.
G. I. R 13

19,177
Crosbie, R.J., Hardy, J.D. & Fessenden, E. ELECTRICAL ANALOG SIMULATION OF TEMPERATURE REGULATION IN MAN. IRE Trans. on Bio-Medical Electronics, Oct. 1961, BME-8(4), 245-252. (USN Aviation Medical Acceleration Lab., Johnsville, Penn.).

19,177
Using the basic equations for heat balance which have been developed to take into account heat losses by radiation, convection, and evaporation, an electrical analog has been constructed to simulate the physiological responses to heat and cold in the nude man. Comparison is made between computer solution and physiological observation for: 1) a nude man essentially in a thermal steady-state when exposed to temperatures between 20 to 35 degrees C; and 2) the transient response when moved suddenly from a warm to cold environment, and during and immediately following exercise. A better understanding of physiological temperature regulation is the aim of this study.
T. G. I. R 12

19,178
Cron, R.L. WHY AUTOMATE INSTRUCTION? IRE Trans. on Educ., Dec. 1961, E-4(4), 132-134.

19,178
Automated instruction is defined herein as the individual tutoring of students by mechanical or electromechanical means or devices. Further characteristics are described. The educational and psychological principles that are applied in this type of instruction are listed as those of participation, reward, knowledge of results, and individual differences. A brief description of the operation of autoinstructional systems is presented. Finally, the aspects of our present educational system that are generating the development and use of automated instructional systems are discussed.

19,179
Whitmore, P.G. A RATIONAL ANALYSIS OF THE PROCESS OF INSTRUCTION. IRE Trans. on Educ., Dec. 1961, E-4(4), 135-143. (USA Air Defense Human Research Unit, Fort Bliss, Tex.).

19,179
The author proposes to provide the lay reader with a general understanding of the process of instruction and an appreciation of the problem areas that must be solved before an adequate technology of instruction can be reached. To this end, he defines instruction and relates instruction to learning, which in turn leads to a clarification of the problem of specifying an adequate instructional program. In the main body of the paper, he is concerned with the general application of these definitions to: 1) identifying what is to be learned, 2) sequencing order for presenting instructional materials, 3) designing instructional situations, and 4) evaluating the effectiveness of instruction.
R 8

19,180
Quackenbush, J. HOW EFFECTIVE ARE THE NEW AUTOINSTRUCTIONAL MATERIALS AND DEVICES? IRE Trans. on Educ., Dec. 1961, E-4(4), 144-151. (Learning Research Center, Pennsylvania State University, University Park, Penn.).

19,180
An evaluation of the effectiveness of autoinstructional materials is attempted by using data derived from 30 published research studies. The instructional areas covered are: elementary, secondary, and special education; armed forces and industrial use. Fifteen possible criteria of effectiveness are presented and the studies reporting data on each of the criteria are listed.
T. R 32

19,181
Mager, R.F. A METHOD FOR PREPARING AUTO-INSTRUCTIONAL PROGRAMS. IRE Trans. on Educ., Dec. 1961, E-4(4), 151-157. (Central Research Staff, Varian Associates, Palo Alto, Calif.).

19,181
A method for preparing instructional programs for teaching machines is described. It is intended to be a guide for the person who is an experienced instructor but a novice programmer. Steps involved in this one method are outlined and a brief description of how each step is accomplished is given.
R 3

19,182
Bitzer, D., Braunfeld, P. & Lichtenberger, W. PLATO: AN AUTOMATIC TEACHING DEVICE. IRE Trans. on Educ., Dec. 1961, E-4(4), 157-161. (Coordinated Science Lab., University of Illinois, Urbana, Ill.).

19,182
Programmed Logic for Teaching Operations is the name given to a teaching machine developed at the Coordinated Science Laboratory of the University of Illinois. It is a device for teaching a number of students individually by means of a single, central, high-speed, general purpose, digital computer. Student keysets for controlling sequence of material and for transmitting questions and closed circuit television for computer communication are other components of the machine. Organization of the equipment and the programmed logic are discussed.
I.

19,183
Lancaster, O.E. MARI: MOTIVATOR AND RESPONSE INDICATOR. IRE Trans. on Educ., Dec. 1961, E-4(4), 167-174. (Pennsylvania State University, University Park, Penn.).

19,183
A simple device, Motivator and Response Indicator, for giving students immediate reinforcement within a class period was described. It was designed, built, and tested in actual classrooms. Installation, methods of use, faculty and student reactions, and maintenance problems were discussed.
T. I.

19,184
Acton Society Trust, London, England. BASIC RESEARCH INTO THE HUMAN FACTOR. Engng., Dec. 1961, 192(4989), p. 712.

19,184
The Acton Society Trust (England) was set up in 1948 to carry out social research, particularly in industrial and related fields. The most significant evidence and end-products of the Society's work were the reports published on research in the field. These reports have dealt with hospital organization and administration, the social relationship between industrial productivity and tendency toward centralization, management and succession, wider shareholding, redundancy, and retirement. Another type of activity of the Society was in the field of arranging seminars, lectures, and management training courses.

19,185
Lowson, M.V. DEVELOPMENT OF A MAN-POWERED AIRCRAFT. Engng., Dec. 1961, 192(4990), 757-759. (Aeronautics and Astronautics Dept., Southampton University, Southampton, England).

19,185
The design and development of a manpowered aircraft capable of brief, low altitude flights were described. The development of this aircraft was largely an exercise in establishing optimum aerodynamic and constructional design criteria. The power problem, aircraft layout, construction details, and controls were discussed. Further improvements for a more sophisticated machine were suggested.
T. G. I. R 2

19,186
Williams, E.M. PROGRAMMED LEARNING IN ENGINEERING EDUCATION--A PRELIMINARY STUDY. IRE Trans. on Educ., June 1961, E-4(2), 51-58. (Carnegie Institute of Technology, Pittsburgh, Penn.).

19,186
Some present conclusions of a study group concerning possible uses of programmed educational aids in engineering education at the college level are presented and discussed. Preliminary experiments with one form of programmed tutoring device are described. The hypotheses underlying this effort are presented and the results evaluated in terms of the hypotheses.
I. R 7

19,187
Ley, B.J. A DESCRIPTION OF A SIMPLE TEACHING MACHINE. IRE Trans. on Educ., March 1961, E-4(1), 38-42. (Electrical Engineering Dept., New York University, New York, N.Y.).

19,187
The operation of the electrical circuit of a relatively simple teaching machine is described. The machine, for individual use, uses a set of ten multiple-choice answer questions that are typed on three by five-inch index cards inserted in appropriate holders. Below each question is a switch for selecting one of five possible answers. After all questions are answered, the score is obtained by pressing the push-for-score button. Some ways in which this machine has been used are described.
G. I. R 3

19,188
Dudley, Beverly. HUMAN RESPONSES--A VITAL LINK IN COMMUNICATIONS PROGRESS. PART II. IRE Trans. on Engng. Writing and Speech, May 1961, EWS-4(2), 35-41. (Laboratory for Electronics, Inc., Boston, Mass.).

19,188
An interpretation of the communications process in terms of stimulus and response is given. Part I (19,189) deals with communications in the physical and behavioral sciences and with the nature of stimulus/sensation under the various sensory conditions. In this part, the basic processes of communication are dealt with further. An example of underwater communication between submarines is cited to show limitations imposed by the transmission medium. Further advances will, to a great extent, depend upon the extent to which the systems' characteristics are related to man's sense-response characteristics. A list of areas needing research is included.
R 15

19,189
Dudley, Beverly. HUMAN RESPONSES--A VITAL LINK IN COMMUNICATIONS PROGRESS. PART I. IRE Trans. on Engng. Writing and Speech, Jan. 1961, EWS-4(1), 5-13. (Laboratory for Electronics, Inc., Boston, Mass.).

19,189
An interpretation of the communications process is given in terms of stimulus and response. Communications and the physical and behavioral sciences are discussed. A survey of man's senses, from stimulus to sensation, and psychophysical responses are other topics that are examined.
G. I. R 13

19,190
Wholey, J.S. THE CODING OF PICTORIAL DATA. IRE Trans. on Information Theory, April 1961, IT-7(2), 99-104. (Applied Science Div., Melpar, Inc., Watertown, Mass.).

19,190
The problem of designing an efficient general method of coding two-level pictorial data was considered. An exact coding technique in which a digital computer was used to realize two-dimensional "predictive coding" experimentally was described. Further experiments which made use of approximation methods were presented. These methods arose from the application of pattern recognition theory to the present problem.
T. I. R 18

19,191
Ives, H.S. HIGHWAY ILLUMINATION WARRANTS—DESIGN—MAINTENANCE—COSTS. Amer. Highways, July 1961, XL(3), 21-26. (Connecticut State Highway Dept., Conn.).

19,191
A critical inquiry was made into the Connecticut Highway Department's warrants for highway illumination on the Connecticut Turnpike, other existing highways, and proposed future highways. These warrants were compared with those of other states and those recommended by technical organizations. The cost of present highway illumination was investigated in all aspects (design and maintenance); recommendations were made for changes to bring about cost savings.
I.

19,195
Gollnick, P.D. & Karpovich, P.V. ELECTROGONIOMETRIC STUDY OF LOCOMOTION AND OF SOME ATHLETIC MOVEMENTS. Contract DA 49 007 MD 889, Sept. 1961, 14pp. Physiology Dept., Springfield College, Springfield, Mass.

19,195
An analysis of the action of the knee and ankle joints during walking on a treadmill with various angles of inclination was made using electrogoniometric methods of measurement. An attempt was made to analyze the action of the same joints during running, somersaulting, and swimming. The action of the elbow joint was studied also in pitching a baseball, in shot putting, and in swimming. The elgon used for knee and elbow measurement was described.
T. G. I. R 3

19,196
Kelley, C.R. & Guinness, G.V., Jr. AUTOMANUAL CONTROL. Report from: "Annual Convention of the American Psychological Association. New York, N.Y., Sept. 5, 1961." 8pp.

19,196
This paper describes the predictor instrument, a special display for manual control systems which presents the predicted future condition of the variables under control, and illustrates how the instrument has been applied in "automanual control," a new concept combining automatic and manual control—the operator controls by continuous adjustments an automatic controller which controls the system. The predictor display informs man of the effects of his adjustments "in advance," thus allowing him to adjust the controller for the desired response. The major advantages of this control system—speed, accuracy, flexibility—are described in terms of its operation. An additional development, the "criterion" display, is described and related to system performance. I. R 3

19,197
Lineberry, E.C., Jr., Brissenden, R.F. & Kurbjun, M.C. ANALYTICAL AND PRELIMINARY SIMULATION STUDY OF A PILOT'S ABILITY TO CONTROL THE TERMINAL PHASE OF A RENDEZVOUS WITH SIMPLE OPTICAL DEVICES AND A TIMER. NASA TN D 965, Oct. 1961, 23pp. National Aeronautics and Space Administration, Washington, D.C. (Langley Research Center, Langley AFB, Va.).

19,197
A simulation study was conducted to determine the ability of a human pilot to control a space rendezvous between two vehicles by 1) correcting the flight path of his vehicle to establish a constant line of sight between the vehicles and 2) controlling the closure rate for a safe approach along the line of sight; to obtain range and closure rate, he must use the visual sightings made during the initial collision-course control. The analytical phase reviewed geometric relations between the vehicles; three techniques were developed to transform angular sightings into range and closure rate. The preliminary phase investigated the accuracy of these techniques by using an analog computer, an oscilloscope to represent the pilot's view, and a timer.
T. G. I. R 3

19,198
Hammer, Lois R. AERONAUTICAL SYSTEMS DIVISION STUDIES IN WEIGHTLESSNESS: 1959-1960. Proj. 7184, Task 71585, WADD TR 60 715, 93pp. USAF Aerospace Medical Lab., Wright-Patterson AFB, Ohio.

19,198
This report documents the more informal, early observations on weightlessness which did not warrant separate publication because of their limited scope and summarizes data from the more rigorous investigations during this period. For each "study" the intent and method of investigation, findings, and references are given. The C-131B, KC-135, free-floating test capsules, camera technique, F-104B, frictionless devices, and water submersion tank are described. The topics of the two headings are: aerospace medical--physiological phenomena, stress, sensory processes, gross motor performance and locomotion, fine motor behavior; and aeromechanics--power generation and heat transfer problems, fluid orientation, Able-5 vehicle stability.
T. G. I. R 25

19,199
Mahowald, M. ON THE MEASURABILITY OF FUNCTIONS IN TWO VARIABLES. Contract AF 49(638) 265, AFOSR TN 60 1096, Res. Rep. 29, Aug. 1960, 6pp. USAF Office of Scientific Research, Washington, D.C. (Syracuse University, Syracuse, N.Y.).

19,199
Two independent topics are considered in this report--the first is concerned with the question of the joint measurability of a function in two variables given continuity in one; the second is concerned with the existence of a measurable modification of a given stochastic process. In the first, the main result is a general theorem on metric compact spaces. In the second, the necessary and sufficient conditions are obtained.
R 4

19,200
Marks, M.R. DEVELOPMENT OF HUMAN PROFICIENCY AND PERFORMANCE MEASURES FOR WEAPON SYSTEMS TESTING. Contract AF 33(616) 7464, Proj. 7190, Task 71608, ASD TR 61 733, Dec. 1961, 85pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio. (Psychological Research Associates, Arlington, Va.).

19,200
"Methods for evaluating human performance are discussed and compared for validity, reliability, objectivity, standardization, and economy. Personnel Subsystem test development constraints are considered and methods are proposed for the construction, scoring, administration, and standardization of measurement instruments. Appendices are included which exhibit sample content, sample computation, and definition of terms of the Personnel Subsystem."
T. I. R 13

19,201
Craig, D.R. IMAGE SHARPNESS METER. Photographic Science & Engng., Nov.-Dec. 1961, 5(6), 337-342. (Log Etronics, Inc., Alexandria, Va.).

19,201
This article describes an image sharpness meter which employs a pair of photoconductive surfaces connected in a bridge circuit to an output meter which shows quantitatively when the image projected onto one of the surfaces has reached critical focus. A fact essential to the operation of the instrument is that when photoconducter response is logarithmic, differential bridge output demonstrates that log (A plus B) is not equal to log A plus log B. This instrument also overcomes the basic difficulty of visual focusing. The meter registers a single-valued indication of image sharpness with a maximum of critical focus.
G. I.

19,202
Blumenthal, S. CONTRIBUTIONS TO THE THEORY OF THE TWO-SAMPLE PROBLEM. Contract AF 49(638) 230, Tech. Rep. 17, Oct. 1961, 71pp. Industrial and Engineering Administration Dept., Sibley School of Mechanical Engineering, Cornell University, Ithaca, N.Y.

19,202
This paper considers the two-sample problem in terms of testing the null hypothesis that X and Y have identical distribution functions. First, the predetermined sample size test is described in detail and its distribution is proved normal under certain restrictions on the density functions. In the second chapter, a sequential test for the two-sample problem is described; its properties are studied; and an estimate of the "efficiency" of the test is obtained. Four appendices on convergence rates of some of the density functions are included.
R 13

19,203
Blischke, W.R. LEAST SQUARES ESTIMATORS OF TWO INTERSECTING LINES. Contract NONR 401(39), Proj. NR 042 212, Tech. Rep. 7, 8pp. Biometrics Unit, New York State College of Agriculture, Cornell University, Ithaca, N.Y.

19,203
Least squares estimators are constructed for the slopes, intercepts, and point of intersection of two straight lines. This minimization of the residual sum of squares is carried out in three stages, the calculations for which are presented in detail. Some other applications of the procedure are indicated.
R 4

19,204
Goldberg, J.H. & Gangwish, R.C. REQUIRED LATERAL HANDLING QUALITIES FOR HELICOPTERS IN LOW-SPEED INSTRUMENT FLIGHT. Contract DA 44 177 TC 524, Proj. 9 38 01 000, TK 902, Rep. 496, Feb. 1960, 39pp. Aeronautical Engineering Dept., Princeton University, Princeton, N.J.

19,204
This investigation was aimed at establishing the requirements for and factors influencing the lateral handling qualities of helicopters. Three pilots served as Ss; the test program was conducted on a variable stability helicopter and consisted of three flying phases—straight and level, level 180 degrees S-turns, and zero reader problem—for each of approximately 40 stability configurations. After each phase the pilot was questioned on the stability and handling charecteristics he had experienced. Both visual and instrument flight problems were considered. In a later phase of the program one pilot went into the testing in a more intensive manner giving more detailed commentaries and evaluations.
T. G. I. R 11

19,205
Wishner, R.P. & Linderlaub, J.C. APPLICATION OF STATISTICAL ESTIMATION PROCEDURES TO THE IDENTIFICATION PROBLEM. Contract AF 19(604) 7400, Rep. 47G-2, Nov. 1961, 24pp. Lincoln Lab., Massachusetts Institute of Technology, Lexington, Mass.

19,205
"The method of maximum likelihood parameter estimation is applied to the problem of measuring parameters of an unknown linear filter or control system from input-output data when it is assumed that the output signal is corrupted with an additive Gaussian noise signal. The physical realization suggested by the integral formulation of the estimation technique is discussed and illustrated. Approximate expressions for the parameter estimates and the covariance matrix of the errors in the parameter estimates are obtained in the strong signal case. This analysis also has applications to the adaptive radar problem."
I. R 13

19,206
Willard, T.L. RESEARCH AND DEVELOPMENT ON CLOSED RESPIRATORY SYSTEM ACCESSORIES. MOLECULAR SIEVES FOR CARBON DIOXIDE ADSORPTION. Contract AF 33(616) 7270, Proj. 6373, Task 63120, ASD TR 61 527, Oct. 1961, 69pp. USAF Life Support Systems Lab., Wright-Patterson AFB, Ohio. (Aeronautical Div., Minneapolis-Honeywell Regulator Company, Minneapolis, Minn.).

19,206
This research and development program was concerned with a regenerable carbon dioxide (CO_2) removal system for manned space capsules on long-term flights. Some background information on molecular sieves, adsorption and design problems associated with them, and desorption procedures were presented. In the adsorption study a Type 5A molecular sieve was examined to determine the effects on capacity and transfer zone lengths of varying CO_2 concentration, operating temperature, flow velocity, molecular sieve pellet size, and gas stream humidity. In the desorption study information on vacuum desorption, purge-gas stripping, and thermal desorption of CO_2 from the molecular sieve was obtained. Sample calculations were made for the design of a test bed.
T. G. I. R 11

19,207
Weybrew, B.B., Molish, H.B. & Youniss, R.P. PREDICTION OF ADJUSTMENT TO THE ANTARCTIC. Proj. MR005.14 2100 3.05, Rep. 350, April 1961, 61pp. USN Medical Research Lab., New London Submarine Base, Conn.

19,207
This research examined the efficiency of psychometric and interview data in predicting individual differences in adjustment to the Antarctic. The Ss were 109 men stationed at Little America. The predictor data: background information, Shipley Hartford Scale, psychiatric ratings, ratings by psychologists, sports inventory, and neurotic symptom checklist were collected prior to the Antarctic trip. The criterion data consisted of derived measures obtained from a factor analysis of the trends in the symptom data obtained from the Monthly Diary together with three attitudinal criteria: line evaluation, attitude study, group behavior description. Factor scores for each of the five factors obtained from the intercorrelation of the criterion measures were computed as adjustment criteria for each man. T. R 8

19,208
Weir, F.W., Bath, D.W., Yevich, P. & Oberst, F.W. A STUDY OF THE EFFECTS OF CONTINUOUS INHALATION OF HIGH CONCENTRATIONS OF OXYGEN AT AMBIENT PRESSURE AND TEMPERATURE. MIPR (33 616) 60 33, Proj. 7165, Task 716501, ASD TR 61 664, Dec. 1961, 12pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio. (USA Chemical Research & Development Labs., Army Chemical Center, Md.).

19,208
The times of occurence and progression of toxic effects in rats exposed to relatively pure oxygen, the times to death of several animal species at controlled environmental conditions, and ambient pressure and temperature were determined. All animals were exposed continuously until death or for a maximum of 240 hours in a modified gassing chamber; Ss were rats of various ages and both sexes, mice, guinea pigs, and dogs. Several measures were obtained: times to appearance of labored breathing; times to death; toxic signs, e.g., flushed coloration of nose, ears, etc.; lethargy; tremors; and pathological changes, e.g., pleural effusion, pulmonary edema, necrosis of pulmonary vein. The findings were related to those of other investigators.
T. I. R 12

19,209
Weir, F.W., Bath, D.W. & Weeks, M.H. SHORT-TERM INHALATION EXPOSURES OF RODENTS TO PENTABORANE-9. MIPR (33 616) 60 41, Proj. 7165, Task 716501, ASD TR 61 663, Dec. 1961, 6pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio. (USA Chemical Research & Development Labs., Army Chemical Center, Md.).

19,209
Rats and mice were exposed to pentaborane to determine the concentration which would cause 50 percent deaths for single 5-, 15-, 30-, and 60-min. exposure periods. The exposures were conducted in a dynamic-flow gassing chamber. The Ss were male white rats and female CF-1 mice; ten were exposed for each period. All animals were observed for toxic signs and death during the exposure period and the survivors were observed for seven days after exposure. For the concentration values, 19/20 confidence limits were calculated and for the dose response curves, standard errors were computed. The need for future studies to aid in estimating safe levels for human exposure was indicated.
T. R 9

19,210
Weeks, M.H., Maxey, G.C., Sicks, Mary E. & Greene, E.A. VAPOR TOXICITY OF UDMH IN RATS AND DOGS FROM SHORT EXPOSURES. MIPR (33 616) 60 32, Proj. 7165, Task 71836, ASD TR 61 526, Oct. 1961, 15pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio. (USA Chemical Research & Development Labs., Army Chemical Center, Md.).

19,210
The effects of single-exposure periods of rats and dogs and repeated exposures of dogs to UDMH vapor are reported. The rat experiments are designed to determine the range of concentrations which produces severe toxic effects after single 5-, 15-, 30-, and 60-min. exposure periods. The dog experiments are aimed at finding the concentration of UDMH which causes minimal or no toxic signs after short exposures—conducted in a dynamic flow gassing chamber. All are observed during and for seven days after exposure; histopathological studies are conducted on them at various times after exposure. Lethal effects for each exposure period are determined; toxic signs, weight changes, and deaths are recorded. Multiple exposures are studied also. Use of these findings for exposures for man is indicated. T. G. R 10

19,211
Turner, R.D. OPERATIONS RESEARCH ON RECOGNITION. THE GENERALIZED SEARCH PROCESS. Contract AF 19(604) 6103, AFCRL 945, Sci. Rep. 2, Nov. 1961, 145pp. Light Military Electronics Dept., Advanced Electronics Center, General Electric Company, Ithaca, N.Y.

19,211
Techniques for the detection, isolation, and description of signals of unknown character, occurring at unknown times, and imbedded in background interference are examined analytically. There are three types of techniques: 1) distributional (based on analysis of the empirical probability distribution of the input), which provides for detection and preliminary classification of signals; 2) transform and hybrid methods, which provide for secondary classification of signals; and 3) linear (exemplified by various types of adaptive filters), which provide fine-grain information about the signals.
T. G. I. R 25

19,212
US Army Services Technical Information Agency. DISPLAY SYSTEMS. AN ASTIA REPORT BIBLIOGRAPHY. AD 265 432, Nov. 1961, 319pp. US Armed Services Technical Information Agency, Arlington, Va.

19,212
This bibliography of ASTIA abstracts covers three broad categories: display systems and equipment, e.g., crt, radar, solid state, sonar; application of these in electronic systems, e.g., air traffic control, anti-aircraft defense, direction finders, computers; and related human engineering factors, e.g., auditory, visual. The listings are alphabetical by source, contract number, and date for Defense Department publications, and by source and title for military publications.
R 800 (approx.)

19,213
Rigby, Lynn V. & Cooper, J.I. PROBLEMS AND PROCEDURES IN MAINTAINABILITY. Contract AF 33(616) 7059, Proj. 7184, Task 71586, ASD TN 61 126, 92pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio. (Norair Div., Northrop Corporation, Hawthorne, Calif.).

19,213
This report is a summary of three surveys on maintainability: literature, operational problems and practices, and current preliminary design practices. First, the scope and sources of the maintainability problem are described. In the next section basic problems of the technician, major operational problems, common design deficiencies, problems of the contract monitor, and general user suggestions are discussed. The design problems and practices are examined mainly in terms of the methods, techniques, and criteria employed. Finally, the difficulty in measuring maintainability is discussed and recommendations for improvement of these measurements are presented.
T. R 55

19,214
Miller, I. & Freund, J.E. INVESTIGATION OF SPECTRAL ESTIMATION. Contract AF 33(616) 6857, Proj. 7183, Task 718301, ASD TR 61 714, 42pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio. (Arizona State University, Tucson, Ariz.).

19,214
This paper reports the results of theoretical investigations in three broad areas of spectral estimation relevant to the determination of human-operator response characteristics: 1) the analysis of relationships among a set of stochastic processes, 2) the development of tests of certain critical assumptions, and 3) the study of multicomponent systems. In (1), theoretical models are developed for situations in which input is varied and output is measured after some time lag; this is illustrated by a tracking problem. In (2), tests of the assumptions of normality and stationarity are derived. In (3), two-component systems are considered which can function even after one of the components has failed; a statistical model is proposed to handle such problems.
R 11

19,215
Eckman, D.P. (Ed.). SYSTEMS: RESEARCH AND DESIGN. PROCEEDINGS OF THE FIRST SYSTEMS SYMPOSIUM AT CASE INSTITUTE OF TECHNOLOGY. 1961, 310pp. John Wiley & Sons, Inc., New York, N.Y. (Case Institute of Technology, Cleveland, Ohio).

19,215
This is a collection of the 14 papers of the first systems symposium at Case Institute; the main theme is to present to the Case group the various problems, objectives, and viewpoints in systems research. Some of the topics discussed are: interdisciplinary aspects of systems research; choice of objectives; use of operations research with large systems; design of large-scale digital computer systems; a decision model for a fourth-level model in the Boulding sense; impedance matching problems of man-computer systems; relations between human engineering, operations research, and systems engineering; quantifiable parameters of group performance; evolutionary design of complex systems; reliability as a systems parameter; transfer dynamics of physical systems; etc. T. G. I. R 94

19,216
Fischl, M.A. & Pfeiffer, M.G. IMPROVEMENT OF FLIGHT HANDBOOKS. Contract N61339 748, NAVTRADEVCEN TR 748 1, June 1961, 211pp. USN Training Devices Center, Port Washington, N.Y. (Courtney and Company, Philadelphia, Penn.).

19,216
To identify the specific inadequacies in flight manuals and to recommend ways and means for their correction, the Navy pilot population was selectively sampled by questionnaires and interviews, while representative flight handbooks underwent critical analysis. "Within the framework of determining realistic information requirements and optimizing the physical characteristics of the handbooks, the data derived from these two approaches were integrated." Specific problems associated with such factors as format, organization, color application, etc. were treated. Detailed instructions, illustrations, and rationale were included in the recommendations for improvement of flight handbooks.
T. G. I.

19,217
Fights, R.C., Vickers, T.K. & Miller, W.E. A STUDY OF DISPLAY SYSTEMS FOR USE IN THE AUGMENTED 4-WHEELS PROJECT. FINAL REPORT. Contract AF 19(604) 7986, AFCRL 753, July 1961, 72pp. Hazeltine Technical Development Center, Inc., Indianapolis, Ind.

19,217
The results of an investigation of available display equipment for possible use in air transportable, air traffic control, and communication systems are presented. Various display techniques and associated equipment are analyzed with respect to these system requirements. Several specific equipments from the following categories are described and analyzed: horizontal PPI console, small plan position indicator, AZ-EL indicator, symbol generation system, and method of displaying flight plan data. One equipment from each category is recommended.
T. I.

19,218
Eckstrand, G.A. & Rockway, M.R. SPACECREW TRAINING: A REVIEW OF PROGRESS AND PROSPECTS. Proj. 1710, ASD TR 61 721, Dec. 1961, 23pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio.

19,218
This report describes all current astronaut training programs and draws some conclusions regarding such training based upon the manned space operations to date. The programs are the X-15, Project Mercury, Dyna Soar, and Vostok. In addition, recently completed and current research on spacecrew personnel training is reviewed and areas where research should be accelerated are identified.
I. R 16

19,219
Dobbins, D.A., Tiedemann, J.G. & Skordahl, D.M. FIELD STUDY OF VIGILANCE UNDER HIGHWAY DRIVING CONDITIONS. Proj. 2L95 60 001, APRO TN 118, Dec. 1961, 40pp. USA Personnel Research Office, Washington, D.C.

19,219
To examine the general level of signal detection performance of drivers of the American Association of State Highway Officals, to determine the nature and extent of any decrement in vigilance over a driving shift, to examine the range and stability of individual differences in signal detection, and to estimate the reliability of the vigilance test scores, Ss drive loaded commercial trucks over experimental highways daily (seven and one-half hours). Conditions are: three driving schedules, six traffic loops, a vigilance task (detecting and responding to one of two types of light signal), signal rates (critical, noncritical), various intersignal intervals, and a one-sec. signal duration; performance measures are percent detection score (ds) and false ds. Analyses of the data are presented. T. G. I. R 18

19,220
Dobbins, D.A., Skordahl, D.M. & Anderson, A.A. PREDICTION OF VIGILANCE: AASHO ROAD TEST. Proj. 2L95 60 001, APRO TN 119, Dec. 1961, 25pp. USA Personnel Research Office, Washington, D.C.

19,220
To examine reliability of and interrelationships between two measures of vigilance, and to determine predictability of the vigilance criteria using various standardized psychological tests and other measures, 111 truck drivers (about half assigned to day and half to night driving) drove loaded trucks on one of five experimental loops. The vigilance task was to depress a foot pedal when one of two types of light signal appeared on a dash-mounted display; vigilance criterion scores were percent detections and false detections; measure of general performance was by an over-all adaptability rating, and of morale by a USA morale inventory; various tests and measures were grouped into one reference and eight predictor clusters. Reliability and validity coefficients were computed for the vigilance criteria. T. R 12

19,221
Crawford, B.M. & Kama, W.N. REMOTE HANDLING OF MASS. Proj. 7184, Task 718406, ASD TR 61 627, Dec. 1961, 25pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio.

19,221
Three hypotheses are tested: difference limens for masses handled remotely are greater than for masses handled directly under simulated weightlessness; weightlessness will not affect absolute judgments; tendency to under- and overestimate stimuli that follow large and small ones, respectively, will operate for both judgment and handling conditions. Remote-handling (apparatus—an Argonne Model 8 Master-Slave Manipulator) and direct-handling groups of Ss make judgments of mass after moving stimulus objects to and fro on an air-bearing table. Frequencies of "heavier" responses for the comparison stimuli are examined and normal ogives derived. For absolute judgments, the main effects of basis of judgment, handling method, and stimulus magnitude are evaluated by Wilcoxon's two-tailed rank test. T. G. I. R 13

19,222
Clark, B. & Graybiel, A. PERCEPTION OF THE POSTURAL VERTICAL AS A FUNCTION OF PRACTICE IN NORMAL PERSONS AND SUBJECTS WITH LABYRINTHINE DEFECTS. NASA Grant R 37, Proj. MR005.13 6001, Subtask 1, Rep. 63, Nov. 1961, 9pp. USN School of Aviation Medicine, Pensacola Air Station, Fla. (San Jose State College, San Jose, Calif.).

19,222
This study compared normal Ss and Ss with defective vestibular function as to the effects of practice on their ability to set themselves to the postural vertical. A large tilting chair was used; Ss, nine normal and ten nonnormal, were strapped in position firmly and their heads were positioned by a rigid head rest. The room was dark and S was blindfolded. S was first upright for five sec.; the chair was then tilted 30 degrees to the right or left; S was then required to immediately align himself to the vertical. There were 30 trials in series of ten with 60 sec. rest between them. Subjective experiences were also obtained. Median error plots for both groups were presented and compared in blocks of five by t-tests.
T. G. R 15

19,223
Connors, Mary M. & Kelsey, Patricia A. SHAPE OF THE RED AND GREEN COLOR ZONE GRADIENTS. J. opt. Soc. Amer., Aug. 1961, 51(8), 874-877. (USN Medical Research Lab., New London Submarine Base, Conn.). (MRL Rep. 363).

19,223
Color sensitivity at the boundaries of the red and green color zones along the 270-degree meridian was investigated using a Goldmann projection perimeter. The red and green stimuli for the main experiment were one degree in size and were equated peripherally in brightness; the background luminance was 1.35 mL. Five observers with normal color vision participated. Measurements at two-degree intervals in the region of the boundary were made; frequency-of-seeing functions were obtained. Smoothed running averages were calculated; chi-square values were computed for the differences between the empirical data and these smoothed curves.
T. G. R 4

19,224
Baum, W.R. & Goldman, S. MULTIDIMENSIONAL INFORMATION THEORY. ANNUAL REPORT. Contract NONR 669(10), Rep. EE494 6109A, June 1961, 54pp. Electrical Engineering Dept., College of Engineering, Syracuse University Research Institute, Syracuse, N.Y.

19,224
This report presents the status of the work on the development of multidimensional information theory. Topics dealt with include: the general theory of figure measures, the development of principles and methods for a multidimensional generalization of the sampling theorem considered as an interpolation theorem, the theory of shape, basic types of noise, and sideband interpretation of amplitude and phase pattern information in an optical object under coherent illumination. Partially developed notes in several areas are presented in appendix form, e.g., almost periodic functions, convex bodies, integral geometric methods in information theory, quantitative aspects of the problem of shape in biology. I. R 38

19,225
Brown, T.M. A SURVEY OF VERTICAL DISPLAY CONTACT ANALOG SYSTEMS. Contract NONR 1670(00), Rep. D228 201 001, Oct. 1961, 18pp. Bell Helicopter Company, Fort Worth, Tex.

19,225
This report presents in chart form descriptions of the operating modes and hardware in the vertical display systems used in the Bell HH-2 research helicopter, the Grumman A2F attack aircraft, the Douglas Aircraft simulator, and the SUBIC submarine programs. Also work being performed at Johnsville on the Grumman system in R4Y aircraft is described. These data are intended as a convenient reference for personnel in the field of information presentation.

19,226
Briggs, G.E. ON THE SCHEDULING OF TRAINING CONDITIONS FOR THE ACQUISITION AND TRANSFER OF PERCEPTUAL-MOTOR SKILLS. Contract N61339 836, NAVTRADEVCEN TR 836 1, Dec. 1961, 34pp. USN Training Device Center, Port Washington, N.Y. (Laboratory of Aviation Psychology, Ohio State University, Columbus, Ohio).

19,226
"The usefulness of display aiding and augmented feedback as techniques for cuing the trainee to the important aspects of a vehicular control task" and "schedules of change in display aiding conditions and augmented feedback so as to optimize the facilitation of skill learning" are examined. The perceptual-motor skill is control of a Type II (acceleration) system. In I, Ss (three groups according to amount of training) experience complete, partial, and nonaided display conditions; control Ss experience only the latter; S transfers progressively to the unaided display when his performance reaches the predetermined criterion for his group. In II, analogous conditions for augmented feedback are developed (amplitude, rate, and acceleration information) and similarly tested. T. G. I. R 14

19,227
Adams, O.S. & Chiles, W.D. HUMAN PERFORMANCE AS A FUNCTION OF THE WORK-REST RATIO DURING PROLONGED CONFINEMENT. Contracts AF 33(616) 6050 & AF 33(616) 7607, Proj. 1710, Task 171002, ASD TR 61 720, Nov. 1961, 44pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio. (Lockheed-Georgia Company, Marietta, Ga.).

19,227
Feasibility of using a four-hours-on-duty and two-hours-off-duty schedule around the clock in the operation of advanced aerospace systems was investigated using two B-52 combat-ready crews while confined in a simulated advanced system crew compartment for 15 days. Performance was measured on: arithmetic computation, pattern discrimination, probability monitoring, warning lights monitoring, and auditory vigilance; records were obtained of: skin resistance, heart rate, skin temperature, and respiration rate. Task performance results and psychophysiological data were analyzed by Friedman's variance test in terms of means of measurements on different days and at different times of day. Performance data from college students in similar experiments were reported. T. G. I. R 5

19,228
Allen, M.J. A STUDY OF VISUAL PERFORMANCE USING OPHTHALMIC FILTERS. Contract AF 33(616) 7216, Proj. 7164, Task 71834, ASD TR 61 576, Oct. 1961, 29pp. USAF Life Support Systems Lab., Wright-Patterson AFB, Ohio. (Division of Optometry, Indiana University, Bloomington, Ind.).

19,228
Methods to effectively compensate for adverse glare conditions encountered at moderately high altitudes were sought. Visual performance, as measured by speed of recognition for the near task (a number target set in a Link Trainer panel) and a j.n.d. threshold spot target (one-half degree) for distance sensitivity, was tested using several ophthalmic filters under various atmospheric conditions. The tests were conducted in an atmosphere chamber whose walls were 400 or 7,000 ft.-L; panel luminances ranged from 0.1 to 0.43 percent of fog room wall luminances; fog simulation conditions represented 50 and 75 percent fog. Six Ss participated; 10,000 judgments were recorded and analyzed.
T. G. I.

19,229
Adams, R.J. & Stanmeyer, W.R. ANTARCTIC 'DAY' OF A NAVAL DENTIST. J. Amer. dent. Ass., Aug. 1959, 59, 322-326. (USN Medical Research Lab., New London Submarine Base, Conn.). (MRL Rep. 325).

19,229
The dentist's activities in the antarctic were recounted. His professional duties were to care for the routine and emergency dental needs of the personnel and to organize and conduct a study of the effects of the stresses of antarctic life on oral health; other activities included assisting in construction of office and quarters, assisting in shoveling snow into snowmelters to provide the water supply for the office, and washing the dental linen supplies. The oral health program consisted of periodic examinations to detect changes in soft tissue health, dental materials performance, and any other aspects of oral hygiene that might lead to more serious and general physical breakdown.
I. R 5

19,230
Auwood, J.A. METHODS OF COMPUTING SIMPLE STATISTICS BY MEANS OF THE TYPE 026 CARDPUNCH AND TYPE 082 CARD SORTER. Proj. MR005.14 2100 1.09, Rep. 349, Feb. 1961, 8pp. USN Medical Research Lab., New London Submarine Base, Conn.

19,230
This report briefly describes the IBM card, the IBM 026 card punch, the 082 card sorter, and proper coding and card punching methods. Procedures for obtaining frequency distributions and computing simple descriptive statistics (e.g., mean, standard deviation, median) using the two IBM machines and a desk calculator are presented and the limitations of these techniques are discussed.
T. I. R 5

19,231
Anderson, T.W. SOME CONFIDENCE BOUNDS FOR DETERMINANTAL ROOTS. Contract NONR 266(33), Proj. NR 042 034, Rep. CU 58 61, Aug. 1961, 23pp. Mathematical Statistics Dept., Columbia University, New York, N.Y.

19,231
The case of two covariance matrices is considered. On the basis of F-distributions, confidence bounds for all roots of one population covariance matrix relative to the other are derived. These consist of multiples of the smallest and largest roots of one sample covariance relative to the other. The main result of the paper is the derivation of the shortest bounds for this case. Confidence bounds also are derived for all roots in a problem of several samples and for some ordered roots in a two-sample problem.
R 7

19,232
Arnest, R.T. ATMOSPHERE CONTROL IN CLOSED SPACE ENVIRONMENT (SUBMARINE). Proj. MR005.14 3002 9.01, Rep. 367, Dec. 1961, 35pp. USN Medical Research Lab., New London Submarine Base, Conn.

19,232
The toxicological problems associated with the enclosed space environment of submarines are summarized and the current state of development of tools for measuring and removing these problem subetances is reviewed. Section I covers sources of contaminants, classification of toxic materials based on physiological considerations, respiratory and circulatory data for determining human exposure, and 31 specific toxicological effects of compounds important and peculiar to this environment. Section II covers instruments for sensing airborne contaminants--the atmosphere analyzer (plus portable monitors), the thermal conductivity Freon leak detector, and a variety of tube tests. Section III reviews the factors and equipment which contribute to air purfication.
I. R 3

19,233
Heinemann, R.F.D. THE RELATIONSHIP BETWEEN THE DIFFICULTY LEVEL AND KIND OF TRACKING PROBLEM AND THE TYPE OF TRACKING AND TYPE OF CONTROL. NAVTRADEVCEN TR 342 4, Oct. 1961, 52pp. USA Training Device Center, Port Washington, N.Y.

19,233
Tracking performance is investigated in terms of: mode of control--position versus rate, mode of tracking--pursuit versus compensatory, type of problem--variable versus constant rate, and difficulty level of problem--less versus more difficult. Time-off-target and integrated error scores are the performance measures of 48 soldiers inexperienced in tracking. Separate analyses of variance are computed for groupings of the early sessions to determine the relationships among the four variables after performance leveled off; comparable analyses are made of two samples of Ss, divided according to difficulty level of problem, and for performance measures.
T. G. R 2

19,234
Ozkaptan, H., Wohl, J.G., Grant, G., Folley, J.D., Jr., et al. HUMAN FACTORS IN MAINTENANCE. A PANEL REPORT OF ANNUAL MEETING OF HUMAN FACTORS SOCIETY AT UNIVERSITY OF CALIFORNIA, LOS ANGELES, 18 SEPTEMBER 1959. 50pp. USN Training Device Center, Port Washington, N.Y. (Grumman Aircraft Engineering Corporation, Bethpage, N.Y.).

19,234
The five papers contained herein represent a comprehensive approach to the maintenance problems of complex electronic equipment which takes into account the interrelationships of design, training, manuals, and general operating problems. The specific topics include: an operations analysis of maintenance problems, design for maintainability, simplification of maintenance without automation, simplifying maintenance training, and the Polaris maintenance system.
T. G. I. R 21

19,235
Ohio State University Research Foundation. CONSONANT INTELLIGIBILITY WITH SELECTED VOWELS IN QUIET AND NOISE. Contract AF 19(604) 6179, Proj. 7684, Task 768402, AFESD TN 61 36, May 1961, 10pp. Ohio State University Research Foundation, Columbus, Ohio.

19,235
Measurement of constant intelligibility at low intensities is compared with a standard procedure using random masking noise. Four trained speakers record the stimuli, 19 syllables with the consonant-vowel pairings for (ee), (i), (e), and (o) in both the initial and final positions, plus the vowel in isolation. Two groups of six phonetically trained Ss are listeners; one hears the stimuli at each of five low-signal intensities (plus 4 to plus 28 db above average detection threshold), the other with each of five signal-to-noise ratios (plus 2 to plus 20 db above threshold). Responses at various levels of quiet and noise and of signal intensity are compared for the 50 percent intelligibility criterion. Reliability and variability of testing consonant intelligibility at low intensities are examined. T. R 3

19,236
Moser, H.M. RESEARCH INVESTIGATIONS ON VOICE COMMUNICATION IN NOISE. FINAL REPORT. Contract AF 19(604) 6179, ESD TDR 62 5, RF Proj. 1080, May 1961, 8pp. Ohio State University Research Foundation, Columbus, Ohio.

19,236
This is a summary of one year's research on International Language for Aviation. Areas of study are: the intelligibility of words, syllables, and speech sounds in noise; comparisons of intelligibility in random noise and at low signal intensities; construction and intelligibility testing of various kinds of word lists; intelligibility and confusability of English vowels, diphthongs, and consonants; and use of the syllable as a functional speech unit for predicting confusability and intelligibility of words. The abstracts of nine reports are included.

19,237
Moser, H.M., Oyer, H.J. & Fotheringham, W.C. ORTHOGRAPHIC REPRESENTATIONS OF THE ENGLISH PRONUNCIATION AS AN AID IN TEACHING ILA. SUPPLEMENT NO. 1. Contract AF 19(604) 4575, AFCRC TN 59 75, 1959, 12pp. Ohio State University Research Foundation, Columbus, Ohio.

19,237
This supplement is a list of Greek orthographic spellings of air traffic control words and phrases. It has not yet been evaluated experimentally.

19,238
Moser, H.M. & Fotheringham, W.C. INTELLIGIBILITY OF BEGINNING AND ENDING CONSONANTS WITH THE VOWEL (I). Contract AF 19(604) 6179, AFESD TN 61 37, RF Proj. 1080, Tech. Rep. 65, May 1961, 18pp. Ohio State University Research Foundation, Columbus, Ohio.

19,238
This study tested the intelligibility of the beginning and ending consonants and the effects of speaker and sex on consonant intelligibility. Consonants and consonant clusters with the vowel (I) were selected to form syllables representing parts of common words. Four trained speakers spoke 52 beginning and 52 ending stimuli in random noise (plus ten signal-to-noise ratio) to 11 phonetically-trained listeners. The data were examined statistically to determine the relationships between the intelligibilities of: 1) speakers and consonant, 2) initial versus final consonants, 3) consonants and consonant clusters, and 4) initial and final consonants. Principal confusions were examined also.
T. G. R 7

19,239
Strasel, H.C., Regan, R.A. & Glaser, R. INVESTIGATIONS OF MACHINE-ASSISTS TO OPERATOR PERFORMANCE: II-AN ILLUSTRATIVE GUIDE TO THE APPLICATION OF MACHINE-ASSIST PRINCIPLES. Contract NONR 624(11), Tech. Rep. 2, Oct. 1961, 76pp. Engineering Psychology Lab., Psychology Dept., University of Pittsburgh, Pittsburgh, Penn.

19,239
"The purpose of this Guide is to provide specific machine-assist principles and recommendations for potential application in the development and/or redesign of job and task characteristics for perceptual-motor operator tasks." Selected naval jobs are analyzed into generalized job-tasks and experimental data are collected concerning perceptual-motor tasks relevant to these job-tasks. The job-tasks and task variables are synthesized and machine-assist groupings are derived from the experimental data. Each machine-assist principle is accompanied by author and year of study on which the recommendation is based. The implications and limitations of the machine-assist concept and of the specific machine-assists contained herein are discussed.
T. R 173

19,240
Sapirstein, L.A. & Ogden, E. THE CORONARY HEMODYNAMIC RESPONSE TO ENVIRONMENT. Contract AF 33(616) 6928, Proj. 7163, Task 716302, ASD TR 61 616, Nov. 1961, 34pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio. (Ohio State University Research Foundation, Columbus, Ohio).

19,240
This report presented the results of investigations aimed at determining the nature of the cardiovascular malfunction in dogs that accompanies the wearing of bladder-type partial pressure suits. The suit was applied to the anesthetized dog following venous and arterial catheterizations. Pressures of 100 and 200 mm of mercury for exposure periods of 10, 20, and 60 min. were tested; gas used in all cases was 100 percent oxygen. Measurements obtained were: cardiac output by the Stewart-Hamilton technique, regional blood flow distribution by a modification of the Fick principle, arterial pressures, and blood volume--plasma and hematocrit. Origin of the circulatory failure suggested from the findings was discussed in detail.
I. R 16

19,241
Steele, W.E. MOTION SICKNESS AND SPATIAL PERCEPTION. A THEORETICAL STUDY. Projs. 7210 & 7232, Tasks 71701 & 71789, ASD TR 61 530, Nov. 1961, 23pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio.

19,241
"Theories of motion sickness are reviewed and compared with a new theory in which the activity of the central nervous system is more important than the intensity or modality of sensory stimulation. Concepts treated are the development and validation of an inertial reference frame; the perceptual transformation of sensory data, which reduces its content, increases its reliability and can incorporate compensations for environmental variables; and the consequences of perceptual inadequacy."
I. R 63

19,242
Newman, K.M. & Davis, A.R. A COMPARISON BETWEEN SPATIAL AND ALPHABETIC ENCODING OF INFORMATION ON A VISUAL DISPLAY. S ROO1 01 01, Task 0401 (NEL Z1 16), Rep. 1084, Dec. 1961, 55pp. USN Electronics Lab., San Diego, Calif.

19,242
Spatial versus alphabetic encoding of information on visual displays is compared for both decoding (identification) and localization (searching) tasks. Display is two 36-cell light panels set at right angles; target message vocabulary (designated by experimenter) is 15 two-letter abbreviations in six categories; message is one two-letter item from each category. Half the Ss (eight enlisted men) have space-division labels as part of their display and half do not. In part I, S must decode one of 27 messages on the display for 27 successive presentations under each of eight experimental conditions (varying amounts of spatially encoded information in each category). In II, S must search for and locate two of the 27 messages. Analyses of variance and correlation coefficients are performed. T. G. I. R 8

19,243
Hufford, L.E. & Coburn, R. OPERATOR PERFORMANCE ON MINIATURIZED DECIMAL-ENTRY KEYSETS. PO 06401, S R006 09 02, Task 5742(NEL N5 5), Rep. 1083, Dec. 1961, 19pp. USN Electronics Lab., San Diego, Calif.

19,243
This study examines designs for miniaturized decimal-entry keysets and compares operator performance on the miniature ketsets with that on the standard-size keyset. Three miniature designs ("touch" and two types of probe-actuated and a standard ten-key serial-entry apparatus) are tested by 12 Ss having some training in the use of keysets. The experimental conditions are two modes of stimulus presentation (visual and aural) and four keysets. The task is to enter on the keyset each of six three-digit numbers which are presented, aurally or visually, at each of six rates: 28, 23, 18, 15, 12, and 10 sec. Mean error score differences between the various conditions are evaluated statistically by t-tests. Average time scores are compared for self- and forced-pacing conditions. T. G. I. R 3

19,244
Holdrege, F.E., Lawrence, H.G., Kagihara, R.H. & Born, G. ITERATIVE ITEM ANALYSIS. Proj. 7719, Task 771902, ASD TN 61 148, Dec. 1961, 10pp. USAF 6570th Personnel Research Lab., Lackland AFB, Tex.

19,244
This paper proposes a method of weighting individual items which employs part correlation coefficients to obtain maximum test-criterion correlation. A relatively easy method for graphical solution of the part correlation formula is presented which makes the proposed analysis feasible without an electronic computer. The technique produces results comparable to those obtained from standard iterative multiple regression techniques. It is applied to a practical item selection problem to demonstrate predictability. Further studies are suggested to determine applicability to other item types.
T. G. R 8

19,245
Gagne, R.M. & Paradise, N.E. ABILITIES AND LEARNING SETS IN KNOWLEDGE ACQUISITION. Psychol. Monogr., 1961, 75(14), 23pp. (Princeton University, Princeton, N.J. & University of Maryland, Baltimore, Md.).

19,245
The learning set hierarchy theory is used to analyze a learning program. Analysis consists of successive applications of learning sets which are increasingly simple and general (potentially supportive of greater numbers of superordinate sets). Seventh graders are given factor reference tests to measure basic abilities relevant to the task (solving linear algebraic equations). Measures obtained of learning rate for each learning set during the program, and of achievement and transfer following it are presented and discussed. Correlation coefficients are computed between abilities and learning sets and among learning sets. Findings "emphasize the importance of measures of rate of learning as criteria against which the predictive efficiency of an aptitude test may be assessed." T. G. I. R 8

19,246
Siegel, A.I. & Miehle, W. INFORMATION TRANSFER IN DISPLAY CONTROL SYSTEMS. I. SURVEY AND VARIABLES INCLUDED IN A PROPOSED DISPLAY EVALUATIVE INDEX. Contract DA 039 SC 87230, Proj. 3A99 01 001, Sept. 1961, 44pp. Applied Psychological Services, Wayne, Penn.

19,246
"The logic and basis of an index for evaluating the information transfer characteristics of the displays in a display-human operator-control system are presented. The purpose of the index is to allow comparative, quantitative evaluation of proposed systems while the systems are in the system concept or the early design stages. The index is related to a logic derived from communications theory and includes five bases. The technique for deriving the scores on which the index depends is described by example and proof of the independence of the variables which form the substrate of the index is offered."
T. I. R 4

19,247
Kenst, D.N. ACOUSTICAL EVALUATION OF F-102 PRODUCTION SILENCER-CONVAIR, SAN DIEGO. Contract AF 33(616) 3938, Proj. 7210, Task 71708, WADC TN 57 390, Nov. 1961, 47pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio. (Bolt Beranek and Newman, Inc., Cambridge, Mass.).

19,247
This report presents the results of an acoustical evaluation of the F-102 production silencer enclosure at Convair, San Diego. Description and diagrams of the silender and the highlights of the measurement techniques are included. Numerous acoustical measurements (SPL) in and around the silencer are reported, e.g., every 15 degrees on a circle 250 ft. from the center of the cell during engine operation at several operating conditions. Also noise reductions of the various elements of the acoustical treatment--air passages, doors, and walls--and of the silencer as a whole are presented.
T. G. I. R 12

19,248
Loret, B.J. OPTIMIZATION OF MANNED ORBITAL SATELLITE VEHICLE DESIGN WITH RESPECT TO ARTIFICIAL GRAVITY. Proj. 7184, Task 718405, ASD TR 61 688, Dec. 1961, 46pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio. (USAF Institute of Technology, Wright-Patterson AFB, Ohio).

19,248
This study provides specific design criteria and an optimum configuration for manned orbital satellite vehicles which are rotated to create artificial gravity. The configuration is based on human factors, engineering, and operational considerations. The first step in the investigation involves an analysis of the artificial gravity environment and its peculiarities in terms of static and dynamic forces. Next, human factors are considered (man's ability to maintain his orientation, equilibrium, and efficiency in this environment) and a human factors design envelope and some design principles are established. Finally, several possible vehicle configurations are compared and an optimum one selected. Some recommendations for future research conclude the report. G. I. R 41

19,249
Hertzberg, H.T.E. NYLON NET SEAT FOR A MODIFIED RB-57 AIRCRAFT. Proj. 7222, Task 71749, ASD TR 61 206, Dec. 1961, 5pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio.

19,249
"A light-weight, adjustable, easily demountable net seat for persons who must operate in cramped quarters is described. Tests lasting for more than a year in a modified RB-57 have shown the seat to be fully satisfactory. Design drawings and photographs of the method of installation are included."
I. R 2

19,250
Graveline, D.E. MAINTENANCE OF CARDIOVASCULAR ADAPTABILITY DURING PROLONGED WEIGHTLESSNESS. Proj. 7222, Task 722201, ASD TR 61 707, Dec. 1961, 8pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio.

19,250
This article presented the results of the initial evaluation of multiple limb tourniquets for possible application in prolonged zero-gravity conditions. Ss were five healthy young men; all wore a modified "dry" skin diving suit in the immersion tank. Each S was immersed for a six-hour period with and without tourniquet protection. Orthostatic tolerances for each condition were determined by tilt-table testing, using a 90-degree tilt for ten min. Blood pressure and EKG records were obtained at one-min. intervals. The relation between this technique and the oscillating bed principle was indicated briefly.
G. I. R 3

19,251
Gael, S. & Reed, L.E. PERSONNEL EQUIPMENT DATA: CONCEPT AND CONTENT. Proj. 1710, Task 171005, ASD TR 61 739, Dec. 1961, 74pp. USAF Behavioral Sciences Lab., Wright-Patterson AFB, Ohio.

19,251
This study attempts to define empirically the content of Personnel Equipment Data; to examine military specifications and related documents that have Personnel Subsystem implications; and to develop a technique for identifying, extracting, and recording the requirements contained therein. Many specifications, exhibits, bulletins, and standards are reviewed and 18 are selected as relevant. From these, a list of requirements and their locations are compiled and presented in the appendices.
T. R 3

19,252
Wienke, R.E. & Schwartz, I. THE EFFECT OF SPECTACLES AND CONTACT LENSES ON THE RAYLEIGH EQUATION. Die Farbe, 1960, 9(1-3), 49-52. (USN Medical Research Lab., New London Submarine Base, Conn.). (MRL Rep. 356).

19,252
The effect of optometric correction with spectacles and with contact lenses on color mixtures of green and red was determined. A MacAdam colorimeter with a ten-degree bipartite field was employed. Four observers—two myopes, a hyperope, and an emmetrope—made 30 matches with their usual spectacles and 30 following adjustment to their contact lenses. The red/green ratios for these two conditions were compared and the importance of the findings in the establishment of color mixture equations was indicated.
T. R 4

19,253
Wienke, R.E. & Schwartz, I. EFFECT OF CONTACT LENSES ON THE RED/GREEN RATIO. Contacto, Nov. 1959, 3(11), 1-2. (USN Medical Research Lab., New London Submarine Base, Conn.). (MRL Rep. 328).

19,253
This study compared the effects of spectacles and contact lenses on the red/green ratio. Four Ss—two myopes, a hyperope, and an emmetrope—were tested using a MacAdam colorimeter with a ten-degree bipartite field, red and green on one side, yellow and blue on the other. Ss made 30 matches using spectacle lenses and 30 after a suitable period of acclimation to contact lenses. The refractive errors and red/green ratios for the right eye of all Ss were tabulated and compared for the two lens conditions. The findings were briefly discussed in terms of everyday color discrimination.
T. R 5

19,254
Schaefer, K.E. SELECTING A SPACE CABIN ATMOSPHERE. Astronautics, Feb. 1959, 4(2), 28-29, 104, 106. (USN Medical Research Lab., New London Submarine Base, Conn.). (MRL Rep. 323).

19,254
This summary of the multiple factors which must be considered in preparing a space cabin or "closed system" was compiled from experiences with submarines and aircraft. Three problems were examined specifically: the carbon dioxide problem, the role of trace substances of a toxic nature, and changes in man's normal diurnal cycle.
I.

19,255
Liebow, A.A., Stark, J.E., Vogel, J. & Schaefer, K.E. INTRAPULMONARY AIR TRAPPING IN SUBMARINE ESCAPE TRAINING CASUALTIES. US Armed Forces med. J., March 1959, X(3), 265-289. (USN Medical Research Lab., New London Submarine Base, Conn.). (MRL Rep. 330).

19,255
Two casualties of submarine escape training are reported in detail. These cases both suffered interstitial emphysema and air embolism. The role of involuntary intrapulmonary air trapping in each case is discussed. Also, the problem of detecting persons liable to suffer involuntary air trapping when breathing air at supra-atmospheric pressure and subjected to the stress of rapid decompression is discussed. Several categories of such persons are indicated. It is felt that these findings should be of civilian interest due to skin diving with self-contained underwater breathing apparatus.
T. I. R 18

19,256
Kern, J.D. THE ETIOLOGY AND PATHOLOGICAL PHYSIOLOGY OF DECOMPRESSION SICKNESS. Proj. MR005.14 3100 2.02, MRL Rep. 345, Dec. 1960, 26pp. USN Medical Research Lab., New London Submarine Base, Conn.

19,256
This is "a rather comprehensive analysis of the available literature covering the physiological phenomena experiences of personnel subjected to pressure changes incident to diving and flying." The findings are considered under the following topics: necropsy; bubble formation, growth and shrinkage; tissue factors in bubble formation; factors in bubble formation in the blood; embolic phenomena; venous and arterial air emboli; fat embolism and fatty liver; and effects of decompression on sealed gas-containing body cavities. Some recommendations for further research are included.
R 33

19,257
Luria, S.M. & Kinney, Jo Ann S. THE INTERRUPTION OF DARK ADAPTATION. Proj. MR005.14 1001 1.21, MRL Rep. 347, Feb. 1961, 6pp. USN Medical Research Lab., New London Submarine Base, Conn.

19,257
This study determined the times required for the dark-adapted eye to regain threshold sensitivity after exposure to red or white lights of various intensities and durations. The interrupting stimuli were .06, 6.0, or 45.0 ft.-L and 5, 10, 15, or 20 sec. The course of dark adaptation was followed using the Hecht-Shlaer adaptometer. Two observers participated; each served three times for each test condition. The resultant recovery times were compared to those obtained under similar condition by other investigators. The relative importance of brightness and duration of the interrupting stimulus was discussed.
G. R 8

19,259
Weybrew, B.B. THE IMPACT OF ISOLATION UPON PERSONNEL. Report from: "Human Factors and the Work Environment. A Symposium Presented by the New York State Society of Industrial Medicine, Inc., September 28, 1960." J. occup. Med., June 1961, 3(6), 290-294. (USN Medical Research Lab., New London Submarine Base, Conn.). (MRL Rep. 358).

19,259
From a survey of the literature, the author attempts to identify some of the psychological effects of prolonged periods of isolation and confinement. The two main sources of information are laboratory studies, particularly those at McGill, and submariner confinement studies out of New London. From the first group the findings indicate a variety of perceptual changes, some minor intellectual impairment, and some physiological changes. The confinement studies show changes in personal motivation and group morale, interpersonal relationships, muscular tonus, and sleep habits. The importance of precise assessment techniques for selecting personnel for such environments is emphasized; five selector factors are indicated.
G. R 11

19,260
Perlitsh, M.J., Nielsen, A.G. & Stanmeyer, W.R. ASCORBIC ACID PLASMA LEVELS AND GINGIVAL HEALTH IN PERSONNEL WINTERING OVER IN ANTARCTICA. J. Dent. Res., July-Aug. 1961, 40(4), 789-799. (USN Medical Research Lab., New London Submarine Base, Conn.). (MRL Rep. 359).

19,260
The relationship between ascorbic acid plasma levels and gingival health in 26 men, ages 21 to 37 years, exposed to the stress of an antarctic winter (1957 to 1958) was presented. Ss (13 indoor and 13 outdoor workers) had monthly dental examinations; blood samples for hematologic and blood chemistry analyses and ascorbic acid determinations, and intraoral colored photographs were taken; a monthly health diary indicating S's physical and psychological well-being was kept. The ascorbic acid plasma data were examined for the groups by an analysis of variance that took into account the effects of correlation between the monthly measurements. Gingival health was compared on the basis of intensity and number of inflamed areas. Implications of the findings were presented. T. G. R 11

19,261
Heybrew, B.B. & Parker, J.W. BIBLIOGRAPHY OF SENSORY DEPRIVATION, ISOLATION AND CONFINEMENT. Task MR005.14 2100.03.04, Memo. Rep. 60 1, Jan. 1960, 9pp. USN Medical Research Lab., New London Submarine Base, Conn.

19,261
This bibliography contains 146 publications in the area of sensory deprivation, isolation, and confinement. The entries are categorized as follows: review articles, anecdotal literature, and experimental literature—reduction of level or variability of stimulation, confinement peculiar to space flight, confinement peculiar to submarine environment, sociological and prison confinement, animal studies, theoretical articles, and miscellaneous.
R 146

19,262
Walk, R.D. & Gibson, Eleanor J. A COMPARATIVE AND ANALYTICAL STUDY OF VISUAL DEPTH PERCEPTION. Psychol. Monogr., 1961, 75(15), 44pp. (George Washington University, Washington, D.C. & Cornell University, Ithaca, N.Y.).

19,262
Is visual discrimination of depth downward at an edge present in animals of different species and ages; is it detectable by the avoidance tendency; does the avoidance tendency increase with drop increase; what conditions or cues operate in this discrimination; does visual experience have a role in promoting this discrimination? A "visual cliff" apparatus is used; a glass sheet covers the entire surface; the animal is placed on a center board and allowed to descend to the optically shallow or deep surface. Position preferences, odor cues, and extraneous stimulation are equated by procedural techniques; effects of different textures, depths of surface, numbers of trials, and sexes are tested. Comparative studies are made for the discrimination responses of various animals and human infants. T. G. I. R 44

19,263
Waugh, J.D. & Holland, H.H., Jr. MUZZLE BLAST MEASUREMENTS ON XM81 GUN-LAUNCHER. OMS Code 5510.12.251BO.01, HEL TM 20 61, Dec. 1961, 19pp. USA Ordnance Human Engineering Labs., Aberdeen Proving Ground, Md.

19,263
The effects of gun-blast upon exposed crew and supporting infantry on and around a tank-mounted XM81 gun-launcher were studied to determine which of four muzzle configurations is least objectionable and what (if any) safety problems are associated with the configurations. Also, the blast levels on exposed optical-electronic equipment positions were measured for purposes of design. All measurements were taken using piezoelectric pressure-sensitive gages. Measurements of peak overpressure, positive impulse, and duration of positive phase were obtained at each of eight positions on and around the tank. These data were compared with known data on human tolerance limits. Recommendations on the use of ear protection devices were included.
T. G. I. R 8

19,264
Hertzman, A.B. REGULATION OF CUTANEOUS CIRCULATION DURING BODY HEATING. Contract AF 33(616) 7077, Proj. 7222, Task 722204, ASD TR 61 740, Dec. 1961, 23pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio. (Saint Louis University, Saint Louis, Mo.).

19,264
This is a summary of currently available information on the regulation of the cutaneous circulation during exposure of the resting nude S to environmental heat. Emphasis is on those adjustments which pertain primarily to the vascular transfer of heat to the skin. The influence of several factors on cutaneous blood flow are discussed: vascularity of skin, vasomotor innervation of skin, regional cutaneous vascular responses to rising ambient temperature, local skin temperature and local skin blood flow, and local sweating and local skin blood flow. The regulation of the vascular convection of heat to the skin is examined in terms of skin pulses and cutaneous venous responses. The effects of dehydration on circulation are mentioned.
T. G. R 55

19,265
Regan, R.A. FACILITATION OF SIGNAL DETECTION BY THE USE OF ARTIFICIAL SIGNALS AND BY THE USE OF LONGER VIEWING TIME. Contract NONR 624(11), Tech. Rep. 3, Oct. 1961, 30pp. Psychology Dept., University of Pittsburgh, Pittsburgh, Penn.

19,265
Experiment I investigated the efficiency of performance in a monitoring task utilizing the observing-response technique implemented with artificial signals; II differed only in the use of a longer viewing time for each observing response. The task was to monitor a voltmeter display by depressing a button to illuminate the dial, i.e., the observing response, during four successive, continuous half-hour periods; 12 real signals were presented during each period and a variable-interval schedule of artificial signals was added for the last two periods. Ss were 13 students who had been familiarized with the apparatus. Three quantitative measures--real signal detection, total signal detection, and total number of observing responses--were evaluated by analyses of variance. T. G. R 14

19,266
Robinson, F.R. & Hamlin, R.L. THE ELECTROCARDIOGRAM AND VECTOCARDIOGRAM OF NORMAL MACACA MULATTA IN DORSAL-SUPINE, RIGHT-LATERAL, LEFT-LATERAL, AND SITTING POSITIONS. Proj. 7231, Task 723101, ASD TR 61 738, Dec. 1961, 13pp. USAF Biomedical Lab., Wright-Patterson AFB, Ohio.

19,266
This study is designed to provide normal electrocardiographic and vectorcardiographic values for monkeys (five male and six female) in dorsal-supine, right-lateral, left-lateral, and sitting positions. For the EKG the leads taken are I, II, III, aVR, aVL, aVF, MV_1, MV_2, MV_3. From lead II several parameters are analyzed: rhythm, rate, PR interval, P wave duration, PQ segment duration, and QRS duration. Mean P vector projection in the frontal plane is calculated. Amplitudes of the component deflections in leads I, aVF, and MV_1 also are determined. Vectorcardiograms are analyzed for: direction of inscription, ratio of length to width, and the mean axis of the QRS vector projected on the three planes for each body posture.
T. G. I. R 13

19,267
Fisher, F.R. (Ed.). MAN LIVING IN THE ARCTIC. PROCEEDINGS OF A CONFERENCE. USA QUARTERMASTER RESEARCH AND ENGINEERING CENTER, NATICK, MASSACHUSETTS. 1-2 DECEMBER 1960. 1961, 143pp. National Academy of Sciences - National Research Council, Washington, D.C.

19,267
This conference, sponsored jointly by the Army, Academy-Research Council, and Arctic Institute of North America, had three general aims: to honor the contributions of the arctic pioneers, to take stock of present capabilities, and to look forward to military and civilian needs of the future. It was conducted in four sessions: the arctic, Quartermaster Corps contributions to man living in the arctic, scientific approaches to solving the problems of man living in the arctic, and the expanding utilization of the arctic. Abstracts of individual pages follow (see 19,268 through 19,276).
T. G. I. R 67

19,268
Siple, P.A. LIMITATIONS TO LIVING IN THE POLAR REGIONS. Report from: "Man Living in the Arctic. Proceedings of a Conference. USA Quartermaster Research and Engineering Center, Natick, Massachusetts. 1-2 December 1960," 1961, 14-17. National Academy of Sciences - National Research Council, Washington, D.C. (USA Office of the Chief of Research and Development, Washington, D.C.).

19,268
The basic requirements for modern man to settle permanently in the arctic are indicated: family life, livelihood, and a communication and road network. Some of the problems encountered in making the polar regions acceptable on such a basis and the over-all contributions of the military and science toward the solutions are mentioned briefly.

19,269
Hammel, H.T. THE COLD CLIMATE MAN. Report from: "Man Living in the Arctic. Proceedings of a Conference. USA Quartermaster Research and Engineering Center, Natick, Massachusetts. 1-2 December 1960," 1961, 17-34. National Academy of Sciences - National Research Council, Washington, D.C. (Medical School, University of Pennsylvania, Philadelphia, Penn.).

19,269
A physiological survey of numerous cultures of men exposed to cold was discussed. Observation was made during eight hours of moderate cold exposure at night at ten-day intervals over a six-week period; apparatus consisted of a ventilated hood (to collect air) and thermocouples (to measure temperatures); S lay on a cot in an unheated tent with head in hood and thermocouples in place. Measures were taken of oxygen consumption; rectal, mean body, and average skin temperature; and heat production. Groups were Norwegians, central Australian aborigines, Alaskan Indians, Arctic Indians, Eskimos, and nomadic and village Lapps. Graphs of comparison were made within and between groups; three patterns of response were recognized and discussed.
G. I. R 8

19,270
Belding, H.S. PHYSIOLOGICAL PRINCIPLES FOR PROTECTION OF MAN IN THE COLD. Report from: "Man Living in the Arctic. Proceedings of a Conference. USA Quartermaster Research and Engineering Center, Natick, Massachusetts. 1-2 December 1960," 1961, 49-56. National Academy of Sciences - National Research Council, Washington, D.C. (University of Pittsburgh, Pittsburgh, Penn.).

19,270
This paper discusses the results of some studies dealing with various aspects of cold weather protection; specific topics include: sleeping bags and their design, control of blood flow to the extremities, methods of warming the body following cold exposure, local application of heat inside the clothing, and the problem of sweat retention in clothing.
R 11

19,271
Kennedy, S.J. CLOTHING AND PERSONAL PROTECTION. Report from: "Man Living in the Arctic. Proceedings of a Conference. USA Quartermaster Research and Engineering Center, Natick, Massachusetts. 1-2 December 1960," 1961, 56-67. National Academy of Sciences - National Research Council, Washington, D.C. (USA Quartermaster Research & Engineering Command, Natick, Mass.).

19,271
The development of adequate and effective cold climate clothing (including arctic footgear, sleeping bags, and a lightweight four-to-six-man tent) for USA use is reviewed and two principles based on previous research are evolved: 1) that cold climate clothing derives its efficiency from its entrapment of still air and 2) that a "layer" clothing system should be employed. Current improvements in the clothing assembly are reported--new type of face and neck protection, substantial weight reduction of assembly through use of new lighter weight fabrics, new water-repellent launderable finish for textiles, better insulated boots, new types of headgear, and auxiliary heating devices. Biophysics of clothing, functional design of clothing, and materials research are suggested approaches for future research.

19,272
Robison, W.C. QUARTERMASTER ENVIRONMENTAL RESEARCH IN THE ARCTIC. Report from: "Man Living in the Arctic. Proceedings of a Conference. USA Quartermaster Research and Engineering Center, Natick, Massachusetts. 1-2 December 1960," 1961, 71-77. National Academy of Sciences - National Research Council, Washington, D.C. (USA Quartermaster Research & Engineering Command, Natick, Mass.).

19,272
The Quartermaster program on environmental research was reviewed briefly. Its over-all aim has been to study various aspects of climate, terrain, and vegetation to the degree that these have a demonstrable relation to military problems of equipment, personnel, and operational functions. Specifically, the objectives of the arctic research program were outlined along with the general nature of the results thus far. The studies fell into three areas: total natural environmental studies, cold stress determinations, and terrain problems in northern regions. Finally, the interservice nature of the work and application of findings were emphasized.

19,273
Blair, J. HEALTH MAINTENANCE. Report from: "Man Living in the Arctic. Proceedings of a Conference. USA Quartermaster Research and Engineering Center, Natick, Massachusetts. 1-2 December 1960," 1961, 79-91. National Academy of Sciences - National Research Council, Washington, D.C. (USA Standardization Group, Ottawa, Ontario, Canada).

19,273
This paper is concerned with man's health problems in the arctic when he is a member of a small isolated group or living in a survival situation. The major summer problem is insect control; the winter problems stem from wet-cold, dry intense cold, and severe wind-chill conditions. The five factors which determine the state of health and efficiency of man are discussed in terms of present available knowledge and gaps in knowledge for future research efforts. These factors are: selection and training of personnel, environmental protection of personnel, adequate supply of food and water, proper waste disposal, and management of medical emergencies.
T. G. I. R 10

19,274
Edholm, O.G. PHYSIOLOGICAL PROBLEMS IN POLAR REGIONS. Report from: "Man Living in the Arctic. Proceedings of a Conference. USA Quartermaster Research and Engineering Center, Natick, Massachusetts. 1-2 December 1960," 1961, 91-100. National Academy of Sciences - National Research Council, Washington, D.C. (National Institute for Medical Research, London, England).

19,274
Some observations and findings on man's life and activities in Polar regions are presented. Types of information obtained include time and motion records, amount of time spent in- and outdoors, subclothing temperature measurements, outside temperature and windspeed measurements, and energy expenditure measured during different activities. Suggestions for further physiological investigations include repetition of activity and exposure study, problems of outdoor work in the cold, windchill, energy expenditure and food intake, weight change and skin fold thickness, and water balance. Some problems requiring more research are indicated: stress of Polar environment, effects of Polar pattern of day and night, changes in diurnal rhythms, and other evidence of stress. I. R 15

19,275
Rioch, D. McK. PSYCHIATRIC PROBLEMS OF MAN IN THE ARCTIC. Report from: "Man Living in the Arctic. Proceedings of a Conference. USA Quartermaster Research and Engineering Center, Natick, Massachusetts. 1-2 December 1960," 1961, 103-114. National Academy of Sciences - National Research Council, Washington, D.C. (USA Walter Reed Army Institute of Research, Walter Reed Army Center, Washington, D.C.).

19,275
The transition period of arctic travel and mobility, i.e., "from the era of hero explorers...to the era when we will have virtually 'taken our preferred climate with us' by mechanical means and developed a set of acceptable conventions and mores to go with it," has produced psychiatric problems in man in the arctic: distorted thinking patterns leading to wrong decisions made and executed, "carelessness" resulting from lack of personal commitment to group objectives, neuroses and other character and behavior disorders, and difficulties in personnel selection and training. Some research findings on man's biological capacity to deal with arctic environmental stresses and on the factors determining the social-psychological stresses encountered are discussed.
R 20

19,276
Horvath, S.M. SUMMATION: MAN'S FUTURE CONQUEST OF THE ARCTIC. Report from: "Man Living in the Arctic. Proceedings of a Conference. USA Quartermaster Research and Engineering Center, Natick, Massachusetts. 1-2 December 1960," 1961, 115-118. National Academy of Sciences - National Research Council, Washington, D.C. (University of California, Santa Barbara, Calif.).

19,276
In summary, many questions remain unanswered. Knowledge of the arctic environment itself, of man's capability to perform and survive therein, of types and designs of protective devices, and of nutritional standards is all badly needed.

19,277
Shackel, B. & Beaney, M. A ZERO CORRECTING SERVO FOR USE WITH D.C. AMPLIFIERS. Electronic Engng., June 1957, 22(352), 284-286. (E.M.I. Electronics Ltd., Hayes, Middlesex, England).

19,277
This zero correcting device for use with direct current amplifiers was designed primarily to null drift voltages which develop in the external input circuits; it also can null amplifier drifts. The main parts of the system are the trigger element and servo. Circuit diagrams and detailed descriptions are included.
I. R 4

19,278
Ford, A. & Leonard, J.L. TECHNIQUES FOR RECORDING SURFACE BIOELECTRIC DIRECT CURRENTS. NEL Res. Rep. 839, May 1958, 23pp. USN Electronics Lab., San Diego, Calif.

19,278
This paper describes the techniques for recording surface bioelectric d.c. which have been adopted at the USN Electronics Laboratory. Some of the numerous uses for d.c. recording are indicated, e.g., EMG, EEG, EKG, as well as the problem of d.c. artifacts and bioelectric overlap. General principles for avoiding electrode artifacts, use of chlorided silver, and the detailed mechanics of electrode preparation are discussed, along with preparation of skin, methods of electrode placement, and effects of electrode area. Finally, the proper instrumentation for use with such electrodes is described.
G. I. R 16

19,279
Day, R.H. & Logan, J.A. A FURTHER INVESTIGATION OF APPARENT SIZE AND RETINAL SIZE AS DETERMINANTS OF THE FIGURAL AFTER-EFFECT. Quart. J. exp. Psychol., Nov. 1961, XIII(Part 4), 193-203. (Psychology Dept., University of Sydney, Sydney, Australia).

19,279
Previous experiments on the relationship between apparent and/or retinal size of the stimulus figure (SF) and the direction of the figural aftereffect were reviewed and two experiments reported. 1) Direction of change in perceived size of a test figure (TF) following fixation of an inspection figure (IF) of the same angular size but of larger and smaller apparent sizes was studied using discs and annuli; S compared TF with the comparison figure before and after fixation of IF and judged TF as larger, equal, or smaller; viewing was monocular. Data were analyzed by chi square and Myers' exact probability treatment. 2) SFs were reduced in size; viewing was binocular; remaining conditions, procedure, and analyses aproximated those in (1).
T. R 12

19,280
Story, Anne W. HAS APPARENT SIZE BEEN TESTED AS A FACTOR IN FIGURAL AFTER-EFFECTS? Quart. J. exp. Psychol., Nov. 1961, XIII(Part 4), 204-208. (USAF Operational Applications Research Branch, AFCCDD, Bedford, Mass.).

19,280
To determine whether figural aftereffects (FAE) differ when monocular rather than binocular vision is used and thus to ascertain whether apparent size has been demonstrated to be a factor in FAE, the inspection figure was presented at each of two distances on the left and on the right of fixation; the test figures were presented in pairs on both sides of the fixation; all conditions were viewed binocularly and monocularly (with alternate eyes for inspection and testing). Ss (160), each tested under only one condition, judged which, if either, of the two test circles appeared larger. Several response comparisons were made, e.g., binocular far and near, monocular far and near, and tested for significance by chi square. Results were discussed in terms of the apparent size hypothesis. T. I. R 3

19,281
Terwilliger, R.F. RETINAL SIZE AS A DETERMINER OF THE DIRECTION OF SIZE DISTORTION IN FIGURAL AFTER-EFFECTS. Quart. J. exp. Psychol., Nov. 1961, XIII(Part 4), 209-217. (Rutgers University, New Brunswick, N.J.).

19,281
The hypothesis that the direction of distortion in figural aftereffects is a function solely of the visual angle subtended by the test (T) figure in relation to that subtended by the inspection (I) figure is tested. Stimuli are line circles: I-figure, a circle to the right or left of fixation, and T-figure, a pair of circles, one on each side of fixation. The 36 conditions are: 1) I-figure, always subtending same visual angle, but of two sizes viewed at two distances (far and near); 2) T-figures of three sizes viewed at each of three distances. Ss, each run on two conditions (near and far with same figures), make a one-min. inspection followed by T-figures, and judge one as larger than the other.
T. [illegible]

19,282
Wilson, J. IS THE FIGURAL AFTER-EFFECT ACCOMPLISHED BY CHANGES IN DISCRIMINATION? Quart. J. exp. Psychol., Nov. 1961, XIII(Part 4), 218-221. (National Physical Laboratory, Teddington, England).

19,282
This experiment was aimed at determining whether an improvement in discrimination accompanies the visual figural aftereffect (FAE). Accordingly, discrimination was tested under conditions which would and would not produce FAE: 1) inspection of vertical straight line and judgment of direction of curvature of vertical slightly curved line, 2) inspection of horizontal straight line followed by same judgment, and 3) a control condition—inspection of curved vertical line followed by same judgment. Ten Ss made 22 judgments for each condition; inspection was 15 sec. and test presentation was one sec. The proportion of correct judgments for the two experimental conditions was compared by chi-square test.
T. R 4

19,283
Sutherland, N.S. FIGURAL AFTER-EFFECTS AND APPARENT SIZE. Quart. J. exp. Psychol., Nov. 1961, XIII(Part 4), 222-228. (Institute of Experimental Psychology, Oxford University, Oxford, England).

19,283
This discussion of the relationship between figural aftereffects (FAE) and apparent size is prompted by the unreproducibility of results previously obtained by the author when small variations in experimental conditions are made. The original findings suggest that when retinal size of test and inspection figures is equal, the direction of the FAE may be determined by the relative apparent sizes of the two figures. Variations which produce different results are: monocular versus binocular viewing, smaller sized circles as stimuli, outline versus filled-in circles; explanations are offered. A new theoretical approach to FAE phenomena, based on some analysis of the stimulus being performed before that stage of the nervous system at which the process underlying FAE occurs, is given. T. I. R 12

19,284
Reed, G.F. & Smith, A.C. LATERALITY AND DIRECTIONAL PREFERENCES IN A SIMPLE PERCEPTUAL-MOTOR TASK. Quart. J. exp. Psychol., May 1961, XIII(Part 2), 122-124. (University of Manchester, Manchester, England).

19,284
This study was aimed at finding whether Ss show any consistency of directional preference in a simple perceptual-motor task and whether this applies to both right- and left-handed writers. Ss, 50 right- and 50 left-handed writers, 9 to 13 years of age, were tested on a stroke-making task with both hands. The tensor (outward) and flexor (inward) movements of hand and arm were compared for the two groups using both hands. The preferences were compared to those obtained by other researchers and discussed in terms of writing habits.
T. R 7

19,285
Halliday, A.M. & Mingay, Rosemary. RETROACTIVE RAISING OF A SENSORY THRESHOLD BY A CONTRALATERAL STIMULUS. Quart. J. exp. Psychol., Feb. 1961, XIII(Part 1), 1-11. (Neurological Research Unit, MRC, National Hospital, Queen Square, England).

19,285
The effect of an electrical warning stimulus to the back of one forearm on the threshold of a similar stimulus (critical) to the opposite forearm was investigated. Five warning stimulus strengths (all suprathreshold) were tested with each of seven strengths of critical (above and below initial threshold) plus an absent condition. Interval between the two stimuli was varied--+500, +100, 0, -100, -500 msec. (negative values--warning signal presented after the critical stimulus). Ten Ss responded yes, no, or doubtful as to the presence of the critical stimulus. The total number of correct responses made was evaluated by analysis of variance; doubtful responses were examined. Distraction, confusion, and excitation and inhibition in central mechanisms were explanations for the effects found. T. G. I. R 14

19,286
Howarth, C.I. & Treisman, M. LOWERING OF AN AUDITORY THRESHOLD BY A NEAR THRESHOLD WARNING SIGNAL. Quart. J. exp. Psychol., Feb. 1961, XIII(Part 1), 12-18. (Psychology Dept., University of Hull, Hull, England & Institute of Experimental Psychology, University of Oxford, Oxford, England).

19,286
The effect of a near threshold visual warning signal on an auditory threshold was examined. The auditory stimulus (AS) was a 40-msec. increment in the intensity of a continuous 500-cps tone at 60 and 70 db; visual stimulus (VS) was ten msec., subtending 14 min. of arc; brightness was determined for each of the three experienced Ss who always knew the interval condition between VS and AS. An experimental session consisted of: pre-warning light, near threshold warning light, and AS. A probit analysis was performed on the corrected probabilities of response for all conditions. Mean differences between auditory thresholds with the warning and simultaneous conditions and between the different brightnesses of the warning signal and the different db values of the AS were compared by t-tests. T. R 13

19,287
Chase, R.A., Harvey, S., Standfast, Susan, Rapin, Isabelle, et al. STUDIES ON SENSORY FEEDBACK. I: EFFECT OF DELAYED AUDITORY FEEDBACK ON SPEECH AND KEYTAPPING. Quart. J. exp. Psychol., Aug. 1961, XIII(Part 3), 141-152. (Yale University School of Medicine, New Haven, Conn.).

19,287
Effects of delayed auditory feedback (DAF) on simple speech and keytapping tasks were examined. Ss were instructed to repeat the sound "b" in groups of three (speech task) and to tap on a key in groups of three (keytapping task); both tasks were done under synchronous and DAF conditions. Continuous performance recordings, measurements of "unit-to-unit time," and intensity were obtained for both tasks. Data were compared for synchronous versus delayed conditions for each task, change in the two measures for the key versus speech task (both by t-tests), and error in number of the key versus speech responses. Pearson product-moment correlation coefficients were computed for several conditions.

19,288
Chase, R.A., Rapin, Isabelle, Gilden, L., Sutton, S., et al. STUDIES ON SENSORY FEEDBACK. II: SENSORY FEEDBACK INFLUENCES ON KEYTAPPING MOTOR TASKS. Quart. J. exp. Psychol., Aug. 1961, XIII(Part 3), 153-167. (Yale University School of Medicine, New Haven, Conn.).

19,288
The effects of different sensory feedback alterations on the rate, amplitude, and pattern characteristics of practiced keytapping performance were studied. For each session of each experimental condition, Ss had a training period, control condition, and experimental condition. Decreased sensory feedback conditions (sfc) were: auditory--masking noise through earphones, visual--tapping hand screened from view, proprioceptive--vibration on forearm, tactile--digital block of tapping finger, and a combination of all four. Delayed sfc were: auditory, visual, tactile, combination of all three, combination plus the digital block. Measures of performance analyzed were unit-to-unit time and intensity scores for each condition; Wilcoxon's paired-replicates test was used; rank order correlations were performed. T. I. R 22

19,289
Sweetland, A. & Haythorn, W.W. AN ANALYSIS OF THE DECISION-MAKING FUNCTIONS OF A SIMULATED AIR DEFENSE DIRECTION CENTER. Behav. Sci., April 1961, 6(2), 105-116. (Rand Corporation, Santa Monica, Calif.).

19,289
Experimental data obtained on the decision-making functions of a simulated air defense center were analyzed. The major functions of the center--surveillance, identification, and interception--were examined by varying systematically certain dimensions of the task and observing the effects on the processes of updating, validity checking, and handling the model of reality constructed from the information received. Variables studied were class of tracks, traffic load, crew, period, experience with same load, and load distribution. Measures of track-handling behavior were number of stimulus tracks carried, percent of tracks carried, items of task-oriented behavior (TOB), and average TOB per track. Data were examined by analysis of variance.
T. G.

19,290
Fagot, R.F. A MODEL FOR EQUISECTION SCALING. Behav. Sci., April 1961, 6(2), 127-133. (University of Oregon, Eugene, Ore.).

19,290
This analysis is concerned with models for equisection scaling, specifically, with problems related to the construction of the scale and with tests of internal consistency for the constructed scale. The construction of the model is carried out in detail with the conditions defined and discussed for both the finite adjacency model and the finite bisection model. The test of internal consistency is illustrated and compared for the two models. Six testable consequences of the condition which asserts the existence of the scaling function itself are formulated. Finally, the problem of "infinite" models is considered.
R 12

19,291
Steiner, I.D. & Rajaratnam, N. A MODEL FOR THE COMPARISON OF INDIVIDUAL AND GROUP PERFORMANCE SCORES. Behav. Sci., April 1961, 6(2), 142-147. (University of Illinois, Urbana, Ill. & University of British Columbia, Vancouver, British Columbia, Canada).

19,291
A model is described which can be used to test a variety of null hypotheses concerned with the relative performance of individuals and groups. It differs from other approaches in that it permits the testing of interval scale data. The general description includes standard deviation and standard error formulations plus those that would be used to test the hypothesis that the group is working at the level of the most competent members. The model is then demonstrated by testing three different null hypotheses with the data of McCurdy and Lambert (small group problem-solving). These data also are analyzed by D. W. Taylor's method. The two approaches are compared and the advantages of the present model discussed.
R 11

19,292
Zimmer, H. PREPARING PSYCHOPHYSIOLOGIC ANALOG INFORMATION FOR THE DIGITAL COMPUTER. Behav. Sci., April 1961, 6(2), 161-164. (University of Georgia, Athens, Ga.).

19,292
The problem of preparing psychophysiologic data for digital recording is considered to be one of extracting the relevant data from the original recordings. A complete digital description of the variable with subsequent data reduction through appropriate programming is the approach suggested here. A ten-channel analog system is described. The inputs are: skin resistance, respiration, muscle action potential voltage, heartrate, finger pulse amplitude, skin temperature, and body-weight shifts. The recording components include: sampling switch, buffer amplifier, format control unit, digital write electronics, and tape.
I.

19,293
Coulson, J.E. SYMPOSIUM ON THE USE OF COMPUTERS FOR PSYCHOLOGICAL RESEARCH. INTRODUCTION: RECENT AREAS OF APPLICATION. Behav. Sci., July 1961, 6(3), 252. (Systems Development Corporation, Santa Monica, Calif.).

19,293
This brief paper introduces the symposium on the role of computers in psychological research. Three major areas of application are indicated: calculation, simulation, and stimulation.

19,294
White, B.W. SYMPOSIUM ON THE USE OF COMPUTERS FOR PSYCHOLOGICAL RESEARCH. THE COMPUTER AS A PATTERN GENERATOR FOR PERCEPTUAL RESEARCH. Behav. Sci., July 1961, 6(3), 252-259. (Lincoln Lab., Massachusetts Institute of Technology, Lexington, Mass.).

19,294
The way in which computers generate patterns, i.e., their display capabilities, is described. The characteristics of the computer which make it so appropriate for this function include: speed, number of operations that can be performed on the coordinates which form the display, and availability of pseudorandom number subroutines (for controlled perturbations of a pattern). Some displays thus generated are shown and described: a statistically defined bar pattern, a pattern gradually dissolved by a two-dimensional random walk, a pattern gradually transformed, and a rigid rotation of a three-dimensional "bent-wire" pattern. Limitations of this method are indicated and some current computer research efforts on pattern recognition are introduced.
I. R 7

19,295
Silberman, H.F. SYMPOSIUM ON THE USE OF COMPUTERS FOR PSYCHOLOGICAL RESEARCH. A COMPUTER-CONTROLLED TEACHING MACHINE. Behav. Sci., July 1961, 6(3), 259-261. (System Development Corporation, Santa Monica, Calif.).

19,295
"This is a progress report on a project to develop a computer-controlled teaching machine to be used as a research tool for the study of different teaching procedures." The machine is composed of three components: a Bendix G-15 computer, a large random access slide projector, and an electric typewriter. The student reads his instructions from the slides, enters his response on the typewriter, and receives knowledge of results on another slide or by a printout on the typewriter. The computer selects the items in terms of various aspects of the student's behavior, e.g., number of errors, amount of time required. The effectiveness of various program features is discussed in terms of the data that have been collected on them. Finally, the limitations and advantages of this research tool are discussed. R 5

19,296
Anderson, Nancy S. SYMPOSIUM ON THE USE OF COMPUTERS FOR PSYCHOLOGICAL RESEARCH. COMMENTS ON THE USE OF COMPUTERS IN PSYCHOLOGICAL RESEARCH. Behav. Sci., July 1961, 6(3), 266-270. (University of Maryland, Baltimore, Md.).

19,296
This paper discusses the nature of the use of the computer as a tool in each of four representative classes of problems: generation of stimulus materials, e.g., in vision and perception; control program for the teaching machine; simulation of behavior, e.g., small group interactions; and model for voting behavior (from survey data and national news). Advances in these areas exclusively attributable to the computer also are indicated.
R 3

19,298
Mackworth, J.F. & Mackworth, N.H. EYE FIXATIONS RECORDED ON CHANGING VISUAL SCENES BY THE TELEVISION EYE-MARKER. J. opt. Soc. Amer., July 1958, 48(7), 439-445. (Applied Psychology Research Unit, MRC, Cambridge, England).

19,298
Improvements in the corneal reflection method of recording eye movements are reviewed and an improved procedure for analyzing eye movements during the viewing of motion pictures is described. Two closed-circuit television cameras are used together to produce one composite picture: one camera picks up the corneal reflection of light (spot magnified about 100 times) and a second one simultaneously provides the scene to the screen in front of S and to a second display where the corneal reflection or eye marker is superimposed. The composite eye-scene display may be recorded by a motion picture camera. The spot can be calibrated to the region of regard within one or two degrees. Areas for application of the technique are visual aiming, visual search, and thinking. I. R 23

19,300
Gottsdanker, R., Frick, J.W. & Lockard, R.B. IDENTIFYING THE ACCELERATION OF VISUAL TARGETS. Brit. J. Psychol., Feb. 1961, 52(Part 1), 31-42. (Psychology Dept., University of California, Santa Barbara, Calif.).

19,300
How the variation in magnitude of velocity is detected was investigated. Ss, 160 students, were required to distinguish between accelerated (positive or negative) and constant-velocity motion of targets on each of 100 trials. The targets were presented by projecting a motion picture made by the technique of animation. The velocity, acceleration, and presentation-times tested ranged from 0.96 to 15.38 degrees/sec., 0.26 to 67.6 degress/sec.^{2}, and 0.45 to 3.64 sec., respectively. Positive and negative accelerations were used; all accelerated runs had constant acceleration. Performance was measured in terms of percent correct response for conditions tested, group thresholds for absolute angular acceleration, and relative thresholds for acceleration and angular velocity change. T. G. I. R 5

19,301
Shackel, B., Sloan, R.C. & Warr, H.J.J. DETECTOR PLOTS. Electronics, Jan. 1958, 36-39. (E.M.I. Electronics Ltd., Hayes, Middlesex, England).

19,301
This paper discusses the eye movement recording technique, electro-oculography, and the major problems encountered in employing it successfully. A complete measuring apparatus built to overcome these difficulties: small size of potential, noise potential from skin and from electrodes, is described and illustrated. Basically, it is an electronic system with two identical channels to amplify and record eye movements separately in the horizontal and vertical planes of rotation. A pen recording and motion picture film of a crt display are obtained. Detailed descriptions of the amplifier, crt display, and electrodes are included. Examples of records obtained from the apparatus are shown.
T. G. I. R 6

19,302
Haider, M. & Dixon, N.F. INFLUENCES OF TRAINING AND FATIGUE ON THE CONTINUOUS RECORDING OF A VISUAL DIFFERENTIAL THRESHOLD. Brit. J. Psychol., Aug. 1961, 52(Part 3), 227-237. (Psychology Dept., University College, London, England & Institute of Hygiene, University of Vienna, Vienna, Austria).

19,302
In this experiment, a visual differential threshold was measured continuously for 14 min. using a kymograph. The records were examined for: general trend with respect to vigilance or fatigue, systematic change with respect to training or fatigue, diurnal variation, individual differences. Ten Ss served in three morning and three evening sessions. Threshold level was maintained by S keeping one of two stimuli just below threshold and the other very dim. Mean threshold values, length of curve, and number of control adjustments were compared for the six sessions. Rank order correlations were obtained. Morning and evening session data were compared, as well as individual data for each session. The findings were discussed in terms of a probable "central variable." T. G. R 21

19,303
Sampson, H. & Spong, P. BINOCULAR FIXATION AND IMMEDIATE MEMORY. Brit. J. Psychol., Aug. 1961, 52(Part 3), 239-248. (University of Auckland, Auckland, New Zealand).

19,303
The effects on speed and accuracy of recall of Arabic digits was investigated for five binocular viewing conditions, two recall conditions, and the information in the right and left eye projections with ten right-handed, right-eye dominant male students. Pairs of digits (one per eye) were projected successively; after a trial (four pairs of digits), S told all remembered digits in any order. Digits were presented nasally, temporally, or one on each side of fixation; interval between pairs was 0.8 or 1.1 sec. Percent correct and speed of response performance measures were evaluated by analysis of variance. Findings were discussed in terms of order of recall and spatial arrangement relationships, and applicability of an intermittency hypothesis of cerebral functioning to the temporal grouping of responses. T. G. R 12

19,304
Gardner, R.W. INDIVIDUAL DIFFERENCES IN FIGURAL AFTER-EFFECTS AND RESPONSE TO REVERSIBLE FIGURES. Brit. J. Psychol., Aug. 1961, 52(Part 3), 269-272. (Menninger Foundation, Topeka, Kan.).

19,304
The relationship between an individual's visual and kinesthetic aftereffects (AE) and between figural AE and reversible figure responses is examined. Two groups of Ss, 30 who showed both types of AEs and 20 who were also part of another study, are used in the three tests. In the visual and kinesthetic tests, Ss respond to fixed test bars, variable test bars, and inspection bars in predetermined sequences; in the reversible figures test, Ss view three such figures for three min. each. Difference scores are obtained for pre- and postinspection judgments; for the second group, retested at a later time, test-retest r is computed between these difference scores. Between the visual and kinesthetic scores and between reversal scores and visual and kinesthetic scores, r's are computed. T. R 13

19,305
Ozbeydar, S. THE EFFECTS OF DARKNESS AND LIGHT ON AUDITORY SENSITIVITY. Brit. J. Psychol., Aug. 1961, 52(Part 3), 285-291. (Applied Psychology Unit, MRC, Cambridge, England).

19,305
Effects of darkness and light on auditory sensitivity were examined using 46 Ss with normal hearing; all thresholds were obtained for a 1,200-cps tone using the descending series of the method of limits. In I, absolute thresholds (ATs) were determined when S was adapted to darkness and to 25 ft.-c; differential thresholds (DTs) were obtained for signal levels 20, 40, and 60 db above AT for S adapted to the same visual conditions. In II, ATs were determined as before; threshold was measured when tone was masked by 40- and 80-db white noise; DT was measured for the test tone 20 db above masked threshold with 40 db of noise--all for both light and dark conditions. In III, ATs were obtained as before with a 100 ft.-c light condition. Threshold comparisons were evaluated by t-tests. I. I. R 9

PART V
AUTHOR INDEX

The Author Index, which appears on the immediately succeeding pages, permits the retrieval of references produced by specific authors. The Accession Numbers following each author should be searched in Part IV. In general, all authors of a publication are listed in the Author Index. However, in some rare instances where a large number of authors contributed to a single work, only the first four authors have been listed in both the citation and the Author Index.

AUTHOR INDEX

Abma, J. 18,737
Abrahams, I.C. 18,761
Abt, L.E. 17,525
Acton Society Trust 19,184
Adams, J.A. 17,347, 17,451, 17,714, 18,732
Adams, J.K. 17,447
Adams, O.S. 18,721, 19,227
Adams, Pauline A. 17,447
Adams, R.J. 19,229
Adams, R.M. 19,077
Adams, T. 17,626
Ades, H.W. 18,451, 18,536, 18,854
Aines, A.A. 17,303
Akerblom, B. 19,085
Alampay, Delia A. 17,658
Alexander, H.S. 18,567
Alexander, M. 17,882
Allen, F.L. 19,012, 19,145
Allen, M.J. 18,535, 19,228
Allen, R.G., Jr. 17,537
Allison, R.B., Jr. 19,135
Allphin, W. 18,733
Alluisi, E.A. 17,247, 18,461
Alper, M.E. 18,734
Alpern, M. 17,838
Alter, Millicent 19,061
Altman, I. 14,325
Altman, J.W. 18,883, 19,168
Alvis, D.L. 18,203
Ambler, Rosalie K. 18,735
Ammons, R.B. 18,953
Ancker, C.J., Jr. 17,895
Andersen, N. 17,541
Anderson, A.A. 19,220
Anderson, D.N. 17,442
Anderson, F. 17,608
Anderson, N.M. 19,173
Anderson, Nancy S. 19,296
Anderson, S.B. 18,393
Anderson, T.W. 19,231
Andreassi, J.L. 17,488
Andreasson, B.O. 17,267
Angell, D. 19,086, 19,087
Anikeeff, A.M. 18,522
Appel, Valentine 17,425
Archibald, E.R. 18,468
Armington, J.C. 13,304
Armstrong, H.G. 18,736
Arnest, R.T. 19,232
Arnoult, M.D. 17,890
Aslund, N. 16,622
Assadourian, A. 19,089
Astrand, P.-O. 17,787, 17,788
Auwood, J.A. 19,230
Axelrod, W. 18,558

Bachner, Virginia M. 17,802
Backlund, F. 19,110
Baggaley, A.R. 17,694
Bahrick, H.P. 17,356
Bakan, P. 17,361
Baker, C.A. 17,296, 17,481
Baker, C.H. 17,856
Baker, L.E. 18,983
Baker, P.T. 17,301
Balke, B. 17,384, 19,044, 19,054
Ball, J.H. 18,725
Ballhaus, W.F. 18,936
Bambenek, R.A. 18,881
Bamblin, W.P. 17,796
Barakat, R. 17,816
Barker, H. 18,728
Barkla, D. 17,438
Barmack, J.E. 17,866
Barnard, G.W. 17,408, 18,650
Barratt, E.S. 18,625, 18,807
Bartlett, C.J. 17,461
Bartlett, R.G., Jr. 17,401, 17,404
Bartley, S.H. 17,666, 17,678 17,679, 17,690, 17,691, 17,872
Bartow, J.E. 16,460
Basore, B.L. 16,425, 16,796
Bass, D.E. 18,775
Bates, J.H. 18,537, 19,030
Bates, Mary E. 19,030
Bath, D.W. 19,208, 19,209
Bauer, H.J. 17,418
Baum, W.R. 19,224
Baumert, L. 18,447
Baumgardt, E. 17,823
Baxter, J.R. 17,321, 18,726
Beach, Barbara R. 6513
Beals, L.S., Jr. 17,518
Beaney, M. 19,277
Beaumariage, D.C. 18,760
Beaupre, Merle A. 17,645
Beck, J. 17,352, 17,851
Becker, G.M. 17,357
Beckman, E.L. 17,531
Beckman, F.H. 18,951
Beckman, M. 18,499, 18,702
Bedford, T. 17,855
Beenken, H.G. 17,774
Beer, M. 18,480
Behan, R.A. 17,324, 17,471
Behar, I. 17,731, 17,747, 17,751
Behnke, A.R. 17,784, 17,785, 17,786
Behnken, D.W. 18,056
Beier, E.G. 17,698, 17,700
Beischer, D.E. 18,588, 18,814, 18,856
Belding, H.S. 19,270
Bell, C.G. 17,811
Bell, D.A. 19,132
Bell Helicopter Corporation 19,088
Bellaire, F.R. 19,101
Bennett, E.M. 19,162
Bennett, G. 17,378
Bennett, H.E. 17,815
Bennett, P.B. 18,954, 18,961 18,962
Benson, N. 18,906
Beranek, L.L. 17,609
Bergen, J. 18,658
Berger, R.M. 15,412
Bergum, B.O. 17,472
Berkner, L.V. 18,441
Berkshire, J.R. 18,735, 18,868
Bernberg, R.E. 17,486
Berry, C.A. 17,375, 18,520
Berry, H.A. 18,995
Berry, P.C. 17,427, 18,261, 18,538
Besco, R.O. 17,716, 18,482
Bevan, W. 17,725, 17,747, 17,751, 18,727, 18,728, 18,729, 18,730
Bies, D.A. 17,593
Billmeyer, F.W., Jr. 18,350
Bilodeau, E.A. 17,514
Birdsall, T.G. 18,803
Birkhead, N.C. 17,639, 18,539
Bishop, C.K. 19,006
Bishop, H.P. 18,731
Bitzer, D. 19,182
Black, J.W. 18,514
Black, R.W. 17,725
Black-Schaffer, B. 17,863

Blackwell, H.R. 18,351, 18,540, 18,541, 18,542, 18,543, 18,544, 18,545, 18,546, 18,547, 18,548, 18,549, 18,550, 18,551, 18,619, 18,681, 18,955
Blackwell, O.M. 18,546
Blair, J. 19,273
Blank, A.A. 17,822
Blaschke, A.C. 17,524
Blatt, S.J. 19,010
Blischke, W.R. 19,203
Bliss, J.C. 17,837
Bloom, J.N. 18,992
Blount, S.G., Jr. 17,630, 17,631, 17,632
Blum, M.L. 17,425
Blumenthal, S. 19,202
Boenning, R.A. 18,835
Boettcher, C.A. 18,667
Boldyreff, A.W. 17,574
Born, G. 18,926, 19,244
Borresen, C.R. 17,741
Borsky, P.N. 18,885, 18,886
Bosee, R.A. 17,402
Botsch, F.W. 18,866
Bourassa, C.M. 17,691
Bourne, L.E., Jr. 17,698
Bowen, H.M. 17,488, 18,714
Box, G.E.P. 16,626, 18,056
Boynton, R.M. 17,817, 17,827
Brackett, H.R. 17,781
Bradley, J.V. 14,892
Brady, P.T. 17,598
Brainard, R.W. 17,416, 18,955
Brandon, M.K. 17,596
Braun, L., Jr. 16,248
Braunfeld, P. 19,182
Braunstein, M.L. 18,382, 18,935
Bravo, Lucy 17,688
Bray, C.W. 18,677
Breckenridge, J.R. 18,716, 18,867
Brehm, H.E. 19,029
Brescia, R.E. 18,833
Bridgeman, Winnie J. 19,093
Brieger, G. 18,888
Briggs, G.E. 18,557, 18,668, 18,882, 19,226
Briggs, P. 18,871
Brissenden, R.F. 18,418, 18,424, 19,197
Brogden, H.E. 19,158
Brogden, W.J. 17,749
Brooks, R. 17,255
Brooks, R.A. 19,028
Brooks, Virginia 17,733
Brouha, L. 17,638
Broverman, D.M. 17,449
Brown, C.R. 18,717, 18,979
Brown, E.L. 18,938
Brown, G.L. 18,750
Brown, I.D. 17,555, 17,560
Brown, J.L. 17,383
Brown, L.T. 17,888
Brown, R.H. 17,721, 18,555, 18,556, 18,613
Brown, T.M. 19,225
Brown, W.L. 17,763, 18,595, 19,076
Brownstein, A.J. 17,778
Brozek, J. 19,134
Bruce, Roselyn S. 17,669
Bruner, H. 17,529
Bryan, A.C. 17,368
Bryan, G.L. 18,558, 18,559, 18,560
Bryden, M.P. 17,660
Buchanan, A.R. 18,561
Buckner, D.N. 18,529, 18,562
Buddenhagen, T.F. 18,563
Budnoff, I.J. 19,165
Buel, W.D. 17,802
Bugelski, B.R. 17,658
Bughman, C.R. 17,471
Bullard, R.W. 17,617, 17,864
Bumpus, J.N. 17,471
Burg, A. 17,414
Burger, J.F. 17,810
Burke, J.M. 17,370
Burns, W. 18,564
Burris-Meyer, H. 17,287
Burrows, A.A. 17,302
Burton, B.B. 18,418
Byford, G.H. 18,718
Cain, S.M. 19,027
Caldwell, L.S. 18,402
Cameron, Jean S. 17,663
Campbell, D.P. 18,565
Campbell, R.A. 17,499, 17,590
Campbell, R.J. 17,416
Carbery, W.J. 17,371
Carbonell, Jaime R. 17,812
Carlson, V.R. 17,722
Carlsoo, S. 17,552
Carlyle, L. 18,566
Carson, T.R. 18,878
Carter, D.L. 18,849
Carter, E.T. 17,534, 18,972
Carter, J. 16,103, 16,104
Carter, L.F. 17,873
Carter, N.L. 19,031
Carter, V.E. 18,480
Carter, W.K. 16,604
Casella, Carmine 17,872
Casey, A. 17,546
Casola, A.S. 17,696
Castelnovo, A. 19,153
Catania, A.C. 17,513
Catranis, J.G. 17,523
Cattell, R.B. 17,549
Cavagna, G. 17,642
Celentano, J.T. 18,567
Chadwick, E. 17,295
Chaffee, J.W. 17,470
Chambers, E.G. 1562
Chambers, R.M. 17,531, 17,647
Champine, R.A. 18,424
Chandler, K.A. 17,852
Chapanis, A. 18,715, 18,719, 19,136
Chase, R.A. 19,287, 19,288
Chase, W.P. 18,863
Cheatham, D.C. 18,424, 19,089
Cheeseman, S.A. 19,046
Cherniack, N.S. 17,376, 18,909
Chernikoff, R. 18,381
Chernoff, H. 16,717
Chichester, C.O. 17,543
Chien, R.T. 18,250
Chiles, W.D. 18,721, 19,227
Chipman, J.S. 16,809
Chisman, J.A. 17,807
Chisum, Gloria T. 18,956
Christal, R.E. 18,473, 18,722
Christensen, E.H. 19,090
Christensen, Margaret L. 18,796
Christensen, P.R. 15,412
Christian, J.F. 18,994
Christner, Charlotte A. 17,475, 17,480
Churchill, A.V. 17,526
Churchill, E. 4369
Cienko, G.M. 18,908
Clamann, H.G. 17,652
Clare, V.R. 17,528
Clark, B. 17,374, 17,380, 18,592, 18,873, 19,222
Clark, L.V. 18,723
Clark, P.J. 17,551
Clark, R.E. 17,422, 18,444, 18,445, 19,002
Clark, W.C. 18,929, 18,934
Clausen, H. 18,906
Clausen, J. 17,867, 18,860
Cleary, J.P. 18,622
Close, D. 17,637
Close, P. 17,532
Coate, R.E. 18,419, 18,644
Coburn, K.R. 17,531
Coburn, R. 18,748, 19,243
Coermann, R.R. 18,884
Coffey, J.L. 17,476
Cohen, A. 17,599, 18,445, 18,724, 18,752
Cohen, H.B. 17,659
Cohen, M. 18,586
Cohen, W. 17,775
Cole, D.L. 16,166
Cole, E.L. 18,937
Collins, Emma H. 17,886
Collins, W.E. 17,696, 17,818, 18,398, 18,704, 18,705, 18,957
Colquhoun, W.P. 17,561

Comalli, P.E., Jr. 17,664, 18,684
Combs, J.J. 19,046
Connor, R.W. 18,603
Connors, Mary M. 19,223
Conrad, R. 17,304
Cook, K.G. 17,803
Cooper, F.S. 18,568
Cooper, J.I. 19,170, 19,213
Cooper, W.N. 17,645
Coppinger, N.W. 17,736
Corah, N.L. 17,775
Corbin, H. 16,103, 16,104
Corlett, E.N. 17,562
Cornell University 18,793
Correll, E.G. 18,813
Corso, J.F. 17,849, 18,397, 18,596, 19,167
Costello, C.G. 17,770
Coulson, A.H. 18,483
Coulson, J.E. 19,293
Coulter, D.C. 19,131
Courtney, D. 18,817
Courtney, J. 18,706, 18,709
Cox, Jennifer 17,830
Craig, A.B., Jr. 17,614
Craig, D.R. 19,201
Crain, K. 17,310, 18,525
Cram, D. 18,855
Cramer, E.H. 17,400
Cramer, R.L. 19,051
Crampton, G.H. 18,403
Crane, H.L. 18,431, 18,707
Craven, C.W. 18,937
Crawford, A. 17,439
Crawford, B.M. 18,570, 18,571, 19,221
Crawford, M.J. 18,738, 18,945
Crawford, W.A. 19,021, 19,022, 19,023, 19,024, 19,025
Creelman, C.D. 17,491
Crise, J.R. 17,617
Crist, B. 18,708
Crockford, G.W. 17,563
Cron, R.L. 19,178
Cronbach, L.J. 18,553
Crook, Dorothea J. 18,569
Crook, M.N. 4376, 18,731
Crosbie, R.J. 19,177
Cross, A.V.C. 18,954
Crumley, L. 18,620
Crump, J.F. 18,980, 18,981, 18,982
Culbert, S.S. 17,199
Curry, E.T. 17,607
Curtis, H.A. 18,503
Curtiss-Wright Corporation 18,572

Dahl, E.V. 19,053
Danhof, I.E. 17,392
Daniels, G.S. 4369
Dann, A.S. 18,949
Dantzig, G.B. 17,651
Daou, A. 17,573
David, E.E., Jr. 17,603
David, H.A. 18,508
Davidson, D.A. 18,654
Davidson, D.E., Jr. 18,799, 18,800
Davidson, E.T. 18,888
Davidson, H.E., Jr. 18,985
Davies, Barbara L. 17,424, 18,442
Davis, A.K. 18,862
Davis, A.R. 19,242
Davis, D.D.W. 19,095
Davis, H.T. 19,149
Davis, J.F. 17,753
Davis, J.M. 18,706, 18,709
Davis, P.W. 18,578
Davis, R. 18,710
Davis, R.H. 17,324
Davis, T.R.A. 17,627, 17,792, 18,406, 18,590, 18,865, 18,887
Day, R.E. 18,417
Day, R.H. 17,321, 18,726, 19,279
Day, W.F. 6513
Deane, G.E. 17,358
Deatherage, B.H. 17,512
deCharms, R. 19,093
Dee, T.E., Jr. 18,443
Deering, R.A. 17,535
DeForest, R.E. 17,531
Degan, J.W. 19,162
de Guenin, J. 17,578
DeHardt, Doris C. 17,678
de Jong, J.R. 19,091
de Lange Dzn, H. 17,825
De Lanne, R. 17,638
Delit, M. 17,245
Demaree, R.G. 18,880, 19,171
Denes, P. 17,602
Devane, J.R. 17,250
Devoe, D.B. 18,853
Dewis, E.V.T. 18,701
Dickey, J.R. 19,077
Dickson, C. 17,799
Dietze, A.G. 17,662
Dimmick, F.L. 17,843
Dinan, J.A. 18,636
Divany, R. 18,620
Dixon, M.E. 17,636
Dixon, N.F. 19,302
Dobbins, D.A. 19,219, 19,220
Dodt, E. 17,835
Doehring, D.G. 17,748
Doll, R.E. 18,868
Domey, R.G. 17,295, 18,591
Dorfman, D.D. 18,859
Dossett, A.N. 18,961, 18,962
Douglas Aircraft Company, Inc. 18,439
Downing, T.S. 18,997
Downs, Judith E. 18,971
Drazin, D.H. 17,362
Dreher, J.J. 17,487
Drenick, R.F. 18,758
Drewes, D.W. 17,421
Dreyer, J.F. 15,043
Drinkwater, F.J., III. 18,846
Droege, R.C. 17,428
Drone, K.C. 18,879
Dudley, Beverly 19,188, 19,189
Duffner, Mabel H. 18,949
Duncan, C.P. 17,727
Duncan, D.B. 16,631
Dunn, B. 17,360
Dunnette, M.D. 17,420
Dykman, R.A. 14,850
Dzendolet, E. 17,323

Early, D.M. 19,131
Easterling, M. 18,447
Eberhart, H.D. 17,522
Eckman, D.P. 19,215
Eckstrand, G.A. 19,218
Eddowes, E.E. 17,395
Edelberg, R. 17,364
Edgington, E.S. 17,680, 17,776
Edholm, O.G. 19,274
Educational Research Corporation 19,017
Edwards, A.E. 17,671
Edwards, W.D. 17,444, 18,768, 18,988
Egan, J.P. 17,587, 18,977, 18,978
Ehart, Mary E. 18,553
Ehrman, J.R. 18,105
Eicher, M. 19,060
Eijkman, E. 17,606, 17,891
Eimas, P. 18,683
Eisenberg, B. 18,685
Eitzman, D.D. 17,616
Ekman, G. 17,349, 17,684, 18,579, 18,711, 18,712, 18,713, 18,933, 19,094, 19,138
Elbel, E.R. 17,637
Elder, F.C. 19,101
Eldredge, D.H. 19,137
Elftman, H. 17,521
Elkin, E.H. 17,416, 18,457
Elliott, E. 17,311
Elliott, Lois L. 18,785, 19,159
Ellis, J.P., Jr. 19,054
Ely, J.H. 18,259, 18,714
Emanuel, I. 17,882
Engel, Gloria 17,772
Engel, J.H. 17,575
Engen, T. 17,515, 17,729, 17,854, 18,932

Engstrom, H. 18,854
Epps, R. 18,972
Epstein, W. 17,546, 17,666, 17,868
Ericksen, S.C. 16,106, 16,854
Erlick, D.E. 18,479
Ernsting, J. 18,694, 18,695, 19,019, 19,020, 19,092
Ettelson, B.L. 17,645
Evans, B.H. 18,915
Evans, W.E. 17,487
Evans, W.O. 17,344, 18,407, 18,696, 18,747, 18,869, 18,947
Everson, D. 18,856
Eyde, Lorraine D. 16,198
Eysenck, H.J. 17,457
Eysenck, S.B.G. 17,457

Fagot, R.F. 19,290
Farley, N.E. 18,580
Farnsworth, D. 17,839
Fay, T.H., Jr. 17,607
Faye, A.E., Jr. 18,423
Feallock, Sally M. 17,726
Feddersen, W.E. 18,991
Federman, P. 18,526
Fegel'man, L.S. 17,263
Fehrer, Elizabeth 17,346
Feigenbaum, E.A. 17,445
Feller, R.P. 19,026
Fernandez, C. 18,614
Fessenden, E. 19,177
Fielder, F.E. 18,552, 18,554
Fights, R.C. 19,217
Fillenbaum, S. 17,463, 17,683
Filley, G.F. 17,630, 17,631, 17,632
Finkelstein, Beatrice 19,033
Fischl, M.A. 18,817, 19,216
Fisher, F.R. 19,267
Fiske, D.W. 17,452
Fitch, D.J. 19,109
Fitts, P.M. 4713B
Flanagan, Gail 19,032
Fleishman, E.A. 19,113, 19,122
Fletcher, J.L. 17,497, 17,510, 18,405, 18,409, 18,697, 18,698, 18,963, 18,964
Flickenger, D.D. 18,756
Flinn, D.E. 17,400, 17,865
Flores, I. 17,668
Flory, L.D. 18,699
Foley, P.J. 18,700, 18,701
Folley, J.D., Jr. 18,958, 19,234
Forbes, T.W. 17,484, 18,678
Ford, A. 19,278
Forney, R.B. 17,870
Forrest, J. 16,604
Forsyth, D.M. 18,979
Fosdick, L.D. 18,105
Fotheringham, W.C. 18,630, 18,631, 18,634, 18,922, 18,923, 19,237, 19,238
Foudriat, E.C. 18,418
Fox, R.H. 17,306
Frahm, W.F. 18,685
Fraisse, P. 17,459
Francois, J. 17,845
Franken, P.A. 17,593
Frankenhaeuser, Marianne 18,499, 18,581, 18,582, 18,583, 18,584, 18,702, 18,931
Frazier, J. 17,653
Fredman, S. 17,448
Freedman, S.J. 18,516, 18,585
Freedman, T. 18,908
Freedman, Toby 17,645
Freeman, H. 18,658, 19,144
Freiman, A.H. 17,371
Freund, J.E. 19,214
Frey, A.H. 18,464, 19,175
Frick, J.W. 19,300
Fried, C. 18,672
Friede, R.L. 18,671
Friedman, M.P. 17,711
Fritz, E.L. 18,959
Froeb, H.F. 17,633
Frost, G.G. 18,587
Fry, G.A. 4713C, 17,829, 17,846
Frye, C.W. 18,966
Fujisaki, H. 17,811
Furchtgott, E. 17,711

Gabriel, K.L. 18,797
Gael, S. 19,251
Gafarian, A.V. 17,895
Gagne, R.M. 17,888, 19,245
Gaito, J. 17,450
Gales, R.S. 17,502, 17,508
Gallagher, T.J. 18,781
Gallant, R.P. 17,649
Galler, S.R. 18,687
Gamo, H. 18,254
Gangwish, R.C. 19,204
Gardner, H.J. 18,633
Gardner, R.A. 16,488, 17,768, 17,850
Gardner, R.W. 19,304
Garfinkle, D.R. 18,686
Garn, S.M. 17,885
Garren, J.F., Jr. 18,688
Garrow, J.S. 19,018
Garvey, W.D. 17,759
Gates, S. 18,620
Gaylord, R.H. 18,689
Geddes, L.A. 19,161
Gedye, J.L. 19,020
Geisler, C.D. 19,111
Gell, C.F. 17,861
George, Marilyn 18,801
Gerathewohl, S.J. 4391
Ghosh, B.K. 19,144
Gibbs, C.B. 9347, 18,690
Gibson, Eleanor J. 19,262
Gibson, R.S. 18,672
Gilbert, Sally B. 17,471
Gilden, L. 19,288
Giorgia, M. Joyce 18,974
Glanzer, M. 19,140, 19,141, 19,143
Glascock, H.W., Jr. 18,742
Glaser, R. 19,239
Glorig, A. 17,798
Glucksberg, S. 18,589, 18,877
Gogel, W.C. 17,670, 17,673, 17,675, 17,686, 17,687, 18,400, 18,401, 18,691, 18,692
Goggans, J.F. 18,921
Gold, J. 18,693
Goldbeck, R.A. 19,142
Goldberg, J.H. 19,204
Goldberger, L. 18,893, 18,894
Goldiamond, I. 18,469, 18,930
Goldizen, V.C. 17,528
Goldman, R.F. 18,775
Goldman, S. 19,224
Goldstein, A.G. 17,255, 17,708, 17,741
Goldstein, D.A. 18,531, 18,532, 18,533, 19,012, 19,145
Goldstein, M.E. 17,693
Goldstone, G. 18,918
Gollin, E.S. 17,661
Gollnick, P.D. 19,195
Gollomp, B.P. 18,258
Golomb, S.W. 18,447
Gonzalez, G.A. 18,631, 18,922
Goodman, B.D. 17,644
Gordon, A.S. 18,966
Gordon, D.A. 17,472
Gottsdanker, R. 19,300
Goude, G. 17,349
Gowing, J. 18,820
Graff-Lonnevig, V. ,582
Graham, A. 17,558
Graham, C.H. 18,483
Granda, A.M. 18,635
Granda, R.E. 18,464
Grandjean, E. 17,559
Granger, G.W. 17,847
Grant, D.A. 17,695, 18,952
Grant, G. 17,301, 18,397, 18,596, 19,075, 19,167, 19,234
Graveline, D.E. 17,384, 17,408, 18,650, 18,965, 19,039, 19,044, 19,139, 19,250

Graves, J.B. 19,150
Gray, Florence E. 18,640
Gray, R.F. 17,386
Graybiel, A. 17,374, 17,380, 17,544, 18,454, 18,588, 18,592, 18,814, 18,870, 18,872, 18,873, 19,222
Green, B.F., Jr. 17,704
Green, C.D. 19,076
Green, D. 19,104
Green, D.M. 17,797, 18,941
Green, H.C. 19,046
Green, I.D. 17,385
Green, J. 18,940
Greenberg, G. 17,745
Greenberg, G.Z. 17,587, 18,977, 18,978
Greenberg, H. 17,573
Greene, E.A. 19,210
Greene, J.W. 18,744, 18,745, 18,874
Greenwood, D.D. 17,492
Greer, F.L. 18,576
Gregg, L.W. 17,717, 17,783, 18,534, 18,942, 19,065
Gresock, C.J. 17,757
Grether, W.F. 18,767
Grewell, J. 17,880
Grieve, June I. 17,305
Griffin, Marie 17,700
Griffo, Z.J. 17,634
Grodsky, M.A. 18,262, 18,628
Groesberg, S. 19,048
Groth, Hilde 17,413
Grover, R.F. 17,630, 17,631, 17,632
Grubb, Patti M. 18,568
Gruber, A. 18,573
Gruber, H.E. 18,929
Grubmeyer, R.S. 18,959
Grunzke, M.E. 17,411
Gschwind, R.T. 18,723
Guedry, F.E., Jr. 17,544, 17,624, 18,398, 18,704, 18,705, 18,872
Guertin, W.H. 17,246
Guilford, J.P. 15,412, 17,446
Guinness, G.V., Jr. 19,196
Gulick, W.L. 18,980, 18,981, 18,982
Gundy, R.F. 17,588
Gutman, N.J. 17,889
Guttman, N. 17,603
Gwynne, G. 18,836

Hagen, D.H. 17,400, 19,056
Haider, M. 19,302
Haine, R.W. 18,257
Hale, H.B. 19,054
Hall, A.W. 18,741
Hall, C.E. 18,502
Hall, J.F., Jr. 17,761, 18,476
Hall, W.J. 18,850
Halliday, A.M. 19,285
Hamblin, R.L. 19,108
Hamilton, C.E. 18,681
Hamlin, R.L. 19,266
Hammel, H.T. 19,269
Hammer, Lois R. 18,649, 19,198
Handscomb, D.C. 18,105
Hanks, T.G. 17,540
Hansen, J. 17,541
Hanson, H.E. 18,443, 18,669
Hanson, J.A. 4376, 18,640, 18,779
Happ, W.W. 19,121
Harabedian, A. 18,530, 18,562
Harbold, G.J. 18,536, 18,743, 18,744, 18,745, 18,874
Hardy, J.D. 19,177
Harker, G.S. 18,404
Harleston, B.W. 16,198
Harnwell, G.P. 18,928
Harris, G.G. 17,612
Harris, J.D. 17,288, 17,604
Harris, J.E. 18,741
Harris, J.G., Jr. 18,856
Harris, Katherine S. 18,568, 18,657, 18,683
Hart, E.M. 18,927
Harte, R.A. 17,836
Hartman, B.O. 17,384, 17,399, 18,574, 19,038, 19,039, 19,045
Hartmann, W. 18,553, 18,554
Harvey S. 19,287
Hasbrook, A.H. 17,284
Hatcher, J.F. 18,528, 18,815
Hausner, H.H. 17,519
Havens, J.H. 5269C
Havron, M.D. 18,487, 18,491
Hawkes, G.R. 17,677, 17,681, 17,682, 17,742, 17,750, 18,575, 18,660, 18,746, 18,747, 18,875, 18,944
Hawkins, W.F. 17,781
Hawthorne, R. 17,654
Haygood, R.C. 17,469
Haythorn, W.W. 19,074, 19,098, 19,289
Heath, Barbara H. 17,883
Hebbard, F.W. 18,353
Heberling, E.J. 17,626
Hecker, C.J. 18,661
Heermann, E. 17,461
Hegenwald, J.F., Jr. 17,875
Heim, H.C. 18,561
Heinemann, E.G. 17,353
Heinemann, R.F.D. 19,233
Heinle, D.R. 18,410
Heinz, J.M. 17,811
Held, R. 18,518, 18,586
Hellman, R.P. 17,509
Hellon, R.F. 17,563
Helme, W.H. 19,109
Henderhan, R.C. 18,923
Hendler, E. 17,377
Henneman, R.H. 17,758, 17,759, 17,760
Henning, G.B. 17,387
Henriksson, N.G. 18,614
Henry, W.O. 19,012, 19,145
Henschel, A. 19,134
Hensley, G.T. 17,863
Herbert, A. 18,711
Herman, E.E. 17,485
Herner, Mary 18,946
Herner, S. 18,946
Heron, A. 19,107
Herrick, R.M. 18,465
Hershenson, M. 17,346
Hertzberg, H.T.E. 17,300, 19,249
Hertzman, A.B. 18,796, 19,264
Hesser, C.M. 18,582
Hettinger, T. 17,639
Hewitt, J.E. 17,536
Hicks, S.A. 18,459, 18,876, 18,998
Highberg, P.F. 19,176
Hill, Beatrice M. 17,428
Hill, J.H. 18,956
Hillix, W.A. 18,748
Hillmann, Beverly 17,823
Hiltz, F.L. 18,464
Hines, H.M. 17,613
Hirsh, I.J. 4382, 17,777
Hitchcock, F. 18,972
Hitt, W.D. 17,475, 17,479, 18,524, 18,737
Hixson, W.C. 18,604, 18,645
Hjelm, H.F. 18,504
Hochberg, J. 17,733
Hock, R.J. 17,623
Hodge, M.H. 18,738, 18,945
Hodgkins, Jean 17,789
Hoff, H.E. 19,161
Hoffeld, D.R. 17,749
Hoffman, C.J. 19,060
Hoffman, G.K. 17,695
Hoffman, L.R. 17,429
Hoffman, P.G. 18,637
Holaday, D.A. 18,967
Holding, D.H. 16,865
Holdrege, F.E. 18,926, 19,244
Holland, H.H., Jr. 19,263
Holmqvist, S.D. 17,555
Holmstrom, F.M.G. 17,878
Holt, R.R. 18,893, 18,894
Hooker, G.V. 18,949
Hopkins, C.E. 17,883
Hopkinson, R.G. 17,569
Hoppe, D.R. 5269A
Hornbein, T.F. 17,634
Horne, E.P. 18,222

Hornick, R.J. 18,638, 18,667
Horowitz, P. 18,995
Horst, P. 18,739, 19,067, 19,068, 19,069, 19,070, 19,071, 19,072, 19,073
Horstein, M. 19,112
Horvath, S.M. 17,639, 17,790, 18,539, 19,276
Hostetter, R. 18,620, 19,075
House, A.S. 17,594, 17,598
House, R. 18,737
Howard, I.P. 17,746
Howarth, C.I. 17,824, 19,286
Howell, W.C. 18,475
Hsia, Y. 18,483
Huebner, G.J., Jr. 18,639, 18,740
Huey, R.S. 19,150
Hufford, G. 18,154
Hufford, L.E. 18,732, 19,243
Hughes, C.L. 17,804
Hughes, F.W. 17,870
Hughes, J.L. 17,426
Hulbert, S. 17,414
Humes, J.W. 17,714
Humphreys, P.W. 17,563
Hunt, D.P. 17,474
Hurley, H.W. 17,794
Hutchinson, F. 17,535, 19,043
Huttenlocher, Janellen 19,140, 19,141
Hutton, C.L. 17,607
Hyde, A.S. 17,376

Iampetro, P.F. 17,621, 18,446, 18,774, 18,775
Ide, H.A. 18,989
Ikai, M. 17,640
Ikeda, H. 17,847
Ikeda, M. 17,817
Imig, C.J. 17,613
Inman, V.T. 17,522
Innis, R.C. 15,394
Institute of Radio Engineers, Inc. 18,246, 18,256
Ireland, R. 17,532
Irons, R.E. 19,131
Irving, A. 18,773
Irwin, I.A. 5299
Issekutz, B., Jr. 17,615, 17,639, 18,539
Ives, H.S. 19,191
Izvestia 17,713

Jackson, Margaret M. 19,139
Jacobson, J.H. 18,891
Janke, Leota L. 18,666
Janney, G.M. 19,066
Jarpe, Gundla 18,583, 18,584
Javitz, A.E. 18,776
Jayson, R.M. 18,480
Jeeves, M.A. 17,858
Jeffress, L.A. 17,800
Jenkin, N. 17,726
Jenkins, J.P. 18,487
Jenkins, R.A. 17,496
Jensen, B.T. 17,442
Jessen, K.H. 17,835
Jewett, A. 18,869
Johansson, G. 19,110
Johnson, G.E. 17,372
Johnson, L.F., Jr. 19,055
Johnson, R.H. 17,472
Johnson, W.H. 17,544, 18,780
Johnston, D.R. 17,627
Jones, F.P. 18,640, 18,778, 18,779, 19,146, 19,147
Jones, Joan E. 17,689
Jones, J.F. 19,145
Jones, M.B. 18,777, 18,828
Jones, R.C. 17,833
Jordan, N. 19,063, 19,099, 19,100
Jovy, D. 17,529
Joy, R.J.T. 18,747
Judd, B.R. 18,710
Junge, K. 18.712

Kaehler, R.C. 18,892
Kagihara, R.H. 19,244
Kahn, A. 16,143, 16,145
Kama, W.N. 18,655, 18,786, 19,221
Kamen, J.M. 17,889
Kamins, M. 18,150
Kaplan, Margorie N. 18,843
Kaplan, S.J. 18,673
Kappauf, W.E. 16,487, 18,677
Kaptur, V.D., Jr. 18,642
Karn, H.W. 17,783, 18,534, 18,942, 19,065
Karpinos, B.D. 17,887
Karpovich, P.V. 19,195
Karr, A.C. 18,751, 18,783
Karrer, R. 17,867, 18,860
Karsh, R. 18,787, 18,877, 19,105
Kasparek, Catherine F. 18,454
Katz, M., Jr. 16,732
Kaufman, H. 17,357
Kaufman, H.R. 18,415
Kaufman, R.A. 18,643
Kaufman, W.C. 19,149
Kaufmann, M.L. 18,643
Keast, D.N. 19,247
Keating, D.A. 18,474
Keesey, U.T. 18,621
Kellermann, F.T. 17,554
Kelley, C.R. 19,196
Kelley, J.R. 19,163
Kelly, D.H. 17,820, 17,831
Kelly, M.E. 18,539
Kelsey, Patricia A. 19,223
Kennedy, J.E. 17,415
Kennedy, R.S. 17,544, 18,870
Kennedy, S.J. 19,271
Kern, J.D. 19,256
Khalil, S.A. 17,595
Kidd, D.J. 18,961, 18,962
Kidd, J.S. 17,419, 17,423, 18,477, 18,492, 18,668
Kiesler, C. 17,348
Kiessling, R.J. 19,064
Kilmer, W.L. 18,251
Kincaid, W.M. 18,351
King, B.G. 17,379
King, W.J. 18,533
Kinney, Jo Ann S. 17,739, 17,771, 18,657, 19,257
Kitchin, J.B. 17,558
Klein, H.L. 18,589
Klein, K.E. 17,529
Klein, S.J. 18,511, 18,781, 18,782
Klemmer, E.T. 17,351
Klumpp, R.G. 17,503
Kneisel, R.S. 18,993
Knetz, W.J. 18,689
Knoll, M. 19,176
Knott, Virginia B. 17,898
Kohut, R. 18,614
Kolcum, E.H. 17,330
Kolers, P.A. 17,743
Konikoff, J.J. 16,767, 17,405
Kopra, L.L. 19,042
Kopstein, F.F. 18,898
Kornhauser, M. 17,460
Kos, C.M. 17,369
Kostanzer, A.R. 18,485
Kovit, B. 17,657
Kraft, C.L. 18,475
Kraft, J.A. 17,719, 18,764
Krampen, M. 17,676
Krassner, G.N. 16,460
Kraus, R.N. 18,785, 19,040
Kraushaar, J.J. 18,561
Krauskopf, J. 17,728, 17,729, 17,828
Krebs, A.T. 18,784
Kreider, M.B. 17,629, 18,446
Kremen, I. 18,577
Krendel, E.S. 937, 17,309, 18,763
Kresse, F.H. 18,480
Kristofferson, A.B. 18,351, 18,547
Krohn, D.L. 18,891
Kroll, Beverley J. 17,889
Kronenberger, E.J. 17,710
Kropp, R.P. 18,503
Krus, D.M. 18,658
Kruse, J.C. 19,060

Kryter, K.D. 18,753, 19,031, 19,032, 19,096
Kubiak, E.J. 18,801
Kubzansky, P.E. 18,641
Kugris, Violette A. 14,184
Kuhn, H.S. 18,824
Kunnapas, T.M. 18,925
Kurbjun, M.C. 19,197
Kurke, M.I. 17,473
Kuttner, R. 17,253

Lachance, P.A. 18,910
Lamb, L.E. 17,390, 19,046, 19,076
Lambert, W.E. 17,463
Lancaster, O.E. 19,183
Landahl, H.D. 18,498
Lane, H. 18,657
Lane, H.L. 17,513
Lane, J.C. 17,321
Lane, R.N. 17,495
Langdon, D.E. 17,406, 18,831
Langendorf, Patricia M. 18,832
Langer, J. 18,659
Lanzetta, J.T. 16,168
LaRochelle, P.J. 18,833
Lathrop, P.A. 18,755
Lauer, A.R. 5269A, 5269D
Lauver, L.S. 17,624
Lavender, H.J., Jr. 18,636, 18,901
Law, O.T., Jr. 18,548
Lawrence, H.G. 19,244
Lawrence, Merle 18,829
Lazo, J. 17,402
Leach, W.G. 17,368
Leamer, B.V. 17,365
Learner, D.B. 17,298, 17,307
Lebo, Dell 17,669
Ledley, R.S. 19,160
Legg, J.C., Jr. 18,969
Leibowitz, H. 17,360
Leibowitz, M.L. 17,580
Leiderman, P.H. 18,890
Leon, P. 18,632
Leonard, G.F. 19,176
Leonard, J.L. 19,278
Lerner, H.D. 18,990
Lerner, R.M. 19,103
Leshner, S.S. 17,343
Leskinen, J.I. 19,007
Levedahl, B.H. 17,483
Levin, A. 18,976
Levita, E. 17,699
Levy, B.I. 5299
Levy, E.Z. 13,202, 17,372
Lewis, D. 18,674, 18,680
Lewis, D.H. 17,595
Lewis, F.J. 19,037
Lewis, R.E.F. 18,816
Ley, B.J. 19,187
Ley, G.D. 17,618
Liberman, A.M. 18,568, 18,657, 18,683
Lichtenberger, W. 19,182
Licklider, J.C.R. 18,481, 18,772, 18,810
Liebel, D.A. 17,874
Lieberman, B. 17,665
Lieberman, P. 17,507
Liebow, A.A. 19,255
Lienert, G.A. 17,685
Light & Lighting 17,570, 17,571
Linaweaver, P.G., Jr. 19,059
Lind, A.R. 17,563
Lindberg, E.F. 18,478
Lindenlaub, J.C. 19,205
Lindman, R. 18,713, 18,933
Lineberry, E.C., Jr. 19,197
Linvill, W.K. 18,757
Lipetz, L.E. 16,770
Lipman, R.S. 17,779
Lipsitt, L.P. 17,854
Lipsitt, P.D. 18,666
Liverant, S. 15,052
Lloyd, K.E. 17,781
Lob, W. 18,257
Lochner, J.P.A. 17,810
Lockard, R.B. 19,300
Loeb, M. 17,497, 17,799, 18,409, 18,660, 18,697, 18,875, 18,944, 18,996
Loftus, J.P. 18,649
Logan, J.A. 19,279
Logie, L.C. 17,763
Lohrenz, C.A. 18,975
Lomnicki, Z.A. 17,859
Long, E.R. 17,758, 17,759, 17,760
Lordahl, D.S. 17,705
Loret, B.J. 19,248
Losee, J.E. 18,685
Lott, D.N. 19,102
Loveless, N.E. 15,374
Lowenberg, E.C. 19,174
Lowrey, R.O. 18,663
Lowson, M.V. 19,185
Lucier, O. 18,817
Ludvigh, E. 18,501
Lumsdaine, A.A. 19,086, 19,087
Lumsden, J. 17,454
Luria, S.M. 17,819, 17,843, 19,257
Luton, W.B. 17,877, 17,881
Luykx, H.M.C. 17,391
Lyle, C.B., Jr. 19,053
Lyman, J. 17,413
Lynn, R. 17,754
Lyons, H.A. 17,635
Lythgoe, C. 19,104

MacAdam, D.L. 17,841
MacCanon, D.M. 17,616
MacDonald, J.A. 18,662
MacEwan, Charlotte 18,617
Mackavey, W.R. 17,872
Mackay, D.E. 18,792
Mackworth, J.F. 19,298
Mackworth, N.H. 19,298
Macurdy, W.B. 17,837
Madden, J.M. 18,473, 18,722, 18,812, 18,974
Maddock, G.E. 17,618
Mager, M. 18,775
Mager, R.F. 19,181
Maheux, M. 17,757
Mahowald, M. 19,199
Maier, Barbara 17,751
Maier, N.R.F. 17,429
Majesty, M.S. 19,097
Malhotra, M.S. 18,791
Mallory, V. 17,287
Malmo, R.B. 16,485, 17,753
Mandler, G. 18,577
Mandler, Jean M. 18,577
Mangabeira-Albernaz, P.L. 17,601
Manheimer, B.H. 19,163
Marbarger, J.P. 17,541
Marchese, Angeline C. 18,883
Marchiando, Barbara W. 18,883
Marcus, R.S. 18,293
Marg, E. 18,353
Margaria, R. 17,642
Marill, T. 19,123
Maritz, J.S. 17,437
Marko, A.R. 17,530, 18,629, 18,813
Marks, M.R. 18,889, 19,200
Marotta, S.F. 17,541
Marshall, G.R. 19,048
Marshall, H.W. 18,478
Marshall, Louise M. 17,773
Martin, D.W. 17,505, 17,506
Martin, O.E., Jr. 18,461
Martin, P. 18,624
Marx, M.H. 17,778
Mascianica, F.S. 18,973
Mashhour, M. 18,924
Mason, L. 18,737
Masucci, F. 18,446
Matarazzo, J.D. 17,464
Matell, G. 18,584
Mathews, M.V. 17,592, 17,602
Matzger, A.D. 18,865
Maxey, G.C. 19,210
Maxfield, Kathryn E. 17,456
Maxfield, M.E. 17,638
Mayzner, M.S. 17,688
McAllister, Dorothy E. 17,737, 18,680
McAllister, W.R. 17,737
McCormack, P.D. 18,656
McCourt, F.P. 19,003

McCourt, W.F. 18,709
McCready, D.W., Jr. 18,549
McDowell, A.A. 18,595
McFadden, N.M. 18,410
McFarland, J.H. 18,594
McFarland, R.A. 17,295, 17,517, 18,591, 18,593, 19,114, 19,115
McGrane, F.J. 18,990
McGrath, J.E. 14,325, 18,490
McGrath, J.J. 18,527, 18,528, 18,529, 18,530, 18,815
McGregor, M. 19,173
McHardy, G.J.R. 19,020, 19,092
McKee, J.W. 18,412
McKendry, J.M. 17,301, 18,397, 18,596, 19,167
McKenna, V.V. 17,738
McKenzie, R.E. 17,384, 17,399, 18,574, 19,038, 19,039, 19,045
McKiernan-Terry Corporation 18,682
McLaughlin, J.T. 18,277
McLennan, M.A. 16,769 18,813
McNamara, W.J. 17,426
McNee, R.C. 19,050, 19,054
McRuer, D.T. 18,763
McTee, A.C. 16,166
Mead, L.C. 17,516, 18,950
Meade, R.D. 17,667, 17,672
Meals, D.W. 17,581
Meek, J.C. 18,588, 18,814
Mehlberg, Josephine 18,720
Meister, D. 17,718
Meixsell, L.M. 16,219
Melching, W.H. 18,673
Melikian, L. 17,697
Melton, A.W. 14,743, 18,788, 18,986
Meltzer, S.A. 18,248
Mendelson, E.S. 18,781
Metzner, J.J. 18,285, 19,148
Meyers, H.C. 4369
Michanek, E. 18,789
Michel, J.F. 18,630
Michielsen, C.E. 19,060
Mickelson, W.F. 19,150
Miehle, W. 19,246
Mikeska, E.E. 17,495
Milauckas, E.W. 5299
Miles, S. 18,792
Miller, B. 17,329
Miller, C.D. 17,883
Miller, C.O. 17,876
Miller, I. 19,214
Miller, J.G. 18,811
Miller, J.W. 18,501
Miller, R.B. 18,260, 18,770
Miller, R.D. 18,966
Miller, R.S. 18,959
Miller, S.U. 18,939
Miller, W.E. 19,217
Mills, B.J. 19,150
Mills, F.C. 17,636
Mingay, Rosemary 19,285
Minifie, F.D. 17,591
Minor, F.J. 17,806
Mitchell, Rhoda R. 18,466
Mitchell, R.T. 18,466
Mitten, L.G. 47130
Moldauer, Ann B. 18,550
Moler, C.G. 18,999
Molish, H.E. 19,207
Moncrieff, R.W. 17,620
Monroe, J.T., Jr. 17,400
Montague, W.E. 17,600
Moore, E.W. 18,785, 19,051
Moore, H.G. 18,864
Moore, O.K. 18,393
Morana, N. 18,976
Moreno, F. 17,635
Morgan, K.C. 18,285, 19,148
Morgan, K.Z. 18,386
Morgan, T.E., Jr. 17,397, 17,398, 17,648
Morin, R.E. 18,952
Moritz, H.C., Jr. 17,539
Morrill, C.S. 17,424, 17,547, 18,442
Morris, Ailene 18,462
Morris, D.B. 18,665
Morrison, J.F. 17,437
Morse, Elizabeth B. 17,765
Morse, P.M. 18,472
Morsh, J.E. 18,473
Moser, H.M. 18,630, 18,631, 18,632, 18,633, 18,634, 18,922, 18,923, 19,236, 19,237, 19,238
Moss, S.M. 18,475
Mote, F.A. 17,695
Moul, M.T. 18,858
Moyer, R.A. 18,678
Muckler, F.A. 16,749, 17,805, 18,857
Mudd, S.A. 19,105
Mueller, G.C.E. 17,793
Mueser, G.E. 16,870
Munger, M.R. 19,168
Munroe, P. 19,113
Murphy, E.A., Jr. 17,875
Murphy, W.W. 17,778
Murray, Betty L. 17,391
Murrell, K.F.H. 19,116
Myal, M.C. 18,642
Myers, J.L. 17,345
Myhill, J. 18,720

Namerow, N.S. 18,939
Nateoulas, T. 17,735
Naylor, J.C. 18,882
Neely, S.E. 17,393
Nehnevajsa, J. 17,585
Nelson, J.G. 17,647
Nelson, T.M. 17,666, 17,679, 17,690, 17,691
Nerode, A. 18,720
Neumann, H.L. 17,875
Neveril, R.B. 18,654
Neville, J.R. 19,052
Newman, A.K. 18,618
Newman, K.M. 18,862, 19,242
Newman, S.E. 17,762
Newton, J.M. 18,531
Nicholas, N.C. 17,539
Nicks, D.C. 19,122
Nielsen, A.G. 19,260
Nisbet, T.R. 19,121
Niven, J.I. 18,604, 18,645
Nixon, C.W. 17,538
Nixon, J.C. 17,798
Noble, M. 17,356
Nogee, P. 17,665
Norell, M.W. 18,654
Normand, G.H. 17,370
Norris, R.C. 18,504
North, J.D. 17,859
Northrop Aircraft, Inc. 18,099
Novotny, H.R. 18,203
Nowak, M.A. 18,915
Nunis, T.E., Jr. 18,861, 18,895, 18,896

Obermayer, R.W. 16,749, 17,805
Oberst, F.W. 19,208
O'Connell, D.N. 17,730
O'Connor, W.F. 18,735, 18,743
Oehrlein, T.F. 18,643
Ogden, E. 19,240
Ogle, K.N. 17,834
Ohio State University Research Foundation 19,235
Ohmart, J.G. 18,955
Olkin, I. 16,652
Olson, P.L. 17,418, 17,586
Orlansky, J. 17,488, 18,714
Ormiston, D.W. 18,653, 19,033
Ormond, D. 17,637
Osborn, P. 17,583
Oshanin, D.A. 17,712
Ostroumov, G. 17,566
Otis, L.S. 18,835
Over, R. 17,764
Overall, J.E. 17,763
Overton, R.K. 17,469
Owen, D.B. 18,460
Oyer, H.J. 19,237

Ozkaptan, H. 19,234

Paiewonsky, B. 16,771
Palmer, M.E. 19,151
Palmore, J., Jr. 18,479
Pangborn, Rose Marie 17,723
Panjian, J. 18,841
Panov, D.Y. 17,712
Papaloizos, A. 17,441
Paradise, N.E. 19,245
Parducci, A. 17,772, 17,773
Park, J. 17,546
Parker, J.F., Jr. 18,971
Parker, J.W. 19,261
Parks, D.L. 18,600, 18,601
Parlett, L.P. 18,428
Pask, G. 18,096
Paskusz, G. 18,836
Patterson, W.E. 17,472
Payfer, G.E. 18,685
Payne, D.E. 17,866
Payne, M.C., Jr. 17,752
Pearson, R.G. 17,717
Peed, A.C., Jr. 5269C
Perlitsh, M.J. 19,260
Perls, T.A. 17,490
Perret, E. 17,559
Perry, J.D. 17,456
Peryam, D.R. 18,976
Peter, J. 17,437
Peterson, G.E. 19,154
Pfaff, D.W. 18,585
Pfaffmann, C. 17,515
Pfeiffer, M.G. 19,216
Phillips, N.E. 17,401
Pickering, J.E. 19,034
Pickett, J.M. 18,900
Pierce, B.F. 17,252
Piercy, Mary L. 18,738, 18,945
Pierson, W.R. 17,242, 17,553
Pigg, L.D. 18,627, 18,655, 18,903
Pikler, A.G. 17,604
Pilgrim, F.J. 17,889
Pinneo, L.R. 17,782
Pitt, F.H.G. 17,840
Pitz, G.F. 18,942
Pizzuto, J.S. 17,763
Pletcher, K.E. 17,366, 17,393
Plomp, R. 17,498
Plutchik, R. 18,838
Poe, R.H. 18,887, 18,888, 18,957
Pogrund, R.S. 17,542
Pollack, I. 18,834, 18,840
Polte, J.W. 18,476
Pope, L.T. 18,837
Porteus, J.O. 17,815
Posner, J. 18,420
Posner, J.B. 18,705
Post, Birgitta 18,931
Potter, N.S. 18,252
Poulton, E.C. 17,560, 17,734
Powers, J.J. 18,866
Pratt, D.E. 17,528
Pratt, R.L. 18,716
Prentice, W.C.H. 17,527
Preston, G.W. 18,249
Pribram, K.H. 16,481
Price, C.W. 17,890
Prince, J.H. 4713E
Pritchard, B.S. 18,619
Pritchard, Joan F. 18,728, 18,729, 18,730
Proctor, C.H. 17,551
Promisel, D.M. 17,808
Pruitt, D.G. 17,767
Prysiazniuk, A.W. 18,656
Pushkar, Dolores 18,820

Quackenbush, J. 19,180

Raab, D.H. 17,346, 17,511
Rabe, Ausma 18,934
Rabideau, G.F. 18,623
Rae, J. 17,348
Rahm, W.E., Jr. 18,980, 18,981, 18,982
Rajaratnam, N. 19,291
Ramo, S. 15,354
Randall, W.C. 17,791
Randt, C.T. 18,421
Ranes, J. 19,153
Rapin, Isabelle 19,287, 19,288
Rapp, Rita M. 18,911
Rasch, P.J. 17,242
Rath, G.J. 18,197
Ratliff, F. 18,621
Ratoosh, P. 4713F
Rawson, R.O. 17,791
Ray, H.W. 17,475, 17,480, 18,524
Ray, J.T. 18,461, 18,663
Redden, R.J. 18,904
Reed, G.F. 19,284
Reed, L.E. 19,251
Reed, W.G. 18,729
Reese, E.P. 16,103, 16,104
Reese, W.G. 14,850
Reeves, J.L. 19,028
Reeves, J.T. 17,630, 16,631, 17,632
Regan, R.A. 19,239, 19,265
Reger, S.N. 19,041
Reid, J.B. 18,673
Reid, L.S. 17,758, 17,760, 17,781
Reilly, R. 17,359
Reininger, E. 18,972
Renbourn, E.T. 17,564
Renshaw, S. 4713G
Resnick, A. 17,299, 18,197
Rest, J. 18,881
Restle, F. 17,348
Rettig, S. 17,461
Revesman, S.L. 17,806
Reynolds, G.E. 17,406
Reynolds, S.R.M. 17,533
Reza, F.M. 18,394
Rheinstein, J. 19,176
Riach, Winifred J. 17,707
Richards, O.W. 18,841
Richmond, D.R. 17,528
Riehl, J.L. 17,860
Riehs, R.C. 16,460
Riesen, A.H. 18,517
Rigby, Lynn V. 19,213
Riggs, L.A. 18,621
Rigney, J.W. 18,558, 18,560, 19,165
Rimoldi, H.J.A. 17,250
Ringel, S. 19,005
Rioch, D. McK. 19,275
Riopelle, A.J. 17,510, 18,588, 18,814
Roberts, D.F. 17,308
Robinson, F.R. 18,622, 19,266
Robinson, J.E., Jr. 17,803
Robinson, W. 17,568
Robison, W.C. 19,272
Roby, T.B. 16,168, 16,198
Rockway, M.R. 19,218
Rodahl, K. 17,615
Roebuck, J.A., Jr. 17,483
Rogers, T.A. 17,409
Rohles, F.H., Jr. 17,411
Rohmann, Christabel G. 17,885
Romaine, O. 17,656
Roman, J. 17,390
Romba, J.J. 18,624
Roos, A. 17,634
Rosebrook, Wilda M. 4713H
Rosenblith, W.A. 18,897
Rosenholtz, M.J. 18,878
Rosenzweig, M.R. 17,548
Rosie, A.M. 19,132
Rosin, S. 17,821
Rosman, R.R. 17,342
Rosner, B.S. 17,743
Ross, E. 18,914
Ross, J.C. 17,618
Ross, S. 17,303
Rothery, R.W. 17,586
Roundy, R.W. 18,474
Roxburgh, H.L. 19,019, 19,092
Roy, J. 18,839
Roy, S.N. 18,839
Royal Naval Personnel Research Committee 18,612
Rubenstein, H. 18,717, 18,840
Rubin, H. 17,610

Rudin, S.A. 18,554
Rudner, R.S. 18,393
Ruff, G.E. 13,202, 17,403
Rule, E. 17,490
Runner, G.H. 18,902
Runquist, W.N. 17,765
Runyan, T.L. 19,165
Rupe, J.C. 19,009
Ryack, B.C. 18,740
Ryan, Alma P. 17,739
Ryan, F.J. 17,514
Rytov, S.M. 17,643

Sacco, M.J. 18,866
Sadacca, R. 18,598, 19,004, 19,153
Sadler, E. 17,359
Sadoff, M. 18,410, 18,846
Saibene, F. 17,642
Saito, S. 17,589
Saltin, B. 17,787, 17,788
Saltz, E. 17,707, 17,762
Sampson, H. 19,303
Sampson, P.B. 18,611
Samuel, J.A. 17,440
Sandage, C. 18,905
Sandeman, P. 17,584
Sander, E.G. 18,801
Sanders, A.F. 17,556
Sansom, Wilma 18,820
SantaMaria, L.J. 17,377
Sapirstein, L.A. 19,240
Saslow, G. 17,464
Saucer, R.T. 17,736
Saul, E.V. 18,771
Saunders, L.R. 17,896
Savage, Terry R. 17,299, 18,197
Saw, J.G. 16,608, 16,760, 16,761
Schaefer, H.J. 17,388, 18,899
Schaefer, K.E. 17,381, 19,254, 19,255
Schafer, T. 18,906
Schaie, K.W. 17,853
Schambra, P.E. 17,535
Scharf, B. 18,794, 18,795
Scheihing, F.A. 18,397
Schloredt, D.L. 18,623
Schmid, Ethel 17,354
Schmidt, C.F. 17,396
Schock, G.J.D. 17,545
Schoettlin, C.E. 18,908
Schreiber, A.L. 18,489
Schulman, A.I. 17,587, 18,977, 18,978
Schultz, D.G. 18,526, 18,605, 18,606, 19,152
Schultz, E.F., Jr. 18,921
Schuster, D.H. 19,165
Schutz, H.G. 17,475, 17,477, 17,478
Schwam, W.J. 18,403
Schwartz, A.I. 18,598
Schwartz, I. 19,252, 19,253
Schwartz, M. 18,247
Schwartz, N.F. 18,652
Schy, A.A. 18,858
Scodel, A. 15,052, 17,869, 18,809
Seaton, R. 18,976
Seeler, H.W. 18,913
Seeley, S.F. 18,920
Seidenstein, S. 17,749, 18,381
Seitz, C.P. 17,520
Sekelj, P. 19,173
Sells, S.B. 18,520, 18,625, 18,807
Senay, L.C., Jr. 18,796
Senders, J.W. 18,769
Senders, Virginia L. 3996
Serrano, J., Jr. 17,372
Severy, D.M. 17,320
Sewall, Susan T. 17,500
Shackel, B. 19,124, 19,277, 19,301
Shapley, L.S. 18,848
Sharkey, V.J. 18,765
Shaw, W.A. 17,851
Sheffey, P. Lynn 18,398
Shelanski, M.V. 18,797
Shelly, M.W. 17,701
Shenkle, W. 18,970
Shepard, R.N. 17,706
Sherman, H. 16,610
Sherman, H.L. 4713I
Sherrick, C.E., Jr. 17,601, 17,777
Shewchuk, L.A. 17,465
Shillestad, Isabel J. 18,898
Shinkman, P.G. 17,709
Shipley, Elizabeth F. 18,919
Shipley, T. 17,848
Shipstone, Eva I. 19,125
Sholiton, R.D. 18,577
Shoop, J.D. 18,640
Shortess, G.K. 17,828
Shuford, E.H. 17,355
Sibila, A.I. 16,773
Sicks, Mary E. 19,210
Siegel, A.I. 17,310, 18,525, 18,526, 18,605, 18,606, 18,804, 18,808, 19,152, 19,246
Siegel, H. 17,727
Silberman, H.F. 19,295
Silverman, R.E. 19,061
Silvern, L.C. 17,720, 19,164
Simches, S.O. 18,569
Simon, C.W. 17,467
Simon, G.B. 18,626
Simon, H.A. 17,445
Simon, J.R. 17,807
Simonsau, G.R. 17,769, 19,012
Simons, A.K. 18,667
Simons, D.G. 17,536
Simpson, W. 17,892
Simson, L.R. 17,863
Singleton, W.T. 17,312
Siple, P.A. 19,268
Sisson, R.L. 17,572
Sivertsen, Eva 19,154
Skordahl, D.M. 19,219, 19,220
Slechta, R.F. 16,604
Sleight, R.B. 18,615, 18,646, 18,802
Slivinske, A.J. 17,761
Sloan, A.W. 17,641
Sloan, Louise L. 17,844
Sloan, R.C. 19,301
Slonim, A.R. 17,625
Small, A.M., Jr. 17,499, 17,590, 17,591
Snedal, H.A. 15,394, 17,409, 17,649
Smith, A.C. 19,284
Smith, A.H. 18,934
Smith, D.D. 18,826
Smith, E.A. 18,603
Smith, M.G. 18,918
Smith, O.W. 17,363, 17,702
Smith, Patricia C. 17,363, 17,702
Smith, P.E., Jr. 17,638
Smith, P.N. 18,680
Smith, S.W. 18,467, 18,987
Smith, W.E. 16,693
Smith, W.M. 18,677
Sniverly, G.G. 17,543
Snowdon, C. 17,337
Snyder, F.W. 18,600
Snyder, R.G. 17,884
Solley, C.M. 17,692
Solomon, P. 18,496, 18,706, 18,709
Sommer, R.W. 18,707
Sosnow, M. 18,914
Soviet Review 17,567
Space Aeronautics 17,338, 17,655
Space Technology Laboratories, Inc. 18,798
Specht, R.D. 17,577
Speeth, S.D. 17,592
Spells, K.E. 19,062
Spencer, Domina E. 18,608, 18,609
Spencer, J. 17,857
Spencer, W.A. 19,161
Sperling, H.G. 17,842, 18,483
Spigel, I.M. 17,674
Spira, S.L. 19,157
Splinter, W.E. 17,622
Spong, P. 19,303

Spritz, H.H. 17,779
Standfast, Susan 19,287
Stanmeyer, W.R. 19,229, 19,260
Stapp, J.P. 18,766
Stark, J.E. 19,255
Starkey, D.G. 17,877, 18,849
Starks, T.H. 18,508
Steedman, W.C. 17,296, 17,481
Steele, J.E. 19,241
Steggerda, F.R. 17,392
Stein, M.I. 18,951, 19,010
Steinberg, C.A. 17,371
Steiner, I.D. 19,291
Steiner, S.H. 17,793
Steinhaus, A.H. 17,640
Stenson, H.H. 17,714
Stern, J.A. 17,448, 18,607
Stern, R. 18,890
Stern, R.M. 18,666
Stern, T.E. 18,253
Stevens, K.N. 17,598, 17,811
Stevens, S.S. 17,501, 17,513, 18,497
Stewart, J.L. 17,596
Stewart, M.A. 17,448, 18,607
Stewart, P.B. 17,636
Stinnett, G.W. 15,394, 17,649
Stockbridge, H.C.W. 17,564
Story, Anne W. 18,602, 19,280
Stoudt, H.W. 18,593
Strasel, H.C. 19,239
Strauss, P.G. 18,939
Strickland, J.F. 17,600
Strickland, L.E. 19,042
Strother, W.F. 18,980, 18,981, 18,982
Strydom, N.B. 17,437
Stuart, H.C. 18,790
Stubbs, R.A. 17,368
Sturr, J.F. 17,817
Sturtevant, J.V. 19,011
Suggs, C.W. 17,622
Sugiyama, S. 17,838
Sukhatme, S. 16,695
Sutherland, N.S. 18,710, 19,283
Sutterer, W.F. 18,478
Sutton, S. 19,288
Svenson, D.W. 18,558
Swan, A.G. 19,149
Swartz, W.F. 16,749, 17,805
Sweeney, E.J. 17,739
Sweeney, J.S. 18,902
Sweetland, A. 19,289
Swets, J.A. 17,500, 18,493, 18,610, 18,803, 18,941

Tagiuri, R. 18,851
Takács, L. 17,897
Tanner, W.P., Jr. 17,597, 17,605, 18,803
Tate, R.F. 16,652
Taub, H.A. 17,345
Taylor, C.L. 17,524
Taylor, C.W. 17,550
Taylor, D.W. 19,126
Taylor, F.V. 18,381, 18,762
Taylor, J.H. 18,551
Taylor, L.W., Jr. 18,417, 18,847
Taylor, M.M. 18,845
Taylor, N.B.G. 18,780
Taylor, W.L. 17,785
Teghtsoonian, Martha 17,706
Teichner, W.H. 17,359
Temple, T.R. 18,647
Tennenbaum, S. 18,720
Terwilliger, R.F. 19,281
Teuber, H.-L. 18,519
Thaler, S. 18,248
Thaler, V.H. 13,202, 17,372
Thomas, F.H. 17,843, 19,008
Thomas, P. 19,113
Thomasian, A.J. 16,732
Thomlinson, J.T. 17,732
Thompson, John I. & Company 18,648
Thompson, P.O. 17,502, 17,508
Thompson, R. 17,361
Thompson Ramo Woolridge Inc. 18,912
Thomson, K.F. 18,616
Thorgersen, H.L. 17,685
Thune, L.E. 16,854
Tiedemann, J.G. 19,219
Tillisch, J.H. 17,534
Tilton, J.R. 17,442
Tinker, M.A. 18,844
Toch, H.H. 17,676
Tolhurst, G.C. 18,536
Tolles, W.E. 17,371
Torgerson, W.S. 19,156
Torre, J.P. 18,723
Townsend, J.C. 17,757
Travis, R.C. 18,676
Treisman, M. 19,286
Trites, D.K. 17,862
Truax, S. 17,488
Truelove, A.J. 17,579
Trump, J.B. 19,109
Truxal, J.G. 16,248, 18,759
Tucker, L.R. 19,155
Tupes, E.C. 18,843
Turner, R.D. 19,211
Tursky, B. 17,730

Uhlaner, J.E. 5269B, 18,440
Ulvedal, F. 17,397, 17,398, 17,648
Underwood, B.J. 17,443
United Research Incorporated 19,057
Upton, A.C. 19,036
US Armed Services Technical Information Agency 19,212
USA Board for Aviation Accident Research 18,916, 18,917
USA Quartermaster Research & Engineering Command 18,513
USAF Ballistic Missile Division 19,118, 19,119, 19,120
USN Electronics Laboratory 19,117
USN Special Devices Center 18,679

Vallance, T.R. 18,852
van Bergeijk, W.A. 17,603
Vandenberg, S.G. 17,551
Vanderhoof, Ellen R. 17,613
Vanderplas, J.M. 17,740
Van Horn, C. 18,560
van Wely, P.A. 17,554
Varvis, C.J. 17,636
Vaughan, J.A. 18,446
Vaughan, W.S., Jr. 18,488, 18,490
Veghte, J.H. 17,628
Vendrik, A.J.H. 17,606, 17,891
Vernon, J.A. 19,130
Verriest, G. 17,845
Vetter, K. 17,790
Vickers, T.K. 19,217
Viterbi, A. 18,447
Voas, R.B. 17,482
Vogel, J. 19,255
Vokes, G.H. 17,795
Volkmann, J. 16,103, 16,104
Vomaske, R.F. 18,846
von Bekesy, G. 17,504, 18,829
von Diringshofen, H. 17,389
von Dobeln, W. 17,373
von Foerster, H. 18,096
von Haller Gilmer, B. 17,871
Voss, J.F. 17,892
Vykukal, H.C. 17,649

Wachsler, R.A. 17,307, 17,418
Wade, E.A. 16,604, 18,611, 18,666
Waern, Yvonne 17,349

Wagner, M. 17,827
Wagner, P.R. 19,019
Wagner, W.G. 18,915
Waldron, D.L. 19,050
Walk, R.D. 19,262
Walker, W.T., III. 18,277
Wallace, J.D. 17,595
Wallach, H. 17,738
Wallach, H.C. 18,806
Wallis, D. 17,440
Wallner, L.E. 18,415
Walraven, P.L. 17,832
Walsh, J.F. 18,293
Walter, R.D. 18,908
Walters, R.H. 17,387, 17,462
Wamsley, J.R. 17,865
Wand, Barbara 18,703
Wang, R.I.H. 18,799, 18,800
Wapner, S. 18,594, 18,658, 18,659, 18,684
Ward, A.A., Jr. 19,127
Ward, J.H., Jr. 18,805
Ward, W.D. 17,494, 17,505, 17,506
Ward, W.E. 18,468
Ware, W.H. 19,128
Warm, J.S. 17,681, 17,742
Warr, H.J.J. 19,301
Warren, R.M. 17,734
Wasserman, W.L. 19,169
Watanabe, S. 17,589, 17,650
Waters, L.K. 18,453
Waters, R.O. 19,035
Watson, E. 17,879
Watson, J.F. 17,376, 18,909, 18,911
Waugh, J.D. 19,263
Webb, M.G. 17,386
Webb, P. 17,628
Webb, W. 18,825
Webber, C.E. 17,347
Webber, H.E. 19,000
Weber, H.C. 18,984
Weber, J. 19,016
Webster, J.C. 17,503, 17,508, 17,801
Weeks, M.H. 19,209, 19,210
Weiner, H. 18,470
Weir, F.W. 19,208, 19,209
Weisiger, J.R. 18,920
Weiss, E.C. 18,277
Weiswurm, K. 18,907
Weisz, A. 4376
Weisz, J.D. 19,001
Welbourn, J.L. 18,910
Welch, B.E. 17,397, 17,398, 17,399, 17,648, 19,076
Welford, A.T. 19,129
Welter, N.E. 16,285
Weltman, G. 17,322
Wendt, G.R. 17,663
Wanzel, D.G. 18,578
Werner, H. 18,594, 18,659,
Werner, H., cont. 18,684
Westerfield, E.C. 17,596
Westheimer, G. 18,821
Weston, H.C. 18,822
Wever, E.G. 18,829
Weybrew, B.B. 19,207, 19,259, 19,261
Wherry, R.J., Jr. 18,453, 18,825
Whitcomb, M.A. 18,222
White, B.W. 19,294
White, R.M. 18,818
White, W.J. 18,935
Whiteside, T.C.D. 17,407
Whitmore, P.G. 19,179
Whitmore, W.F. 17,582
Whitson, W.L. 17,576
Whitten, J.B. 18,418
Whitworth, R.H. 17,800
Wholey, J.S. 19,190
Wicker, J.E. 18,595
Wieland, Betty A. 17,724
Wienke, R.E. 19,252, 19,253
Wilcott, R.C. 17,774
Wildes, Gail 17,361
Wilinski, F.T. 18,878
Wilkinson, R.T. 17,557, 17,703
Willard, T.L. 19,206
William-Olsson, W. 18,713
Williams, C. 19,032
Williams, E.M. 19,186
Williams, H.D. (Mrs.) 19,058
Williams, J.L. 18,958
Williams, S.J. 18,678
Willis, H.R. 17,489
Willis, M.P. 19,168
Wilson, J. 19,282
Wilson, R.B. 18,664
Wilson, S.G., Jr. 18,830
Wingrove, R.C. 18,419, 18,644
Winokur, G. 17,448, 18,607
Winterberg, R.P. 18,471
Wishner, R.P. 19,205
Wissler, E.H. 17,619
Wittenborn, J.R. 17,455
Wohl, J.G. 17,715, 19,166, 19,172, 19,234
Wokoun, W. 18,749
Wolbers, H.L. 17,646
Wolf, E. 18,823
Wolf, J.J. 18,525, 18,804, 18,808
Wolin, B.R. 16,482
Wolpin, M.P. 18,563
Womack, G.J. 19,049
Wood, E.H. 18,478
Wood, W.B. 19,064
Wood, W.D. 16,425, 16,796
Woodcock, A.H. 18,670
Woodhead, Muriel M. 17,611
Woodhouse, M.C. 17,555
Woods, I.A. 5269B
Woodson, W. 18,819
Woolman, M. 19,013
Woolner, R.W. 18,841
Wortz, E.C. 16,166
Wright, H.C. 18,791
Wright, H.N. 17,286
Wright, S. 18,646
Wulfeck, J.W. 18,471
Wulff, J.J. 18,261, 18,277
Wyant, G. 18,966

Yarbus, A.L. 18,597
Yarnold, K.W. 17,585
Yates, Doris C. 18,949
Yevich, P. 19,208
Yntema, D.B. 16,870
Young, R.S. 16,768
Youniss, R.P. 19,207

Zajac, J.L. 17,744, 17,755
Zajonc, R.B. 18,859
Zechman, F.W., Jr. 17,376
Zeff, J.D. 18,654
Zegers, R.T. 17,696
Zeidner, J. 18,440, 18,598, 18,827
Zeigen, R.S. 17,882
Zeleny, C.E. 17,803, 18,523, 18,990
Zeller, A.F. 17,370
Zellmer, R.W. 17,537, 19,034
Zimmer, H. 19,292
Zipf, Sheila G. 17,780
Zubek, J.P. 17,465, 18,820
Zuccoli, J.L. 17,812
Zuckerman, C.B. 19,048
Zwislocki, J.J. 17,509, 18,458, 19,047
Zymet, B.L. 18,975

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